

HUMAN
CHALLENGES
IN A CONTEXT
OF CHANGING
LANDSCAPES

BOOK OF ABSTRACTS

LANDSCAPE
ARCHAEOLOGY
CONFERENCE



LAC 2024

10-14 JUNE
ALCALÁ UNIVERSITY
SPAIN





ALCALÁ UNIVERSITY
COLEGIO DE SAN ILDEFONSO- RECTORADO

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WEB EVENT

The images appearing in this book were generated by AI based on the keywords for each session.



MESSAGE FROM THE ORGANIZING COMMITTEE



Dear participants,

Under the title 'Human challenges in a context of changing landscapes', LAC2024 attempts to explore some of the most important challenges facing Landscape Archaeology in the 21st century within the context of the following themes:

- Mobility, settlement and people: an environmental approach.
- Places, people and identity: a conceptual challenge for Landscape Studies.
- Space vs site: human dynamics in landscape.
- Cutting-edge technologies and theories: a new perspective from Landscape Archaeology.
- Knowledge transfer and local communities in Landscape Studies.
- Landscape heritage values.
- Climate change and ancient natural and human-shaped landscapes: interdisciplinary approaches.
- Landscape Archaeology: visual and virtual perceptions.
- Landscape Archaeology and Landscape Ecology.

The importance of the field of Landscape Archaeology cannot be underestimated. The discipline not only allows us to understand how past civilizations adapted and modified their landscapes, but also offers valuable lessons to help us face contemporary challenges such as climate change and the sustainable management of natural resources. In a world increasingly affected by extreme weather events, research in landscape archaeology takes on a new dimension. Understanding how past societies faced environmental challenges can inspire innovative solutions to today's problems.

We would like to stress the importance of the role of the session chairs in proposing such interesting sessions and reviewing and accepting the papers. The LAC2024 organizing and scientific committees have tried to ensure that the papers presented meet high academic standards and address relevant and urgent questions. The review carried out by the session chairs has contributed to the validity and reliability of the findings presented during the congress. This process is essential for maintaining scientific integrity and ensuring that the research is rigorous and of high quality.

We are confident that LAC2024 will be a success and we can only wish all the participants an enjoyable and productive congress.

With our warmest wishes,

The Organizing Committee



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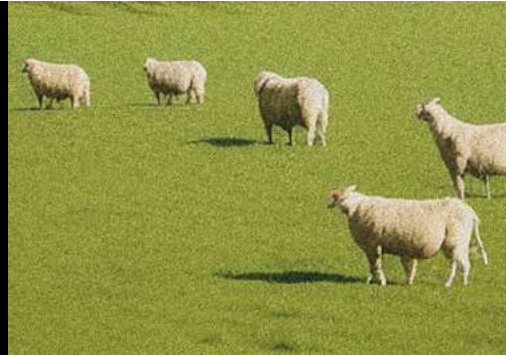
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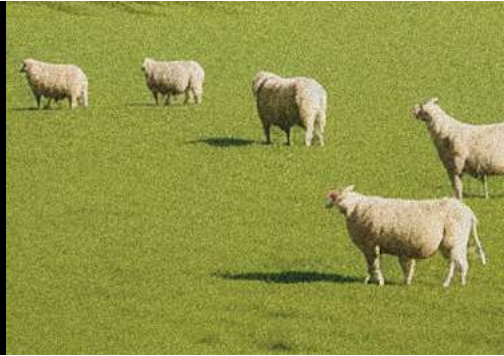
INAUGURAL
CONFERENCE I

MIKE PARKER PEARSON

Institute of Archaeology, University College London (UCL)

The Stonehenge landscape: new insights

The management strategies associated with domesticated farm animals in the past (e.g. sheep, cows, goats, pigs, horses) has taken different forms; from on the farm management, to the seasonal, year-on-year movement between pasture areas, to the daily-rote from farm to shieling, or the temporary emplacement of animals across the summer months within or out of the farm. But the extent to which these forms were dependant on particular environments has yet to be widely discussed. In exploring the landscape environment with different elements such as farm, fold and shieling locations, or through the lenses of movement to and from the pasture areas, or in terms of changes in practices of maintenance and their temporalities, this session will examine the generation and maintenance of transhumance systems across the North Atlantic region. From field survey and excavated archaeology, to scientific approaches, and to historical and archaeo-ethnographic studies, we hope this will be an inter-disciplinary session, involving specialists from across North-west Europe, Scandinavia and UK. In doing so, and from a comparative basis, we hope that a broad discussion will occur on the relationship between environment and other elements that will lead to several topic points that will explore differences and similarities in the systems of animal management, and the intersections of 'environmental' and what 'human-induced' aspects in the past from prehistory to the early modern periods.

INAUGURAL
CONFERENCE II

HELENA KIRCHNER

Universitat Autònoma de Barcelona

Building a new agrarian landscape in al-Andalus

The Arab Berber conquest of the Iberian Peninsula from 711 AD onwards brought about a profound transformation of the agricultural landscape. Extensive research on irrigated, rainfed and even drained cultivation areas, both rural and urban, allows us to describe this process of transformation in considerable detail, with significant regional variations. The so-called Islamic Green Revolution, first identified by Andrew Watson on the basis of Arabic written sources, has been associated, in the case of al-Andalus, with the spread of plants and hydraulic techniques, as well as with urban development from the 10th century onwards. However, a broader view, which seeks to identify the impact of this process on the landscape and settlement organisation, reveals that Berber and Arab peasants made technical choices determined by the different conditions of the settlement sites in al-Andalus. This selection process followed new criteria compared to the Roman and Late Antique agrarian tradition.

INAUGURAL
CONFERENCE III

PEDRO DÍAZ-DEL-RÍO

Instituto de Historia, Consejo Superior de Investigaciones Científicas

Funding Landscape Archaeology Research at the ERC

The European Research Council is the most prestigious funding agency in Europe. Its funding scheme (Starting, Consolidator, Advanced, and Synergy grants) supports excellent curiosity-driven science that is open to applicants at different career stages, from post-doctoral researchers to well-established professionals. ERC panel SH6, 'The study of the human past', has been a key factor in the transformation of the Archaeology of the 21st century. It has fostered a genuinely interdisciplinary approach to the materiality of the past and has promoted a sweeping change in the scale of observation. Between 2007 and 2022 the ERC funded 209 archaeological projects, with over 490 million euros invested in archaeological research. Understanding past landscapes has been a key part of this research, exploring the historical aspects of the climate, environment, and ecology of our human past. These aspects will be illustrated with some relevant ERC projects.

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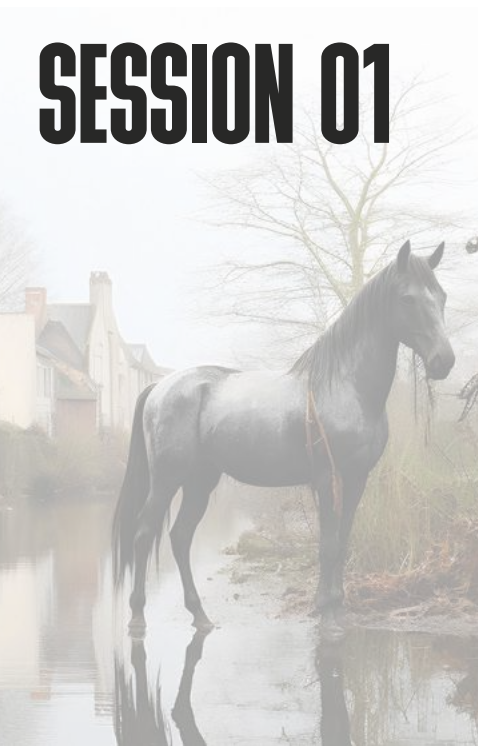
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LAC 2024

FARM, FOLD,
SHIELING:
ENVIRONMENTS,
ANIMAL
MANAGEMENT
AND THE
TRANSHUMANT
SYSTEMS IN
THE NORTH
ATLANTIC
REGION
(CLOSED
SESSION)

SESSION 01



FARM, FOLD, SHIELING: ENVIRONMENTS, ANIMAL MANAGEMENT AND THE TRANSHUMANT SYSTEMS IN THE NORTH ATLANTIC REGION (CLOSED SESSION)

SESSION ORGANIZER:

OSCAR ALDRED

University of Cambridge – session lead

ELIN ÓSK HREIÐARSDÓTTIR

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ÁRNI DANÍEL JÚLÍUSSON

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The management strategies associated with domesticated farm animals in the past (e.g. sheep, cows, goats, pigs, horses) has taken different forms; from on the farm management, to the seasonal, year-on-year movement between pasture areas, to the daily-rote from farm to shieling, or the temporary emplacement of animals across the summer months within or out of the farm. But the extent to which these forms were dependant on particular environments has yet to be widely discussed. In exploring the landscape environment with different elements such as farm, fold and shieling locations, or through the lenses of movement to and from the pasture areas, or in terms of changes in practices of maintenance and their temporalities, this session will examine the generation and maintenance of transhumance systems across the North Atlantic region. From field survey and excavated archaeology, to scientific approaches, and to historical and archaeo-ethnographic studies, we hope this will be an inter-disciplinary session, involving specialists from across North-west Europe, Scandinavia and UK. In doing so, and from a comparative basis, we hope that a broad discussion will occur on the relationship between environment and other elements that will lead to several topic points that will explore differences and similarities in the systems of animal management, and the intersections of 'environmental' and what 'human-induced' aspects in the past from prehistory to the early modern periods.



ID: 87942

Mother Oak: Medieval Transhumance in South-East England a dependency on lowland wood-pasture

ANDY MARGETTS- University College London

KEYWORDS: **shielings, transhumance, history, archaeology, Iceland**

The most important transhumance system of lowland southern England involved the seasonal movement of livestock to medieval wood-pasture commons. Wood-pastures are the product of grazing animals within historic land management regimes. They comprise a vegetation structure rather than a particular plant community and their form and ecological composition differs dependent on underlying environmental factors. Variables can include geology and climate as well as the type of grazing animals present and their stocking density in relation to available land.

In those pastures where transhumance was practised this created a co-dependent relationship, one where people and animals, and the wood-pasture itself, were reliant on a balanced arrangement. Communities and their livestock exploited the environment and in turn the characteristic vegetation structure of a wood-pasture was maintained. This situation could only persist through cyclical use as cultural grazing ground.

This paper will explore these interrelationships in areas where the bio-culture of English wood-pasture continues to be strong. In the New Forest, the Weald and the region surrounding London, medieval transhumance left a legacy in the landscape. These traces are apparent in the physical fabric of the countryside, archaeological remains and in the palaeoenvironmental record. From shielings to road networks the paper will explore south-east England's transhumance from its uncertain origins to its eventual demise.

ID: 90493

The historical development of summer farming in Iceland 900-1900 - comparing written and archaeological records

ÁRNI DANÍEL JÚLÍUSSONS- Stefansson Arctic Institute

KEYWORDS: **shielings, transhumance, history, archaeology, Iceland**

Until recently, many things have been unclear regarding the status of summer farming (transhumance, shielings) in Iceland. What is known is primarily thanks to the Norwegian/German scholar Egon Hitzler, who came to Iceland in the early of the 20th century and studied summer farming in Iceland with rare diligence and industry. His research was published in a book by the University Press in Oslo in 1979.



Hitzler's research laid the foundation for knowledge of Icelandic summer farming through detailed observations of written sources such as Árne and Pál Jarðabók, the *Diplomatarium Islandicum* and the Icelandic Sagas. He checked language usage and ethnographic sources about Icelandic shielings, and observed abandoned shielings in the field. Archeological records of the past decades have since added to the knowledge of summer farming in Iceland. In this paper, the intention is to compare the main features in the picture that Hitzler paints of the geographic distribution and frequency of Icelandic shielings and summer farming, especially in the period 1700-1730 with what frequency and distribution during the Middle Ages has been revealed in archaeological registration of shielings. The question could also be phrased in the following way: where do the written sources on summer farming stand in comparison to the archaeological sources about the distribution and frequency of shielings in Iceland, and what picture do they show? How does this picture compared to the historical development of f.ex. Norwegian summer farming?

ID: 90807

Archaeology of transhumant livestock practices in the north of the Iberian Peninsula

JOSÉ ALBERTO DELGADO ARCOS- University of Oviedo, *Pablo López Gómez*- University of Leon, *PABLO LÓPEZ GÓMEZ*- University of Leon, *MARGARITA FERNÁNDEZ MIER*- University of Oviedo

KEYWORDS: mountain Archaeology, mountain livestock, transhumance, multiscalar studies, local communities

Over the last 20 years, the LLABOR research group has carried out intensive research on the agrosilvo pastoral landscapes of the Cantabrian Mountains. Our inter-relational approach has allowed us to overcome the traditional discourses that confronted livestock and agriculture, focusing on understanding the socio-ecological mountain systems that imply a necessary complementarity between herds and crops, being more appropriate to talk about conflicts between the different types of transhumance -and the interests of the various social groups behind them-.

In this context, the high mountain pastures of the Cantabrian Mountains become multifunctional and multi-scale scenarios in which different rights of use -privative and collective- are superimposed. A complex network of social and natural relations that form part of the worldviews and identities of the livestock farming communities that still manage and inhabit these territories.

In this paper we present the main results we have obtained and the new lines of research open. This allows us to have qualitative data on the diachronic use of mountain landscapes, with the excavations of several livestock settlements associated with transhumance practices, bioarchaeological and zooarchaeological



data from domestic and farming contexts and the recent intervention of a meeting place where an important livestock fair was held since the Middle Ages.

Our intention is to focus on the investigation of livestock farming practices from the understanding of local communities and collective forms of management associated with transhumance in the valley. But without forgetting the complex bi-directional interrelationships that occur in complex mountain agro-biological systems. By promoting research on living livestock as opposed to the traditional approach centred on consumption practices.

ID: 90494

Social implications of transhumance in Iceland: A landscape perspective

GYLFI HELGASON- Institute of Archaeology, Iceland

KEYWORDS: **transhumance, Iceland, landscape, geographical information system, inequality**

This paper deals critically with the landscape settings of shielings in Iceland. Whilst our knowledge about several individual shielings, e.g. Pálstóftir in the highlands, and their significance for pre-industrial farming communities is good, we still possess poor understanding about their landscape and archaeology and their wider social implication for the society they belonged to.

Icelandic settlement consisted of individual farms, often dispersed throughout the lowlands with the mountains regions in Iceland mostly used for collecting various resources, transport, and transhumance. Field survey data from upland sites is generally of high-quality, thanks to the survivability of ruins on mountainous sites since they are often undisturbed from much of modern levelling or other development projects. This survey data, which has been gathered over 20 years in Iceland on shielings, has sadly not been explored in any great detail in Icelandic archaeology. This talk will utilise this untapped knowledge from the survey data in a geographic information system to examine their number, ruins and slope and compare them to the farms they belonged to and their farm value. By combining this excellent landscape information with historical and archaeological or chronological data, this paper seeks to provide some footings regarding to what extent the shielings were a part of the economy of high-status farms and to what degree they were a part of the agricultural system of other farms (owner-occupied or tenant farms).



ID: 89169

When the Desert Met the River: On the importance of Desert and Wadi in the late Old Kingdom

JOHN BURN- Macquarie University, Sydney, Australia

KEYWORDS: **environment, climate, ecology, resilience**

My studies have investigated the ecological changes that may have occurred at the end of the Old Kingdom because of lower than usual flood levels and uncharacteristic rainfall events. These irregularities would have affected the environmental properties of the river, changing the nutrient balance within the river and thereby, altering the characteristics of the food webs associated within it. During this time marshland resource became more important: fish and waterfowl depictions increased, and cattle became a significant factor in the resource bases. At the same time, desert animals became more habituated to human contact and representations of them became an increasingly important part in offering procession scenes at this time.

The presentation will present a summary of these findings and discuss the potential role of wadis in allowing the exploitation of cattle resources. It will present an ecological underpinning of why these phenomena may have developed and, hopefully, will expand upon the role that wadi and desert—based resources played in late Old Kingdom society.

ID: 88655

The Norwegian Shieling System - Continuity and Change in Transhumant practices in the Intersection between Humans, Environments and Landscapes

KRISTOFFER DAHLE- Møre & Romsdal County Council- NTNU University Museum

KEYWORDS: **shieling, Norway, Transhumance, Environmental Archaeology**

In Norway, the origin and development of the shieling system has been widely debated, with answers often depending on definition, emphasis or study area. Based on new investigations in Western Norway, as well as an overview of archaeological studies across the country, I am suggesting a new and refined chronology - with elements of both continuity and change.

By employing a wide range of methods, studying various material and environmental traces of humans and animals in the landscape, I am trying to step away from traditional and purely retrogressive perspectives and to provide a better understanding for how the shieling system evolved across Norway.



Focusing on the relation between transhumant sites and their location in the landscape, I am further exploring the reciprocity between humans, animals and their environments in a long-term perspective.

ID: 90654

Trans-human: human and nonhuman entanglements at shielings in Iceland

OSCAR ALDRED- University of Cambridge

KEYWORDS: **transhumance, Shieling, Human, Nonhuman, Entanglement**

In this paper, we introduce the archaeological investigations that we and colleagues have carried out as part of an Icelandic Research Fund project (2022-2024), combining archaeology, history and environmental science, examining transhumance in Iceland (called TRANSICE). We will discuss aspects of c. 20 shieling sites we have investigated in two different areas of Iceland, presenting the techniques and results, as well as the trends we have seen. One observation that has emerged from this research is that the character of archaeological investigation of transhumance is often limited in what it can say about the seasonal movements of animals and humans, or about the entire operation of transhumant systems. Rather archaeology focuses on the fixed points in the landscape. Nonetheless, shieling sites are dynamic points of convergence between human and nonhuman (trans-human) mobility and immobility, lying at the interface between faster and slower activities across different scales in the transhumant operation. In this sense, transhumance from an archaeological perspective is place-centred, as opposed to a space through which movement occurs; it is 'concentrated transhumance', intensive, as opposed to extensive. In discussing this and other observations, we will recast an understanding of Icelandic shielings, and in doing so examine the range of human and nonhuman entanglements in their contribution to furthering our understanding of transhumance.

ID: 90075

Land-use legacies of former transhumance – the case of Menstrie Glen, Scotland.

SEBASTIAN WOLFRUM- University College London

KEYWORDS: **shielings, Transhumance, Soil modification, land-use legacies, sustainability**

Whilst transhumance has been researched as a land-management system, its legacy on soil-nutrient levels had never been studied. Our project addressed this



by asking what can be learned from studying the vegetation and soil-chemistry at sites of former transhumance. Can such investigations provide information, which can help to better understand practises of past transhumance? Furthermore, can such investigations shed light on the sustainability of former transhumance?

The study was conducted in Menstrie Glen in the Ochil-hills of Scotland, which saw high-altitude summer grazing during the post-medieval period. Two former transhumance-sites were surveyed regarding present day vegetation. In addition, a chemical analysis of the soil for key plant-nutrients (N, P, K) along transects running through the shieling-sites was carried out. Our hypothesis was that the grazing of animals will have left a discernible footprint of these nutrients in the soil. Whilst the vegetation survey only produced inconclusive results, the chemical analysis of the soil revealed a clear enrichment in plant-nutrients along the transects at both sites. The maximum enrichment with nutrients was however not closest to the shieling but spread at some distance (50-100m) to it.

These findings allow a plethora of explanations. From overgrazing close to the shieling (explaining the trough of nutrients in its immediate vicinity), to an "optimum-distance"-effect, which would increase nutrient loads most in areas which are close enough to allow milking and far enough to provide enough space for the animals.

In the light of the findings I will discuss the question if environmental evidence, as presented here, could ever shed light on past sustainability, other than through current ontological lenses representing nature and culture as separate conceptual entities. I will discuss the implications of this on considerations relating to attempts in reconstructing how the transhumance-landscape would have appeared to the people inhabiting it.

ID: 89824

Shielings and their surroundings: The palaeoenvironment of two shielings in Svarfaðardalur, N-Iceland.

SNÆDÍS THORLACIUS- University of Iceland.

KEYWORDS: **transhumance, Soil, Palaeoecology, Palynology, Environmental archaeology**

In this paper, palaeoenvironmental research on two shieling sites in Svarfaðardalur, N-Iceland will be presented. Shielings used to be a common form of transhumance practised in Iceland where herders travelled from the main farm to a shieling during the summer. The island has undergone dramatic environmental change over the last millennium, therefore, the aim of the research is to improve our understanding of the environmental trajectories associated with the rise and fall of the transhumance system in Iceland and place in context with historical and archaeological information. Application of palynology, sedimentology and



tephrochronology on peat cores from these sites has yielded palaeoenvironmental data spanning from before human settlement in the late 9th century AD until early modern times. Environmental proxies for human presence aided by dated tephra layers are used to date the arrival of humans and their influence on the environment during the period of shieling activity. Grazing by sheep, previously acknowledged as a potential driver for land degradation, will be discussed in relation to shielings. Decrease and disappearance of grazing intolerant taxa are used as a proxy for increased grazing pressure, indicating shieling activity and evidence of further, rapid change in vegetation is inferred to represent the demise. Similarities and differences between the data from the two sites will be discussed and explanations proposed.

ID: 90719

Mountain landscapes and settlements between seasonality, homing practices and animal farming: an archaeological perspective to the social construction of the space. Case studies from Southern Europe (16th-21st c.)

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KEYWORDS: environmental and rural archaeology, homing practices, environmental resources management practices, husbandry

This paper aims to explore the transformation in husbandry practices in southern Europe between the 16th and the 21st c., focusing on the relationship between long-distance and short distance pastoral mobilities, in term of materialisation of social relationships. Over the last few years, husbandry has become one of the main topics in historical archaeology, and particular attention has been given to seasonal settlements, the relationships between husbandry and the multiple environmental resources management practices characterising mountain landscapes, the different forms of appropriation, negotiation and legitimation of access rights to land. In addition, environmental research has also shown animal extensive farming played a key role in the maintenance of grasslands, prairies and wooded-pastures and the animal and vegetal species that find their habitat there.



Through a multidisciplinary approach including archaeology, archaeobotany, historical ecology, archival research and oral history, our objective is to connect the seasonality of rural and pastoral practices with life cycles and homing practices, inside and outside settlements. Our aim is to reflect on the “social construction of space”, as it has been defined within micro-historical analysis. Starting from the study of seasonal settlements as spaces of social interaction and practices, the research will tackle the following topics: the changes, over time, in the relationships between seasonal, permanent settlements and spaces, and the role played in these changes by the progressive disappearing of long-distance pastoral mobilities; the historical reliability of categories such as “seasonal” or “permanent”; the role of environmental resources management practices in the social life of local collectivities and how it changes through time (and the environmental and social effects of these changes or their disappearing altogether); the historical complexity of the concept of sustainability with the inextricability of economic, environmental and social dimensions.



LAC 2024

SURVEYING
THROUGH
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SESSION 02



SURVEYING THROUGH CHANGING LANDSCAPES

SESSION ORGANIZER:

*MIGUEL ALMEIDA**THIERRY AUBRY**JOSÉ ANTONIO LÓPEZ-SÁEZ*

Following the discovery of the Côa Valley rock art engravings, a successful surveying and excavation program was implemented since 1996 to produce a relevant archaeological context for this art, interpreted as Palaeolithic, leading to the discovery of such crucial sites as Cardina and Fariseu.

Nonetheless, the obvious relation with Siega Verde and the early discovery of the Olga Grande sites, located in the margin of the interfluvial plateau quickly raised the question of the Pleistocene human occupation of the vast territory between the Côa and Águeda valleys.

An exploratory theoretical model based on the palaeolithic groups' dependency on water, protein, vegetables, wood, lithic resources, safety, visibility, and accessibility served as a base for the first test of a systematic surveying project in the CAT (Côa-Águeda Territory). Although struggling with a very scarce knowledge of the territory's palaeogeographic and palaeoenvironmental evolution, due to (1) a lack of multidisciplinary research and (2) the accelerated artificialization of the landscape and hydrological network, derived from human activity and climate change, this survey produced numerous new prehistoric sites, paving the way for the test excavation of several plateau sites as a complement for the previously known archaeological record from the valley.

The first excavated site, Picões dos Grilos 4, revealed unexpected results: while the surface survey had produced a prolific series of lithic objects, including in quartzite and silex, indicating the presence of an upper Palaeolithic site, the excavation exposed, 1 meter below the surface, an apparently discrete archaeological layer exclusively composed of quartz cores and implements technologically consistent with other regional known Middle Palaeolithic sites.



These results encourage us to change the focus of the next field research from classic surface surveys to the direct search for suitable buried Pleistocene archaeological deposits, thus increasing the urgency of a thorough reconstitution of the region's evolution since MIS-5, including:

- A Paleoenvironmental reconstitution allowing us to understand the structure of the human occupation requisites described above; and
- A Paleogeographic reconstitution aiming to identify the geographical distribution of these criteria through an evolving territory.

This Côa experience serves as a basis to open the methodological discussion about new insights into improved archaeological surveying projects deeply dependent on paleoenvironmental studies and Landscape Archaeology.

Contributions are expected to focus on:

1. Surveying projects supported by innovative multidisciplinary studies of the territory.
2. Paleogeographic and paleoenvironmental reconstructions leading to Landscape Archaeology projects.
Regional and palethnological synthesis dealing with landscape intense modifications due to increased human artificialization of the landscape and climate change



ID: 89979

Looking for new lakeside settlements. Geomorphological and paleoenvironmental reconstruction of the western shore of Lake Banyoles (NE Iberia).

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KEYWORDS: lakeside settlements, Late Prehistory, Geoarchaeology, Lake Banyoles, Environmental archaeology

Previous paleoecological research in Lake Banyoles revealed evidence of anthropogenic impacts during the Late Prehistory in the western shore of the lake. Firstly, during the early Neolithic (ca. 7000-6000 cal BP), evidence of deforestation and soil-erosion episodes were attested. In a second stage, during the Late Neolithic (ca. 5200-4000 cal BP), stronger evidence of human impacts at local scale involved burning practices and cultivation of cereals. In 2022-2023, fieldworks seasons were focused on the extraction of drilling cores in a wide area along the western shore of Lake Banyoles. The main aim of this new study is to reconstruct the geomorphological evolution of this area along the Holocene and to identify areas with archaeological potential in relation to Late Prehistory occupations.

This methodological approach involves core drilling (7 new cores) following N-S and E-W transects, sedimentological description, radiocarbon dating, loss on ignition analysis and pollen analysis. Sedimentary cores provided information about lake level fluctuation over the past 11000 years and pollen and non-pollen palynomorphs data was useful to reconstruct local environmental conditions and attest evidence of anthropogenic impacts. In that sense, the combination of Cerealia-type pollen, spores of coprophilous fungi and layers of charcoal was interpreted as strong anthropogenic indicators.

The results show how Lake Banyoles occupied a wider surface at the onset of the Holocene and, progressively, the lakeshore regressed, specially from 9.0-8.0 kyr cal BP onwards, in relation to global cooling episodes. During the Middle Holocene, wetlands prevailed in this area, with phases of higher wetness and phases of peaty sub-aerial conditions. In the transition to the Late Holocene, important sedimentological changes occur, with the input of terrigenous clays and fluvial silty and sandy sediments, showing how this western shore of Lake Banyoles became a floodplain influenced by Castellar and Morgat streams.



ID: 89694

25

Human Occupation: analysis of archaeological sites in western Algarve through GIS

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KEYWORDS: Archeology heritage, western Algarve, Surveying; GIS (Geographic Information System), Science Tourism

Archaeology plays a crucial role in both cultural and scientific tourism, offering insights into the past and the evolution of human societies within their environments. The western Algarve is a region of excellence for the development of cultural and scientific tourism. With a rich history and diversity of ecosystems that allowed human occupation since Prehistoric times. This cultural richness is evidenced by the numerous archaeological sites scattered throughout the region, which include, for example, megalithic monuments, Roman villae and medieval castles. Currently, 502 archaeological sites have been inventoried, covering chronologies from Prehistory to the Contemporary Period.

To achieve a better understanding of the different types of archaeological sites, an archaeological chart was created for the western Algarve area using GIS (Geographic Information System). Initially, a database was compiled with information on the archaeological sites, which was then inserted into a GIS environment along with the relevant cartography.

As part of the SciTour project, eight archaeological sites were selected based on a combination of scientific and touristic criteria, such as chronology, location, and accessibility, making them ideal for inclusion in the tour route.

This presentation will highlight outcomes related to (1) the importance of the selected archaeological sites, namely their state of protection and preservation; (2) and contribute to the requalification of the Algarve archaeological heritage and its direct access by the public, thus conferring the potential for tourist development of the region.

ID: 90591

The Dacian fortress of Ardeu (Hunedoara County, Romania) between archaeological landscape and landscape archeology

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KEYWORDS: landscape modeling, protohistory (iron age), archaeological landscape, landscape archaeology



The Dacian fortress of Ardeu is one of the most intensively studied Dacian fortifications of recent decades, in southwestern Transylvania, Romania. The site includes "Cetățuie" Hill, the lands at its base to the south, on one side and the other of "Apa Ardeului" river, as well as a series of terraces, among which a plateau located on the eastern side stands out. The research covered all areas with human activity. The image resulting from the research reflects the way the landscape was shaped by the communities that inhabited the site. The most consistent habitation dates from the period of the Dacian kingdom, but we also have evidence from other historical periods (from the Eneolithic to the Middle Ages).

The landscape is mountainous with a dense distribution of archaeological sites, thanks to the rich resources of raw materials but also to the access and communication routes between the Mureșului Valley and the Apuseni Mountains. Our study focuses on how the inhabitants exploited the landscape, adapting it to the needs and customs of the society of the 1st century BC - 1st century AD

ID: 92204

Archaeological surveying isn't skin deep

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KEYWORDS: **Archaeological survey, Method, Geophysics, Soil sampling, palaeogeography**

Designed to provide material context to the recently found open-air rock-art engravings, the Côa archaeological survey and excavations program implemented in 1996-98 immediately faced the significant topographic and ecological diversity of the vast territory extending to the Águeda river, where Siega Verde's rock-art had already been discovered.

Following the identification and excavation of the main sites in the Côa alluvial terraces, the first proof of human occupation of the Côa/Águeda interfluvial came in 1997, at Olga Grande, thus encouraging further efforts to find human groups in this plateau, archaeologically very promising, but where the Pleistocene landscape remains mostly unknown.

A recent survey project focusing on the Côa/Águeda territory targeted the palaeolithic groups' dependency on water, food, mineral resources, thermal comfort, safety, and mobility.

Although the transference of this theoretical model to the field solely relied on the analysis of thematic cartography, satellite imagery, and 3d models of the contemporary landscape, two fundamental results emerged from this survey program:

The abundant surface evidence and multiple potential sites identified demonstrate the frequency of the Pleistocene hunter-gatherers' presence in the plateau.

Further developments of this survey program require increased knowledge of the regions' paleogeographic and paleoenvironmental Pleistocene evolution.



Moreover, the excavation of Picões dos Grilos 4 produced no stratified layers correlative to the Upper Palaeolithic artefacts recovered in surface surveys, but a surprising Middle Palaeolithic level buried 1 meter deep, thus confirming the need for a strategic and methodological change:

Strategy: Search sedimentary deposits with archaeological potential rather than direct physical archaeological remains.

Method: Cartographic preparation, 3d digital twins, and satellite imagery integration, followed by field-walking complemented with touch probe, intensive coring, Geophysics, and Archaeological tests.

The persistent limited knowledge of the past Geography and Environment of the Côa/Águeda Territory seriously hinders the expected efficiency of this methodological change.

ID: 90011

En route to a pollinic framework of the Côa Valley: state-of-the-art and perspectives

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KEYWORDS: **Pollen, Côa Valley, Paleoenvironment, Pleistocene, Holocene**

The discovery of open-air rock art panels and correlative archaeological sites in the Côa Valley since 1991 testifies to the presence of human groups during the Pleistocene and Holocene in this region. Palaeolithic hunter-gatherers explored the territory as early as 155 ka.

The relationship between these communities and their environment has been inquired through raw material sourcing, site formation analysis, and geomorphological studies of the territory. However, the interpretation of ecological relationships and climatic fluctuations still lacks the fundamental contextual input of a comprehensive paleoenvironmental framework, requiring new data concerning vegetation association, growth, and dynamics in order to reconstruct the past landscapes and climatic evolution, and thus contribute to better understand how hunter-gatherers dwelled in the territory.

As this lack of consequent environmental data presently represents one of the most urgent needs for the development of the ongoing research about the valley's hunter-gatherer communities, efforts of paleoenvironmental reconstruction in the Côa region have been mostly oriented towards other complementary/indirect methods, such as micromorphology, grain size analysis, and clay mineralogy, based on data recovered from archaeological excavations at sites such as Cardina Salto do Boi, Fariseu and Olga Grande 4 and 14.

Although pollen analysis sampling has been conducted in geographic areas contiguous to the Côa Valley, a substantial pollinic dataset is yet to be found and explored within it.



Here we review the environmental studies and information concerning the Pleistocene and Holocene available for the Còa Valley, evaluate their need in relation to the scientific investigation being developed there and present some preliminary work for locating and sampling deposits for pollen analysis.

ID: 90781

Exploring prehistoric waterscape in Maremma district (Central Italy): a focus on archaeological survey in the Talamone area

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KEYWORDS: prehistoric landscape, waterscape, archaeological survey, lithic artefacts, Maremma district

Liminal areas in wetland environment constitute challenging contexts to investigate landscapes -waterscapes relationship during prehistoric peopling process. The contribution presents some issues related to the archaeological field survey activities carried out in recent years by the Prehistory Unit of the DSSBC – Siena University in the territory of the Maremma Regional Park (Grosseto District, central Italy). The investigations are part of the broader research project “Prehistoric landscapes in the Maremma Regional Park: field survey and GIS analysis of evidence from the prehistoric era” (PRM 2020-2025) and in this paper we are focussing on the reclamation area of Talamone which represent a very dynamic context. A detailed study of the lithic artefacts is used as a key to explore the settlement strategies occurred on the edges of the wetland zone. The results of the study are particularly stimulating because they testify to a long frequentation of these areas not only in the recent phases of Prehistory but also in more ancient periods dating back to the Middle Palaeolithic. The analyses of prehistoric artefacts related to landscape features offers new insights in the interpretation of this dynamic environment. Ancient shores, investigated also through remote sensing analysis, testify the importance of these relict morphologies and liminal features in the understanding of settlement strategies in wetland prehistoric landscape.



ID: 90256

A Roman spa under time: archaeological research on topographical changes, reoccupation and the increasing anthropization around a mineral spring (Termas de São Vicente, Penafiel, Portugal)

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KEYWORDS: Roman spas, Landscape anthropization, Remote sensing, Geophysics, 3d modelling

Archaeological research and survey projects face increasing artificialization of the earth's surface and soils due to agriculture, forestation, roads, and other anthropic impacts on the landscape.

Because of the obvious similarities between roman and later criteria for location, continued intense reoccupation represents a huge challenge in Roman Archaeology: persistent urbanization imposes considerable anthropic destruction on the original roman structures, layers, and archaeological remains. Whenever such later occupation of the roman sites persisted until the 20th century, the risks of destruction increase exponentially. Moreover, an additional difficulty specifically affects surveying projects: access! The urban land-use restricts (when it doesn't completely prevent!) any classic surface archaeological survey strategies, let alone intrusive tests.

The case of the Termas de São Vicente site (Penafiel, Portugal) is paradigmatic: the roman baths complex, completely excavated in 1901 by J. Fortes, has been since preserved in a restricted enclosed area, in the private park of the contemporary SPA, c. 3 meters below the current ground level. In this type of sites, the economic and medicinal interest of thermal water sources justifies the persistent reoccupation, thus causing parasitic stratigraphic degradations, topographic changes, and overall increasing landscape artificialization

Recently, the São Vicente site was partially re-excavated (BALNEO-SAO VICENTE project - 2021/23), in order to reassess the original spatial organization and use of the building. However, the altimetric relation of the roman structures (buried meters under the contemporary SPA building) and the surrounding thermal waters water table causes the uncovered structures to be recurrently flooded and covered by thick mud layers, rendering any archaeological work extremely difficult.

To overcome these difficulties, a multidisciplinary remote sensing program was designed, using a combination of Geophysics and Geomatics techniques to recover information concerning the functionality of some rooms, the characteristics of underlying infrastructures, and the possible existence of additional, unknown buried structures.



ID: 89743

A mining landscape crossed by water: the hydraulic network of Las Médulas and the construction of the cultural landscape (León, Spain)

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KEYWORDS: Roman gold mining, water systems, geo-archaeology, paleoenvironment, remote sensing

The essence of the landscape is the coexistence of “natural” and “human” and the changes in their relationship over time. When archaeological methodology is applied, space and time can be simultaneously read in landscape. This requires a wide range of techniques and methods, when coordinated multiply the possibilities of historically understanding landscape. All of this also implies producing valuable information to manage its future, considering its heritage values as assets for planning and using the territory, above all for its inhabitants, but also for visitors.

Las Médulas is an exceptional cultural landscape and that justified its recognition as World Heritage. Beyond its spectacular nature (as the largest open-cast gold mine under the domain of Rome and reflection of imperial interests), one of its main values is its integrity and the capacity to synthesize the multiple aspects that built and build it as landscape: the mines, the associated hydraulic network, the ancient settlement, the anthropization of the environment, its historical configuration as a rural landscape... Research on its hydraulic network constitutes an exceptional example of this:

- It involved the transformation of a huge territory.
- It involved topographical alterations, the incorporation of artificial elements and deforestation.
- It is an excellent example of how human work alters natural conditions, generating constant changes.

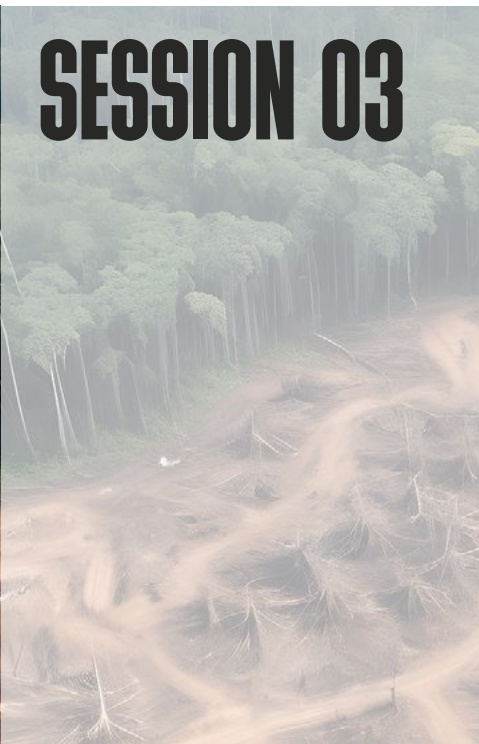
In this communication we propose to present how the research has been approached and the main results, highlighting that the combination of remote sensing, field survey, selective and minimally intrusive sondages and geoarchaeological and paleoenvironmental analysis has been crucial.



LAC 2024

ECOLOGY AND
ARCHAEOLOGY
OF FOREST
LAND USE
LEGACIES:
CHARCOAL
ANALYSIS AS
ANALYTICAL
TOOLS OF
HUMAN-
INDUCED
CHANGES

SESSION 03



ECOLOGY AND ARCHAEOLOGY OF FOREST LAND USE LEGACIES: CHARCOAL ANALYSIS AS ANALYTICAL TOOLS OF HUMAN-INDUCED CHANGES

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The important role of social factors in shaping surface, structure, and composition of forests, through economic activities, policies, and demographic changes, is well-known by ecological research and topic of debate for the future governance of forest areas subject to the current mix of strong anthropogenic and climatic pressures. However, the socio-economic factors that led to changes in forest land use over time are rarely explored, especially for pre-industrial ages. The favourite tool of (palaeo) ecology is unequivocally the biostratigraphic pollen analysis, high-resolution research allowing the phytosociological reading of the land cover over long diachrony, exploring the role of climate or anthropogenic impact in the recorded changes, from marine, lacustrine or peat cores. Nevertheless, the deterministic approach and the formulating simplistic causal relationships in pollen studies have been pointed out, due to time and spatial scales where the local complexities of human-induced changes are inevitably smoothed.

Instead, discerning the relative importance of climatic factors and the role of human action in the transformation of forest landscapes is essential to identify what, who and when produced those environmental changes that shaped the structure, organisation, management, and economy of forest land use. A more 'consilience' approach with anthropological sciences is continually demanded, involving historians, archaeologists and palaeoecologists working together with instrumental, documentary, archaeological and palaeoenvironmental documentation, in order to integrate social and environmental factors and produce a holistic narrative.

A tool between palaeoecology and archaeology is charcoal analysis (anthracology), defined as the study of wood fuel remains derived from archaeological sites. Charcoal is of high interest due to its widespread use and provides insights into the use of wood by people in all archaeological situations. Anthracological assemblages therefore represent the material residues of human-forest interactions and, being of essentially anthropogenic production and dispersal, investigate the complexity of palaeoecological and cultural signals in the archaeological remains of a community. If the forest is an integrated space in community life, it is inside the community spaces that traces of this integration are preserved. Anthracology provides a unique set of analytical tools disentangling the various phases of the complex relationships between vegetation, climatic conditions and forest management and land use in the past.



This session aims to collect contributions of charcoal analysis conducted in archaeological sites or off-site areas with associated and determined human frequentation. Case studies may focus 1. on the reconstruction and composition of past forest land cover and its changes over time; 2. on the ecological, growth and habitat conditions of the collected fuelwood; 3. on the use and function of fuelwood; 4. on cultivation practices, forms, and management. Data discussion is recommended including forest land use in pre-industrial times with the perspective of ecology and silviculture and the depth of socio-cultural analysis of sources from archaeological settlements. The main objective is to argue about charcoal analysis as a science-driven approach for integrating socioeconomic and palaeoecological data to explore forest land use legacies.

ID: 89881

The exploitation of forest environment at the Roman site of Sepino (Molise, Italy): the role of anthracological analyses

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KEYWORDS: Laboratory of Archaeobotany and Palaeoecology Department of Cultural Heritage University of Salento (Lecce, Italy)

Saepinum is an important archaeological site located in Molise, where the most significant structures and buildings of the ancient Roman city are still preserved today. This contribution will show the first results of the anthracological analyses on the sampling carried out during the recent archaeological investigations of the Roman temple, the ancient cloaca and a domus. The site is located in an articulate environmental context, in close contact with the valley area of the Tammaro river and with the eastern zone of the Matese mountain system, areas continuously exploited by human both for the procurement of wooden resources and for the agricultural production. The ancient sources talk about an erosive process of the forest cover that began in Roman times and continued in the following centuries with the tendency, for a long period, to cultivate all potentially arable lands, even the most difficult ones. The first anthracological data help to understand the possible changes in the woodland coenoses between the Roman period and Late Antique and also allow us to get a series of information on the methods of selecting wood fuel in relation to the functional and contextual aspects within different areas of the site. Finally, the results obtained were compared with the conservative aspects of the current environment to define in detail the dynamics of variation in forest vegetation and the modalities of the anthropic impact on the territory.



ID: 90175

First results of the comparative analysis of human impact on the vegetation of the small islands around Sicily (SILVA)

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KEYWORDS: **anthracology, islands, insular landscape, stable isotopes, woody plants**

SILVA (Sicilian small Islands Vegetation After human arrival) is an ongoing MSCA-COFUND RSTAIR project. The aim of the investigation is to understand human-vegetation dynamics in some of the small ($5 > 70$ sq km) islands around Sicily, in particular Ustica, Pantelleria, Lampedusa and the Aeolian archipelago, since their first human occupation. We believe that small islands are significant case studies to understand how the communities of the past have adapted to the available local woody resources and what kind of strategies they can have adopted along the millennia of occupation under the pressure of the human exploitation and climatic changes. Woody plants are an irreplaceable resource for the daily activities of human communities, especially to produce fuel and for architectural purposes. We analyzed the anthracological data coming from some of the archaeological sites spanning from the Neolithic to the Roman Empire age, to reveal what species and associations were present in the past. We detected if and how the catchment changed through time and what has been the status of these species in the pre-industrial and current vegetation of these islands. The preliminary results point to a potential change in the catchment of species throughout the Bronze Age on Pantelleria island, possibly to adapt to a climatic shift, differently from the Aeolian archipelago where the exploitation does not look affected in the same period. We also present the first data from the analysis of carbon stable isotopes on modern and archaeological samples of Maritime (*Pinus pinaster*) and Aleppo (*Pinus halepensis*) pines to investigate the changes in the rainfall regimes correlate them with the demographic dynamics and the management of the forests.

ID: 90733

Fire is a tool. Slash and burn, flaming and the fate of the charred material

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KEYWORDS: **Slash and burn, pasture burning, regeneration of vegetation and soil, charcoal taphonomy, model for fire economy.**

Two test and monitoring sites in SW-Germany (Forchtenberg) and Leghia (NW-Romania) furnish insights to the regeneration modes after fire in forests and open land. It includes experiments on slash and burn in a deciduous forest (Forchtenberg), monitoring in a conifer forest as well as pasture burning (Leghia). We could document the autonomous co- evolution of vegetation and soil over two decades. It was done by transects and mapping as well as by soil analysis and micromorphology. The role of soil animals for the weathering of charcoals became evident. The evolution of vegetation and soil after a wildfire could be studied on the Leghia-site and compared with the Forchtenberg results. As the Leghia site was not cleared after the fire, it enabled us to follow the stages of decay and of regeneration, where conifers do not play a role. Moreover, we could investigate the effects of grass- and pasture fire, still active in the region. It also evidenced the necessary differentiation of charred material into wood- and grass coal. The indicator values of topsoil/soil surfaces are discussed as well as those of charred material for the regeneration stages. A new and threefold model for the slash-and-burn-and pasture economy will be presented. Finally, we will discuss the fire risk in deciduous forests under a changing climate.

ID: 90642

Exploitation of wood and its environmental context during Roman times in western Iberia

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KEYWORDS: **Charcoal analysis, Roman Period, Lusitania, Palaeoecology, Landscape**

Palaeoecological studies throughout the Mediterranean basin and the central-northern Europe suggest the Roman period was a time of deep landscape



changes. Archaeological investigation tallies these assumptions demonstrating the development of a wide road network, new settlements, cities and a variety of farms with new crops, agricultural techniques and facilities which surely implied a further level of landscape transformation.

The combined use of palynology and anthracology may provide crucial information on this matter. In fact, pollen analyses in articulation with archaeological studies provide good evidence for regional trends in vegetation history and its relation with broad environmental and human factors. On the other hand, archaeological charcoal gives valuable information on the use of wood for different domestic purposes while providing some, although sometimes ambiguous, local palaeoecological data.

This presentation will provide a synthesis of the anthracological data for the Roman province of Lusitania, in Hispania, including unpublished data gathered in the scope of the B-ROMAN project. The selection of wood for different purposes will be addressed as well as the landscape impact of the exploitation of wood resources, in an integrated approach which will include available palynological and archaeological records.

ID: 89604

An approach from charcoal analysis in geoarchaeological records to holocene vegetation dynamics in the semiarid lands of the central ebro basin (ne Spain)

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KEYWORDS: semiarid Mediterranean landscape, Middle-Late Holocene, central Ebro basin, human-induced changes, anthracology.

Open-air archaeological sites in semiarid lands are overly infrequent causing a severe bias for the understanding of human settlement patterns. In the central Ebro basin (NE Spain) charcoal analysis conducted in off-site areas affected by recurrent human frequentation appear as adequate tools to understand climate-biased and human-induced vegetation dynamics. In this work we present the study case of Jubierre (Los Monegros, NE Iberia) in the framework of a multidisciplinary project including archaeology, geomorphology and palaeobotany. An intense local-scale deforestation of woodlands would take place during the second part of the Holocene, inducing soil erosion episodes and ending in a degraded landscape with scarcely fertile and often bare soils. Charred plant macro-remains recovered from the slope deposits of isolated buttes and residual reliefs (tozales) have allowed the radiocarbon dating of the sequence and botanical identification. First results suggest the existence of 3 different phases in relation to human settlement in the region. The first phase (ca. 7000-5000 cal BP) corresponds with a clear dominance of junipers at a local-scale that probably corresponds with the pioneer forests which starred the postglacial forest reconquest. The second phase is revealing a



local-scale retreat of junipers in parallel to the advance of Aleppo pine forests that could be related to the increase in anthropogenic disturbance in the area, during the Bronze Age (ca. 3500 cal BP). The last phase starts after an important data gap influenced by the human abandonment of Jubierre during Medieval Age. Wood charcoal data are revealing the disappearance of the pine forests in parallel to the recovery of the juniper open landscapes probably due to depletion of lands.

ID: 90712

Habitat and woodland use in the Tyrrhenian coastal plain of Tuscany (central Italy) from Roman to Medieval times

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KEYWORDS: **Archaeo-anthracology; Mediterranean oak forest; human impact; cultural landscape**

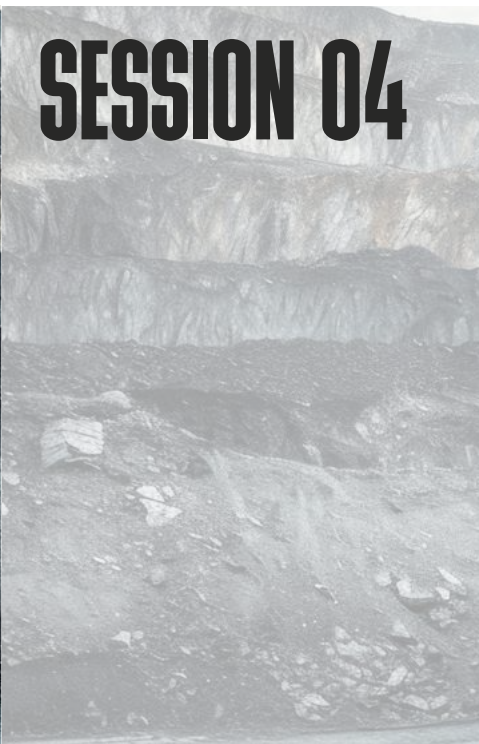
Charcoal analysis, carried out at the archaeological sites of Populonia and Carlappiano in the lower reaches of the Cornia river valley (Tyrrhenian southern Tuscany, Italy), has revealed the exploitation, management and ecology of the forest cover during the Roman and Medieval periods. In this region of the central Mediterranean, well studied by palaeoenvironmental and archaeological research and historical cartography, the timber and fuelwood supply area during the Roman period was characterised by *Q. ilex* with several sclerophyllous shrubs. However, deciduous *Quercus* characterised the forest cover of the seashore in the Cornia river valley throughout the Roman period, as well as on the first inland slopes, as indicated by local pollen sequences. The use and development of evergreen vegetation resources were limited to areas of settlement influence. In fact, in medieval Carlappiano there was more firewood from mixed deciduous *Quercus* forests, with a marked thermophilous component (*Fraxinus ornus*, *Ostrya carpinifolia*, *Erica* and *Q. ilex*), which competed and colonised open habitats and lightly wooded areas as a result of forest exploitation. Despite the episodes that locally affected the vegetation, the wood resource in the Cornia valley remained widespread, both in space and in time. In 1821 (according to the maps of the Leopoldine Cadastre) in the area of Carlappiano there were coppices and pastures under oak trees, as well as open pastures with spontaneous herbaceous vegetation. Since ancient times, forest management has allowed a balanced use of wood resources, initiating a tradition of forest use and marking the evolution of a cultural landscape that still characterises central Tyrrhenian Italy.



LAC 2024

ALL WATCHED
OVER BY
MACHINES OF
LOVING GRACE.
CHALLENGES
AND
OPPORTUNITIES
IN THE
APPLICATION
OF MACHINE
LEARNING IN
LANDSCAPE
ARCHAEOLOGY.

SESSION 04



ALL WATCHED OVER BY MACHINES OF LOVING GRACE - CHALLENGES AND OPPORTUNITIES IN THE APPLICATION OF MACHINE LEARNING IN LANDSCAPE ARCHAEOLOGY.

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Airborne Laser Scanning (ALS)/Lidar together with other remote sensing data has the ability to document and reveal the remains of archaeological features in the landscape, such as ancient settlements, roads, or structures. Machine learning, a branch of artificial intelligence (AI), is dedicated to the creation of algorithms and statistical models that enable computer systems to acquire knowledge from data and subsequently make predictions or decisions based on this trained knowledge.

Machine learning models (MLM) can be a valuable tool in landscape archaeology by assisting in the analysis and interpretation of archaeological landscape data and help detect and identify archaeological sites and features. Through the analysis of remote sensing data, subtle earthwork features can be detected and classified in topographic data and subsurface archaeology features can be identified through the automatic identification of crop marks in aerial imagery.

In the development of efficient and successful machine learning models and tools for the analysis of landscape archaeology data, both the software designers and users are required to make many considerations as they progress through the MLM processing and analysis pipeline. Areas of focus include:

- Data Quality - Topographic data often comes from a variety of sources with varying degrees of accuracy. How can we ensure that both high-quality and consistent data is used to accurately train and implement models?



- Data Processing – What are the best approaches to preprocessing and visualising lidar in the training and development of MLMs and deep learning methods? Which approaches are the most successful and what considerations are required in their application?
- MLM Development - Should we use the same kind MLM and deep learning methods for all kinds of landscapes or do we need to adjust our approach depending upon the overall landscape form and what kind of sites we are searching for?
- Reusing MLM - What are the issues in the transfer application of MLM developed in different regions, do domain adaptations issues occur and what strategies can be employed to overcome this?
- MLM Evaluation - What is the level of false positives are being observed by current MLM tools and what are some of the reasons they are appearing in the results? How, detections still require human verification. What are strategies for designing an efficient workflow for this, especially when dealing with large numbers of detections and how can additional geospatial information support this?
- Software - What software tools are being, and should be developed which will enable landscape archaeologists to access MLM in their landscape research? How should software tools be integrated within current workflows and what should be the standard outputs?
- Open Software & Data - How do we make MLM software tools open for further development by experienced users whilst ensuring novice users are not confused? How can we make the analysis/classification of (archaeological) remote sensing data using semi-automated workflows FAIR and sustainable?

This session will explore these and many other aspects of the development and application of MLM in the research and analysis of archaeological landscapes.



ID: 90067

The changing lived-in landscape between the Copper and Bronze Ages in south-eastern Italy through the lens of machine learning

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KEYWORDS: **Copper Age, Bronze Age, MaxEnt, Machine Learning, human-environment interactions**

The emergence of the productive economy deeply reshaped the ways through which humans interacted with the environment, increasing the impact of anthropogenic agents on soils, vegetation, and even some landforms. The multiple trajectories of change in social organisation, coupled with the branching paths of increasing social complexity, have resulted in a diverse framework of interactions between prehistoric communities and their surrounding landscapes.

In recent years, machine learning methods have significantly expanded our capabilities to reconstruct and explore diverse scenarios of human behaviours in the landscape. These methods also enable the investigation of biases affecting the archaeological record and the challenging of territorial data uncertainty. On this subject, the possibility of modelling the suitability of diverse environmental niches for agricultural practices of prehistoric communities, by combining changeable and unchangeable environmental factors, opens the way for reconstructing the specific locations to which prehistoric communities were tied from a completely innovative methodological perspective.

The period encompassing the Copper Age (4th – 3rd millennia BCE) and the Bronze Age (2nd millennium BCE) of southeastern Italy provide key case studies for exploring the transformations of human interactions with the surrounding landscape driven by changes in productive economic practices. In fact, during this period, a progressive emergence of differentiated settlement patterns occurred across diverse ecological niches, ranging from the development of long-lasting settlements (e.g., Coppa Nevigata) to the persistence of small and dispersed hamlets, along with the occurrence of seasonal sites. These changes were also accompanied by an increase in the social complexity of some communities.

This presentation aims to offer an overview of the methodology and main outcomes of a new research effort aimed at reconstructing the connections between humans and places in a long-term perspective using the ecoinformatic MaxEnt modelling technique, with a specific emphasis on modelling locations potentially linked to agricultural practices.



ID: 90732

Are we there yet? Desiderata to bridge the gap between FAIR principles to FAIR practices in archaeological remote sensing

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KEYWORDS: **archaeological remote sensing, semi-automated analysis, archeo-geophysics, FAIR, sustainable workflows**

This shows that there is a long way to go in the implementation of the FAIR (Findable, Accessible, Interoperable and Reusable, Wilkinson et al. 2016) principles and the sustainability of research output. This is a clear deceleration of and declaration for research: lacking code, data, open workflows and best practices, researchers spend much time understanding and reconstructing existing models and workflows, sometimes even giving up, often starting from scratch, which has led to a multitude of custom solutions and a lack of transferability and generalisation ('reproducibility crisis'). These are symptoms of the lack of broadly used research standards (Barton et al. 2022). These might exist on local, regional and even international scales, but their implementation often depends on financing and politics, but also on coordination and infrastructure. For long, the significance of spatial data standards was not recognised in archaeology, which constituted a barrier to sustainable solutions for the future of research data and also for research itself (McKeague et al. 2019). Archaeological remote sensing is an umbrella-term for different data types of different characteristics and complexities. This has to be taken into account when applying different semi-automated methods as these (often) cannot be transferred without adaptation. To facilitate FAIR and sustainable work with archaeological remote sensing data, standardised and semantically consistent protocols are needed to develop data type specific workflows that can be generalised and transferred to data sets with similar characteristics. The following presentation proposes a set of desiderata for archaeo-geophysical data.

ID: 90644

Machine Learning in LiDAR-based and optical imagery prospection in archaeology: challenges and potentialities

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KEYWORDS: Machine Learning, LiDAR, Satellite imagery, Archaeological prospection, Multispectral images

Archaeological prospection has leveraged Machine Learning (ML) to speed up and improve the visual inspection of Remote Sensing data and the screening of large territorial extensions. Many studies have indicated that ML can effectively detect buried or above-the-surface archaeological structures on LiDAR-based Digital Elevation Models with an IoU metric exceeding 0.75. Despite the considerable proliferation of LiDAR-based applications, only a handful of studies have successfully employed optical imagery to automatically identify buried archaeological structures. Whereas LiDAR is often employed in wooded areas, which have contributed to the preservation of archaeological features, optical imagery is often used in open-agricultural spaces, where profound anthropogenic transformation and the evolution of fluvial and coastal systems have severely affected the preservation and visibility of archaeological traces. In addition, unlike topographic anomalies, radiometric anomalies in optical imagery are associated with alterations in vegetational covers and exposed soil, the visibility of which depends on crop life cycles, harvesting periods and weather conditions.

This presentation aims to analyse similarities and differences in the application of ML methods to both LiDAR and optical imagery. Through practical case studies, we seek to provide fresh insights into the challenges of identifying subsoil features on optical imagery. We tackled visibility challenges by establishing a multitemporal dataset of multispectral images and employing semantic segmentation across various periods of the year to classify palaeochannels on a Sentinel-2 time-series imagery and PRISMA pansharpened images. The framework was set up to reconstruct the traces' continuity regardless of seasonal variations, mitigating background interference on feature visibility, and evaluate performance metrics under different environmental conditions to eventually establish the most favourable conditions for such features. Our experiments aim to lay the groundwork for extending these methods to smaller archaeological traces on higher-resolution images, where detection challenges are more pronounced due to the limited size of archaeological datasets.

ID: 90758

Exploring the relationship between grain shape and environmental conditions through the combination of micrometric 3D scanning, morphometrics, and deep learning

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10-14 JUNE. ALCALÁ UNIVERSITY. SPAIN

HUMAN CHALLENGES IN A CONTEXT OF CHANGING LANDSCAPES



of Classical Archaeology (ICAC-CERCA), Michael P. Wallace- Department of archaeology of the University of Sheffield, Landscape Archaeology Research Group (GIAP) Catalan Institute of Classical Archaeology (ICAC-CERCA), **BORJA URBISTONDO**- Landscape Archaeology Research Group (GIAP) Catalan Institute of Classical Archaeology (ICAC-CERCA), Darío Herranz-Rodrigo- Landscape Archaeology Research Group (GIAP) Catalan Institute of Classical Archaeology (ICAC-CERCA), Ioannis Mylonas- Ellinikos Georgikos Organismos (ELGO)-DIMITRA, **ELISSABET NINOU**- International Hellenic University, Alexandra Kriti - Landscape Archaeology Research Group (GIAP) Catalan Institute of Classical Archaeology (ICAC-CERCA)

KEYWORDS: Machine/deep learning, 3D scanning, morphometrics, archaeobotany, experimental archaeology

Although previous work has noted that the shape of seeds is affected by their growing conditions, no research has been put into exploring this relationship. This is logical as these shape changes are so minute that cannot be appreciated using optical methods. Such growing conditions can offer important insights into the nature of the Bronze/Iron Age Aegean economy and climate (both essential in current debates about the so called 'Dark Ages'). DarkRevisited has developed a pioneering workflow in which several cutting-edge technologies combine to investigate the relation between shape and environment:

Experimental cultivation and burning.

3D micrometric scanning and co-registration.

Advanced 3D treatment and transformation.

Automated massive measure extraction from 3D data.

Machine and deep learning identification and classification. Preliminary results obtained with a restricted training/test dataset of more than 700 individual 3D models of scanned barley grains allow us to state that the workflow:

Can identify landraces with high accuracy and precision values (depending on method and landrace).

Can reliably differentiate between 2 and 6-row straight barley grains, which is currently not possible for human experts using traditional methods.

Can clearly differentiate the origin of the grains independently of the type of grain (2 or six rows) and the landrace, which provides an important basis for the differentiation of the growing conditions of the grains.

The results provided are still preliminary as only barley grains have been employed for the training of the algorithms. Ongoing experimental cultivation incorporate other species commonly found in archaeological assemblages to provide a useful and functional tool for the analysis of past agricultural regimes and climate.

ID: 89248

From find-spots to landscapes: How to integrate AI into state wide heritage management

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KEYWORDS: landscape archaeology, artificial intelligence, heritage management, charcoal kilns, burial mounds



When it comes to analysing archaeological sites on a landscape-wide scale, human analysis quickly meets its limitations, and researchers have been trying to introduce various forms of automation to ease the burden. In recent years, techniques and tools from the domain of Artificial Intelligence (AI), and in particular Convolutional Neural Networks have had remarkable success in academia, but the research areas have been rather small and the question on how to integrate these workflows into the daily work of a heritage management authority has not been addressed.

In the research presented here we utilised the LiDAR data of the entire German state of Hesse (some 21,000 km²) to train AI systems for detecting burial mounds, charcoal kilns, and 'grave gardens' across the entire state. We then examine the question on how the results from automation could be verified in an efficient way to facilitate the integration of these AI systems into the heritage management workflow of the authority. With some classes we achieve a detection quality of 90% and above at an acceptable rate of False Positives, for others the number of False Positives is still significantly higher.

It turns out that not only the quality of the training data had a large impact on the results but also the types of landscapes and of features the system was aiming for. Nevertheless, using AI techniques has proven an enormous support when trying to find previously unknown sites and to understand landscapes, their development, and their changes.

ID: 89250

Pre-Hispanic landscape occupation in Chilean Andes. A Remote Sensing and Deep-Learning coupled approach

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KEYWORDS: **Pre-hispanic landscape occupation, Chilean Andes, Deep Learning**

During the late pre-Hispanic times, the western Andean slopes have witnessed the development of a complex settlement system, extending between the altiplano of Caranga and the coast of Arica (Chile). In particular, the Arica highlands (located between 3000 and 4000 m. a.s.l.) are characterized by an architectural homogeneity of stone-made structures, such as large housing complexes, associated with corrals and terraces with perimeter walls and identified with the living signs of an imperial agricultural landscape. However, due to the region's difficult terrain, traditional archaeological surveys and post-processing works are more labor-intensive here. Extensive surveys are rather an exception and the manual check of the available satellite data, although already approached with good results, is, as well, time-consuming and expensive. At the date, we still miss a comprehensive and more extensive overview of the socio-spatial configuration of the Arica Highlands during Pre-Hispanic times.



Aiming to face such challenges, this study outlines a workflow method based on Convolutional Neural Networks to speed up and automate the detection of complex archaeological structures, based on high resolution satellite images (WorldView2). A systematic procedure, that combines Remote Sensing, a rich survey database, and a Convolutional Neural Network, has been developed, trained and tested on the Azapa upper basin, an area of ca. 21x10 km².

The results obtained, as an accurate probability map for anthropic, stone signatures across the study area have been evaluated and compared with previous and new field surveys data. Remote sensing combined with Deep Learning can provide an effective way to expand investigation areas and detect new sites in areas difficult to access, such as the Chilean Andes, with an unprecedented level of detail, that has at the same time, major implications for understanding the archaeological significance of less explored and marginalized regions.

ID: 90126

Developing the Automatic Detection of Archaeological Features (ADAF) tool

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KEYWORDS: **Machine Learning, AI, Lidar, Archaeological Landscapes, Monument prospection**

The growing demand for applying machine learning (ML) techniques in archaeology is driven by advancements in image analysis and the increasing availability of high-quality airborne laser scanning data (ALS). In this paper, we describe the development of the Automatic Detection of Archaeological Features (ADAF) tool, designed to facilitate user-friendly software for ML-based automatic identification of archaeological features from ALS data. Funded by Transport Infrastructure Ireland (TII), ADAF aims to mitigate the potential impact of the discovery of archaeological remains/features and the resulting excavation during major road scheme construction.

The ADAF software minimizes user interaction and requires no prior ML expertise, enhancing accessibility within the archaeological community. Our ML models are trained on an extensive archive of ALS datasets from Ireland, meticulously labelled with three types of archaeological features: enclosures, ringforts, and barrows. Key components of the tool include the Relief Visualization Toolbox (RVT) and the Artificial Intelligence Toolbox for Earth Observation (AITLAS), both actively utilized in aerial archaeology. RVT processes input data by converting digital



elevation models into ML-friendly visualizations, while AiTLAS provides access to the ML models. A series of experiments explore various visualization methods and ML architectures for object detection and semantic segmentation, determining optimal configurations for the software. Exploration of retraining the ML model will also be explored for the adoption of the ADAF for different geographic regions and variable monument morphologies.

In conclusion, we release the ADAF tool under open access for reuse within the research community. We evaluate ADAF through comparative analysis against human-only identification of archaeological features, addressing identification challenges such as false positives.



LAC 2024

COMMUNITY IN THE
MINING LANDSCAPE:
ANALYSING HUMAN-
ENVIRONMENT
INTERACTIONS
THROUGH A
MULTIDISCIPLINARY
APPROACH.

SESSION 05



COMMUNITY IN THE MINING LANDSCAPE: ANALYSING HUMAN-ENVIRONMENT INTERACTIONS THROUGH A MULTIDISCIPLINARY APPROACH..

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The diachronic study of the relationships between anthropic activities and the environment is undoubtedly one of the broadest field for interdisciplinary research. This is where natural sciences and human sciences meet, and where questions, goals and operating methods are leveraged against one another.

Among the human activities having a major impact on environment, stand the exploitation of underground resources, along with the operational steps of the production processes, including metallurgical ones; all these activities produce “ecofacts” that help us identify the distinctive features of historical mining landscape, whose cultural value is acknowledged by the European Landscape Convention. Furthermore, the study of mining landscapes is connected to the study of ancient settlements patterns, social and demographic structures, lifestyle and pathologies of the human community, historical and technological topics.

The combination of complex issues related to the protection of environment and historical heritage, which are typical of mining landscapes, has often turned these areas into “open air labs” in Europe and abroad, where cutting-edge projects and new technological protocols have been performed. Indeed, it is through a global historical approach that the relationship between mining resources and communities can be stressed.

Building on these premises, the session aims at comparing different approaches to the study of mining landscape, taking into consideration technical aspects linked to mining and production cycles, as well as the ways in which communities took advantage of underground resources, managing their exploitation and trade.

This implies the analysis of:

- mining works (above and below ground), and dumps;
- management of raw materials, such as water and wood;
- road networks, supporting the production landscape;
- trade networks, connecting production areas to consumption centres;
- demographic composition of the community linked to the mining context, stress markers, pathologies, pollution of human remains.

The session is open to proposals that explore the topic in a diachronic perspective, by means of different sources and methods of analysis: archaeological prospection



ID: 90598

The transformations in northwest iberia landscapes after the roman conquest: the impact of gold mining in the upper sil river

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KEYWORDS: NW Iberian Peninsula, roman gold mining, hydraulic networks, castros, paleopollinic analysis.

The study of ancient landscapes in the upper Sil River (province of León, Spain) has revealed the presence of a significant number of castros occupied in protohistoric times, with a tendency toward self-sufficiency and political autonomy. The beginning of Roman domination implied the disappearance of the castro social structure, with the emergence of social inequalities in parallel with the framing of these territories in the newly created civitates. One of the fundamental objectives of imperial policy in large sectors of the NW Iberian Peninsula was the systematic exploitation of gold resources, in whose development the army would have played a fundamental role, with enormous investments of work being observed in the construction of hydraulic networks and in the processes involved in the extraction and processing of gold ore. The traces of this dynamic have been identified from the development of field surveys, the interpretation of Digital Terrain Models prepared from LiDAR data, the archaeological excavation of channels, reservoirs and settlements and the paleopollinic analysis that show extensive deforestation in mountain areas. In this process, some old castros remained occupied and housed prominent segments of society, either integrated into military units or into the bodies of officials at the service of the Roman state, while other newly created enclaves, subordinated to the previous ones in the new settlement networks, they would have been occupied by the mining population and the peasants in charge of agricultural production. Thus, a drastic transformation of the characteristic landscapes of the Iron Age can be documented during a period that would barely last five or six generations, since at the end of the 2nd century AD gold mines and towns suffer widespread abandonment, with a drastic decrease of anthropic pressure indicators.

ID: 90661

Cultural traits and material traditions. Gold-mining castros in north-western Hispania from Iron Age to Roman rural landscapes

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KEYWORDS: Roman Gold Mining, rural economy, local identities, pottery technology, Landscape Archaeology

A castro can be defined as a strategically situated fortified settlement, that was the most notable landmark during the 1st millennium BC in the cultural landscape of the north-western Iberian Peninsula. It gives its name to the so-called “castro culture”, as the main habitat way for rural areas. Our approach argues for egalitarian, agrarian and segmentary communities, with the castros being self-sufficient political units and connected in community-type relationships through inter-group contacts. These communities were subjected to drastic changes, bringing them to an end, from late Iron Age and during the Roman conquest at the end of the 1st century BC. The territory of Asturia and Gallaecia were thoroughly transformed and integrated into an administrative and political control, articulated into rural civitates. Under Augustus, the mining castros appeared as part of the local community restructuring in the territory, in order to intensively exploit the gold mining areas as part of the imperial strategy. They maintain certain pre-Roman traditions in their morphology and material culture, but with new Roman elements (construction systems, forms of internal organisation, products and goods, among others). For study the indigenous agency through local people and the emergence of local elites, we present a study focused on the spatial distribution of the traditional indigenous pottery with the rest of the materiality like Roman common/luxury ware, glass, ornaments or living-spaces and dwellings architecture. Evidences of different habitat and domestic areas of the mining castros will be presented, suggesting social inequalities within the households. We use a broad and transversal perspective to explore the social and economic spheres under which the domestic life of the mining castros took place. How they adapt and reinterpret the dominant culture, imposed by the hegemonic imperialistic Roman model into the process of creating new provincial societies in a new cultural mining landscape.

ID: 90021

Tracing socio-ecological history of the North Karanpura Coal field, Jharkhand India

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KEYWORDS: socio-ecological, tribal, coal mining and north karanpura

Holding an estimated 40 billion tonnes of coal, the Damodar Valley, later renamed North Karanpura after a small village that lent its name to the extensive mining initiative, became the focal point for substantial coal exploitation from the early 20th century. In 1985, a state-of-the-art, turnkey mechanized coal mining project, envisioning numerous mines, was initiated through a collaboration between the Indian and Australian governments. This venture was formalized through an agreement with Whyte Industries of Sydney. The initial vision was to open 25 large



opencast coal mines, displacing over 200 villages.

The 2001/2002 Heritage at Risk Report by ICOMOS for India extensively discussed the peril posed by coal mining and a thermal power station to Hazaribagh and the North Karanpura Valley. Originally encompassing the entire North Chotanagpur Division, the Hazaribagh District spanned the entire plateau of Hazaribagh, situated as the northern segment of the massif separated by the Damodar River from east to west. To the south lies the Ranchi plateau. Presently, this area is integrated into the new tribal State of Jharkhand, denoting "Forest Land." Notably, it boasts a rich archaeological history with abundant megaliths and dolmens, along with revered rivers like the Damodar River and numerous sacred groves (sarna).

India, a country still home to 104 million native tribal population. In this heartland of India amidst the then lush forests, scheduled tribes Oraon, Munda, Santal, Birhor, Ganju, Turi, and scheduled artisan castes such as potters (kumhar), carpenters (rana), basket-makers (turi), oil extractors (teli) and agriculturists and weavers (jolha) live. The paper will map the socio-ecological history of the region to serve as the collective record of the impacts of coal mining in eco-sensitive regions with indigenous population.

ID: 90563

Pre-industrial mining landscapes in the Colline Metallifere region (Tuscany, central Italy). A multiproxy study of environments and communities

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KEYWORDS: medieval archaeology, historical landscapes, mining archaeology, medieval history, multidisciplinary

The Colline Metallifere territory is one of the most important mediterranean contexts for the study of pre-industrial mining landscapes; in this area the University of Siena is undertaking archaeological projects since more than 30 years.

Research has particularly focused on Medieval chronologies, relying on surveys, digs and archival data. Pioneering investigations in the renowned castle of Rocca San Silvestro, dating to the mid 80es, has been strengthened by subsequent research in other mining castles (e.g., Rocchette Pannocchieschi, Cugnano, Montieri) and further implemented by extensive surveys carried on large mining districts (e.g. Val di Cornia and Val di Pecora). To date, the Colline Metallifere is one of the best examples of extensive research on mining territories in Europe.

Over the past decade, multidisciplinary protocols (geochemical, archaeological, archival, bioarchaeological and remote sensing analysis) have been developed for a broader and deeper research strategy, providing new insight into the historical landscape of production, as well as on relations between settlement patterns and resources exploitation.

Focusing on Medieval times (X-XV centuries), this contribution will propose in-depths on some crucial research issues that, thanks to the new data obtained,



have been particularly stressed. Selected territorial examples will allow to discuss in particular technological choices concerning mining exploitation and metal production; trades of raw materials; settlement dynamics and political strategies for the control of underground resources.

ID: 90791

The Value of Waste: Archaeology of the Mining Landfills of Pre-industrial and Industrial Sardinia

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KEYWORDS: mining landfills, landscape archaeology, value transformation, community interaction, Sardinian mining history

Drawing from the diverse experiences gained by the University of Cagliari in the study of mining habitats in the Sulcis and Iglesiente districts in Sardinia, this proposal examines the transformative role played by mining landfills from antiquity to the present day, highlighting the dynamic interaction between human communities and landscapes of waste. By analyzing archaeological evidence, historical records, and contemporary accounts of Sardinian mining contexts, this contribution examines the evolution of pre-industrial and industrial mining landfills, describing some of the value-assigning processes that involve this special type of "heritage," in the transition from simple waste deposits to complex cultural landscapes. The study emphasizes how these landfills have been reused and revalued, serving not only as historical record of mining practices but also as resources for contemporary cultural heritage and community identity. Through a diachronic approach, the contribution explores the environmental, economic, and social implications of mining waste management practices, revealing the adaptive strategies that communities of south-west Sardinia have developed to confer new values on these landscapes. This revaluation offers a nuanced understanding of the interaction between industrial activity and landscape transformation, contributing to the broader discourse on sustainable heritage management and the archaeology of human-environment relations.

ID: 90532

Bioarchaeology of Medieval mining community in Tuscany: ecosystem, resources and lifestyle at Rocca San Silvestro castle

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KEYWORDS: **mining archaeology; biological anthropology; archaeobotany; zooarchaeology; Metalliferous Hills**

The ARC project Pursuing Public Health in the Preindustrial World, 1100-1800 (Monash University), has the objective of studying Premodern age public healthcare. The project provides an opportunity to investigate the human community, working conditions and environmental ecosystem exploitation in the Medieval mining context of the Rocca San Silvestro castle. From 1984 to 1994, archaeological excavations revealed and documented a setting characterized by mining areas, production areas, stately and working-class dwellings, a village, a church, and a cemetery. The specific impacts of mining and metallurgical activity on a given ecosystem depend on numerous physical factors and complex human decision-making. For this reason, current research uses a multidisciplinary bioarchaeological approach focused on the human community and its interaction with the landscape and environmental resources. Anthropological and paleopathological analyses aim to reconstruct the biological profile of the individuals in order to define mortality trends, lifestyle, and subsistence strategies, analyzing occupational markers, pathologies, trauma, paleodiet and exposure to pollutants. Analysis of charcoal remains from anthropogenic contexts provides the composition of forest habitats in the past, the alteration of woodlands over time and the ecological changes induced in vegetation successions. Seeds and fruits of cultivated plants allows an understanding of agrarian resources and agri-food production in the past. Likewise the zooarchaeological analyses aim the intricate relationship between humans and domesticated animals and the role of cattle to meet miners' needs.

ID: 90630

How a medieval community shapes a mining landscape: the case of the Iglesias silver mountains in Sardinia

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KEYWORDS: **Silver mines, Sardinia, Middle Ages**

Sardinia is a island of silver veins; that has been exploited for several millennia, from prehistory to the end of the 20th century. Abundantly resumed between the 13th and 14th centuries, the deposits that concentrated in the Paleozoic mountains of Iglesias made the island one of the main silver producers in the medieval Mediterranean. On this Byzantine margin, Germans are reported as early as the 12th century, then the Ligurians and especially the Tuscans established themselves there before having to compose with the Aragonese conquest in the 14th century. A political and economic stake, the Iglesiente was also a technical crossroads and a social laboratory within which the actors, practices, and norms of production were enriched and competed at the same time. This vast industrial terrain with a landscape marked by the successes and failures of silver-mining companies from several horizons is the subject of a historical and archaeological investigation. The



presentation will propose a preliminary assessment of the research. The topography of production will first be established, from the location of the mines to those of the charcoal forests and the workshops for transforming the ores; the practices of the workers; space will then be reconstructed, particularly their journeys between the workshops and the habitats; the social attractiveness and economic influence of the Iglésiente silver mines will finally be highlighted, through European migrations and Mediterranean exports of ingots.

ID: 90795

Cinnabar exploitation during the Late Neolithic in the mining landscape of Southern Tuscany (Italy): the case study of Poggio Spaccasasso mine and Mount Amiata

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KEYWORDS: Cinnabar mine, Late Neolithic, raw materials, mineralogical - petrographic analyses, spatial analysis

This contribution presents the preliminary results of an ongoing multidisciplinary research aimed at exploring the development of a mining landscape linked to the cultivation of cinnabar, in Southern Tuscany.

Recent data from the excavation of Poggio Spaccasasso mine, dated to the mid-5th millennium BCE, reveal the relationship between human activities and territorial resources management. Notably, a series of mineralogical and petrographic analyses are allowing to identify the raw materials employed in the manufacturing of mining tools and their retrieval areas. Additionally, the anthracological study of charcoals from two fireplaces has also enabled us to recognize the plant species used in the management of the fire-setting technique, providing valuable insights into the environmental context of these operations. Finally, spatial analysis of both on-site and off-site extraction areas will contribute to mapping their distribution across the hill, thus offering a more detailed understanding of cinnabar exploitation processes and their environmental impact.

The exceptional preservation of this mine has unveiled new perspectives on the deep relationship between humans and the environment, framed within local and broader mobility patterns. The mining landscape of the Uccellina Mountains enriches our understanding of extractive activities, including those less evident in the Mount Amiata region. Indeed, radiometric dating of organic artifacts and archival records from Amiata mining archives have confirmed the contemporary cinnabar exploitation at both Poggio Spaccasasso and Mount Amiata.



ID: 90780

Prehistoric flint mining landscape in Gargano (Apulia, Italy): mining markers and lithic evidence to analyse the process of flint exploitation

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KEYWORDS: Flint mining, Prehistoric Landscape, Neolithic, Settlement strategies, Chaînes opératoires

Different investigations performed since the 1980 by the prehistory unit of Siena University individuated numerous prehistoric evidence in the Gargano promontory. Most of them were linked to the production and distribution of flint tools during the Neolithic and Eneolithic periods. The area was extensively exploited for the extraction of high-quality flint, resulting in the creation of complex underground mine structures and significant changes to the landscape caused by the management of large amounts of rock debris, which was spread in several open fans on the hills; surfaces.

By integrating different types of research approaches related to lithic analysis, settlement strategies and landscape changes, we gain a better spatial understanding of the exploitation and diffusion of lithic raw material in the Adriatic area within a broader perspective.

The paper describes some of the topographic transformations related to prehistoric mining activities derived from the management of debris, flint mining and processing taking advantage of a GIS platform. This approach integrates lithic analysis, prehistoric evidence and topographical data aiming to provide a spatial understanding of the exploitation and diffusion of flint raw material and artefacts and the making of the prehistoric flint mining landscape.

ID: 90262

The ancient anthropic activities in a mining district of Iberian Peninsula (San Juan de los Terreros, SE Spain)

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KEYWORDS: Paleoenvironment, amino acid racemization, trace elements, lipid biomarkers, faecal stanols.

The palaeoenvironmental conditions of SE Iberian Peninsula during the Holocene were reconstructed after a multidisciplinary study to identify natural variations and the anthropic processes of this coastal area. For this purpose, a 14 m-deep core was drilled in San Juan de los Terreros, Almería. Amino acid racemization using ostracode shells and radiocarbon (^{14}C) dating of plant debris were used for building the chronological framework using a bayesian age-model. Based on the sedimentological determination, mineralogical content, lipid biomarkers and trace elements quantification, specifically lead (Pb), both natural and anthropogenic variations were identified. The results reveal an age range between 0 and 7000 yr cal BP, in which environmental conditions varied, and a clear human influence in the geological record since the Chalcolithic, being noticeable during Phoenician and Roman times. The lithogenic and anthropogenic Pb concentrations along the sedimentary record were calculated, together with the Pb enrichment factor using titanium (Ti) as a conservative reference element and normalized with pre-anthropogenic data. Findings showed that the influence of anthropogenic factors predominated in the last four millennia, particularly aerosol deposition linked to mining and industrial activities in the area. In addition, the presence of faecal stanols, such as coprostanol, corroborated the presence of human populations in the area. Thus, these results indicated a relevant human influence in the last 4000 yr cal BP. In brief, the coastal record of San Juan de los Terreros can be considered a preserved environment, suitable to search for regional human activity fingerprinting, specifically that related to the deposition of heavy metals such as Pb.

This research was conducted through the project PID2021-123549NB-I00 funded by the Spanish Ministry of Science and Innovation (MCIN/AEI/ 10.13039/501100011033).

ID: 90614

Scars on the Landlord of Molina de Aragón: Medieval Mining Landscapes in the Center of the Iberian Peninsula through Archaeometallurgy and Spatial Analysis

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KEYWORDS: mining landscapes, spatial analysis, archaeometric análisis

Molina de Aragón stands as a testament to the profound human-environment interactions that shaped the medieval mining landscapes of the central Iberian Peninsula. This paper investigates the intricate relationship between human communities and their surroundings within this unique geographical context. As an important lordship situated in the heart of the peninsula from the 12th to the



15th centuries, Molina de Aragón emerged during the feudal expansion phase, with its power predominantly rooted in the control of strategic natural resources, including minerals, by the noble Lara family.

Drawing upon a multidisciplinary approach, this study integrates archaeometric analysis of metallic artifacts recovered from archaeological excavations, including slag remains, with a thorough examination of ancient mining evidence. Leveraging the interlocking of landscape archaeology and spatial analysis techniques through GIS tools, the paper delves into the historical significance of mining landscapes in this region, shedding light on the socio-economic dynamics that underpinned medieval society.

By exploring the archaeological and historical evidence in conjunction with spatial analysis methodologies focused on the relation between production areas and consumption centres, this research aims to offer new insights into the complex interplay between human agency, resource exploitation, and landscape transformation in Molina de Aragón. Through this exploration, we endeavor to contribute to a deeper understanding of medieval mining practices and their broader implications for community development and environmental management in the past.



LAC 2024

THE NOBLE
LANDSCAPE
AND ITS
RESIDENCE:
THE POWERFUL
INTERSECTION
OF ART,
ARCHITECTURE
AND
ENVIRONMENT

SESSION 06



THE NOBLE LANDSCAPE AND ITS RESIDENCE: THE POWERFUL INTERSECTION OF ART, ARCHITECTURE AND ENVIRONMENT

SESSION ORGANIZERS

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The nobility's constructed landscape encompassed meticulously designed gardens, agricultural lands, hunting forests, as well as the residence and its satellite structures such as stables, home farms and mills. In some cases, the designed environment is all that remains of this system. Landscape, in this context, is perceived as a deliberately shaped system of spaces, a testament to and an embodiment of human concerns (Jackson, 1984; Hunt, 2016). The creation of this system implies a significant connection between the exterior and interior of these residences. Notably, noble patrons sought expansive vistas over their carefully curated surroundings, facilitated by the characteristic large windows of early modern palace architecture. The presence of landscape within the noble residence extended beyond the views from inside to outside. Landscape elements were often prominent features in paintings, and at times, even the central subject matter. These landscape paintings frequently showcased the patron's own possessions. An iconic example of such artwork can be found in Giusto Utens' lunettes, depicting seventeen de Medici villas and their surroundings at the end of the sixteenth century.

This session aims to explore the intricate interplay between the portrayal of landscapes within early modern noble residences and the tangible environments surrounding them. We invite proposals that study the relationship between the landscape and its stylized representation. This includes depictions of villas and estates, the perception of these landscapes, the interplay between the landscape and the residence, representational facets of the residence in connection to the landscape, potential relationships between the decorative themes within the residence and the surrounding landscape, as well as analyses of landscapes with lost residences using preserved imagery. These connections and relationships can shed a new light on existing landscapes, or even identify 'lost' landscapes. This session's theme lies at the crossroads of different disciplines: landscape archaeology, art history, landscape history and architectural history. A transdisciplinary landscape approach will notably improve our understanding of the relationship between noble patrons, their residences and the surrounding landscapes. We invite research papers addressing, but not limited to the following topics:

- The relation between representations of the landscape and the tangible environment.



- The connections established between the exterior and the interior of noble residences and their surrounding landscape.
- Analysis of how noble residences and their surroundings were visually represented in landscape paintings and the role of these representations in shaping the viewer's perception of the landscape.
- Exploration of how noble patrons used the visual representations of their landscapes, as well as the landscapes themselves, as a means to project power and cultural ideals.
- Analysis of existing landscapes with lost residences using preserved imagery
By bringing together different case studies from all over the world, we hope to develop these research questions further. We welcome scholars from different disciplines to submit, to reach an interdisciplinary discussion on early modern landscape and its representations.



ID: 00000

Cultivating Status: Noble Landscape and Garden Architecture in the Southern Low Countries

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KEYWORDS: **Noble landscape; Southern Low Countries; Strategies of self-representation**

This keynote presentation offers an exploration of the noble landscape and garden architecture in the Southern Low Countries during the late fifteenth to eighteenth centuries. Utilizing primary sources such as the seventeenth-century “castle books” of Antonius Sanderus and Baron Jacques Le Roy, as well as other iconographic sources like the Albums of Croÿ—a compilation featuring over 2500 views of the southern Low Countries in the sixteenth century—the presentation analysis the representational aspects of landscape and garden architecture.

During the period between 1400 and 1700, Netherlandish artists pioneered stylistic innovations in landscape painting, resulting in realistic depictions of topography. Additionally, the Low Countries were meticulously mapped by cartographers and draughtsmen, leading to the city views by Antoon van den Wijngaerde in the sixteenth century and the maps commissioned by Count Joseph de Ferraris in the eighteenth century.

This keynote will center on the methodological considerations in examining the early modern noble landscape. It will explore the integration of archival and iconographic sources mentioned earlier with modern techniques, including drone aerial surveying and LIDAR technology. Furthermore, the presentation will contextualize the noble landscape within the strategies of self-representation adopted by the nobility, shedding light on the role of meticulously designed landscapes in conveying social status.

Drawing from interdisciplinary insights and methodologies, the presentation aims to bridge the gap between art history, cartography, and (landscape) architecture. By providing a nuanced understanding of the noble landscape in the early modern period, this keynote contributes to a deeper appreciation of its evolution and significance within the southern Low Countries.

ID: 90301

The Inside Out Landscape of a Noble Residence in the Southern Low Countries

CATO LEURAERS- KU Leuven

KEYWORDS: **landscape-architecture, interior, castle, nobility, landscape painting**

The early modern residence and its surrounding environment should be seen as a system, contributing to the image of how its patron wants to present themselves.



Charles III of Croÿ, Duke of Aarschot and his seigneurial seat in Heverlee (Leuven, Belgium) can be considered an important example of this. After inheriting this sixteenth century castle in 1595, he immediately started making plans to transform the building and its surroundings. He ordered the meandering landscape to be structured by two perpendicular axes, connecting his residence to the family mausoleum and the nearby city of Leuven. Around the new axes he added gardens, extending the flower garden that had been commissioned by his father, who passed his interest in botany down to his son.

The view over this new creation could be enjoyed from multiple galleries in the residence. The link between the interior and exterior was further strengthened by the decorative programme of the residence. The walls were decorated with flowers, fruits and leafy branches and landscape paintings were distributed throughout the different spaces. From surviving inventories, it appears that the duke carefully chose where to place which artworks. For example, the ground floor gallery, which does not offer a widespread view over the landscape, was decorated with large landscape paintings on canvas. In contrast to this, a cabinet with very narrow windows overlooking the landscape was comprised of many small landscape paintings.

This paper aims to explore the link between these decorations, their location, and the real landscape outside. How did Charles of Croÿ use his residence to further shape his landscape and identity and visa versa?

ID: 90398

Reconstructing the water landscape of the Ducal Palace of Vila Viçosa (Portugal) through historical sources and GIS technology

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KEYWORDS: Water history, Landscape history, history of hydraulics, architectural history, House of Bragança.

The Ducal Palace of Vila Viçosa, located in Alentejo (Portugal), was the principal house of the Dukes of Bragança during the 16th century. Intending to create a humanistic court, the fourth and fifth dukes, Jaime I (1483-1532) and his son Teodósio I (1532-1563), relocated their residence from the medieval castle to a country villa on the outskirts of the town. Much has been studied about the architecture of this palace, but little is known about its gardens and surrounding landscape. Water played a fundamental role in the conception and development of this residence. Both for practical reasons, such as the irrigation of orchards or the supply of kitchens, and for leisure purposes, such as the layout of some of the first mythological fountains in Portugal, or the lakes for recreational sailing. Through the study of historical sources, fieldwork, and the design of Geographical Information Systems, we have aimed to reconstruct the water landscape that surrounded the Ducal Palace of Vila Viçosa.



ID: 89903

Beyond the Walls: Contextualizing Premodern Classical Chinese Gardens in Regional Landscape Making

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KEYWORDS: **Classical Chinese Gardens, fence, pollard, landscape-making, landscape infrastructure**

Classical Chinese gardens were enclosed literati dwellings encompassing houses and garden courtyards. Having been celebrated in Chinese literature for centuries, these gardens were widely circulated through paintings, poems, and travel accounts in East Asia and beyond. Between 1997 and 2000, UNESCO inscribed a group of nine gardens on the World Heritage List as pinnacle examples of Chinese landscape design. Notably, the restoration efforts of these gardens in the mid-twentieth century, guided by American-trained Chinese architects, underscored a resurgence of interest in Chinese garden history in Europe and the United States. However, prevailing scholarship, both domestic and international, tends to emphasize architecture, aesthetics, and literati culture, often confined within the garden walls.



LAC 2024

COMPUTATIONAL
APPROACHES
IN LANDSCAPE
ARCHAEOLOGY:
EXPLORING
HUMAN-
ENVIRONMENT
DYNAMICS AND
SETTLEMENT
PATTERNS FROM
PREHISTORY TO
RECENT TIMES

SESSION 07



COMPUTATIONAL APPROACHES IN LANDSCAPE ARCHAEOLOGY: EXPLORING HUMAN-ENVIRONMENT DYNAMICS AND SETTLEMENT PATTERNS FROM PREHISTORY TO RECENT TIMES

SESSION ORGANIZERS

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The session “Computational Approaches in Landscape Archaeology” stands at the intersection of natural and human sciences, providing a unique lens for comprehending the profound connections between our past societies and their environments. In this session, we aim to shed light on the transformative potential of computational methodologies in deciphering the intricate tapestry of human-environment relations and settlement patterns throughout history and prehistory.

Introduction:

The unfolding story of human history is increasingly being revealed through the lens of computational tools and techniques. By harnessing the power of data analysis, geospatial modelling, and machine learning, archaeologists and researchers are redefining how we perceive and interpret the past. This session aims to bring together scholars and experts from diverse backgrounds to showcase the latest advancements and insights derived from applying computational approaches to landscape archaeology.

Session Topics:

This session will explore the dynamic interplay between human ancestors and the landscapes they inhabited, employing computational methods to decode this relationship. Contributions to this theme may delve into topics such as:

- **Geospatial Analysis:** The use of Geographic Information Systems (GIS) and Remote Sensing (RS) to scrutinize ancient landscapes, reveal concealed archaeological features and track environmental transformations over time.
- **Agent-Based Modelling (ABM):** Simulating past human behaviours within evolving environments, providing invaluable insights into settlement dynamics, resource management, and how societies responded to environmental fluxes.
- **Machine Learning and Pattern Recognition:** Harnessing the power of artificial intelligence to recognize patterns in archaeological and environmental data, potentially reshaping our comprehension of human-environment connections.



- **Predictive Modelling:** Employing computational models to predict potential archaeological sites and settlement locations based on a fusion of environmental factors and archaeological records.
 - **Digital Reconstructions:** Crafting immersive digital reconstructions of ancient landscapes and settlements, enabling new perspectives and in-depth analyses.
 - **Network Analysis:** Investigating the intricate web of ancient settlements and their relationships with the surrounding environment. Such analyses uncover trade routes, communication networks, and patterns of resource exchange.
- Conclusion:

This session will serve as a dynamic and collaborative platform for archaeologists, environmental scientists, computational experts, and researchers to exchange ideas, present innovative research findings, and establish partnerships. Papers should comprise the current standards of open science in Archaeology. Together, we aim to advance our understanding of human-environment dynamics and settlement patterns, bringing forth new perspectives and deeper insights into landscape archaeology. We eagerly invite contributions from scholars using computational methods to enhance our collective knowledge on the methods and techniques that can be applied to explore the past landscapes and their relationship with human societies.



ID: 90676

Exploring the automatised classification of pottery wares: towards a semantic segmentation of hyper-spectral images of Roman assemblages

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KEYWORDS: Pottery classification, hyperspectral imaging (HSI), spectral signature, deep learning dimensionality reduction, Principal Component Analysis (PCA)

Pottery classification and identification provides archaeologists with the basis of chronological adscriptions and unique insights on past socioeconomical patterns. Recent attempts for the automated classification of pottery (Smith et al. 2010; Markidis and Daras 2013; Tyukin et al. 2018, van Helden et al. 2022; ArchAIDE project) are still restricted in terms of pottery types and requires them to be decorated with recognisable patterns or to preserve a significant portion of the vessel section. Despite the potential of multispectral and, particularly, hyperspectral imagery (Sciuto et al. 20222; Agapiou et al. 2023), it has never been applied to pottery classification.

Here we introduce a proof of concept of a workflow, which combines hyperspectral imagery and machine learning for the automated classification of pottery fragments according to standard ware types. We used a reference collection from the Ancient Roman town of Iesso (present-day Guissona, Catalonia). The applied workflow consists of 1) obtaining hyperspectral images capturing the spectral range of 400-1000 nm with 224 bands of 5.5 nm spectral resolution, and 2) applying machine learning algorithms to segment and classify the observed ceramic fragments. Experiments show the system capacity to distinguish between main Roman ware types (e.g. Black-glazed, Terra Sigillata, Amphora, etc.), without requiring the presence of decoration or the preservation of specific parts of the section. It is also quite successful identifying subtypes (73% accuracy) that are difficult to distinguish even for specialists (e. g. different workshops of TS Hispanica). The system reliability, with an accuracy of 88% and a weighted f1-score of 79% achieved with classical methods, offers an important margin of improvement.

However, it also presents some inconveniences, which will be addressed in future research. The immediate aims are to increase the reference collection and training dataset and to fully automatise the workflow to provide a practical tool for pottery classification.



ID: 89674

Uncovering the 'secrets' of NE Romania's burial mounds through high-resolution Airborne and Remote Sensing techniques

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Keywords: burial mounds, Bronze Age, LiDAR, geophysics, NE Romania

The northeastern part of Romania showcases a notable concentration of burial mounds, with a significant portion still uninvestigated and lacking comprehensive understanding. Previous studies, undertaken for this territory, have revealed that the majority of these monuments were constructed by the Early Bronze Age communities also known as the Yamnaya culture, and subsequently reused by later civilizations up until the early medieval periods. Despite this, there has been a noticeable absence of organized initiatives to document these sites, ascertain their chronology, or study their geomorphological characteristics. Moreover, numerous mounds are constantly endangered by both natural and anthropic factors, resulting in irreversible damage.

This current study seeks to address these gaps by employing an innovative methodological approach centered on high-resolution airborne sensing techniques. These methods encompass oblique and vertical aerial photography, photogrammetry, and LiDAR. Focusing on the Jijia River catchment area, the objective is to precisely pinpoint and characterize the micro-morphology of the tumuli monuments, in the quest for establishing their chronology. An initial examination of the specialized literature pertaining to the region revealed a relatively limited number of sites, with varying degrees of accuracy in their location.

However, the availability of high-resolution digital elevation models derived from LiDAR measurements, offered a chance to substantially increase the number of these sites (up to 1600 burial mounds) and reevaluate their spatial distribution across the Jijia River catchment landscape. Additionally, the research involved conducting geophysical investigations (magnetometry, electrical resistance, ERT and GPR) for various case studies, thereby offering valuable novel data regarding their characteristics and possible chronological attribution. Although this endeavor proved to be a challenging one, it is deemed crucial within the broader context of preserving these monuments, particularly given the ongoing threat posed by intensive modern agricultural practices.



ID: 89640

An approach to the locational analysis of Late Prehistory domestic sites in the Northwest of the Iberian Peninsula

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KEYWORDS: **Settlements, Late Prehistory, NW Iberian Peninsula, GIS, R Statistics**

In studies of the domestic phenomena of the Late Prehistory (ca. 4800-1200 BC) of the Northwest Iberian Peninsula, several locational factors have been proposed. However, its unknown which variables mentioned in the scientific literature explain the location of open-air domestic sites. The challenges faced in understanding this phenomenon, such as the ambiguity of occupation patterns, are not unique to this region but are also observed in other European areas like Brittany (France), the Netherlands, and Denmark.

Therefore, the proposed study introduces a methodological approach for examining domestic sites of Galicia (NW Iberian Peninsula) and these methods could be extrapolated to another European regions. The analysis carried out involves the application of Geographic Information Systems (GRASS-GIS, SAGA-GIS, etc.) and open-source statistical analysis programs (R). This combination allows a comprehensive regional-scale study of the domestic phenomenon. Through various spatial and statistical tools - including density, clustering, and complete spatial randomness (CSR) - we can discern the occupation patterns of settlements. In summary, analyses have revealed distinct territorial occupation strategies among the identified site clusters. This suggests that these prehistoric communities made a wide use of different biotopes. Moreover, evidence indicates that the locations of these settlements might have shifted during the Chalcolithic period, pointing to a potential economic evolution in how these communities harnessed natural resources.

ID: 89462

Mapping Harappan Navigation Routes: Fresh Insights from Remote Sensing-based Landscape Study

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KEYWORDS: **Harappan navigation, maritime trade, remote sensing, computational archaeology, Lothal**

The maritime trade network of Bronze Age civilisations of Harappan and Mesopotamian during the third millennium BCE along the Makran Coast and



the Persian Gulf is widely acknowledged and well documented. To augment the intercultural trade, the Harappan civilisation established a robust intraregional trade network between resource-rich sites, production, and distribution centres, across the northwestern part of the Indian Subcontinent, including present-day Gujarat. Lothal, situated along a palaeo-estuary, was an important Harappan port town and manufacturing centre. It served a vital role in facilitating the raw material distribution network and maritime commerce. The navigational network of the Gujarat Harappans is well attested in the form of sites located on islands like Dholavira, transportation of raw materials and finished products (massive pillar elements), in particular the latter from Dholavira to Mohenjo-daro and Harappa through water networks. Despite the known maritime activities, some of the key questions about Harappan seafaring routes, specifically whether they circumnavigated the Saurashtra coast from Lothal or used a navigable route connecting the Gulf of Khambhat to the Rann of Kachchh, remain unanswered. Additionally, the strategic importance of Lothal location has raised intriguing questions. This study aims to address these inquiries by integrating satellite data, the Digital Elevation Model, field observations, and existing literature to reexamine Lothal. The analysis focuses on the present and past landscape of Lothal, emphasising trade routes. This study provides new perspectives on various maritime routes converging at Lothal from diverse directions, underscoring the crucial geographical significance of Lothal in promoting economic exchanges and interactions.

ID: 89705

Analysis of the intervisibility of archaeological sites in the Guadiato Valley: Implementation of Remote Sensing and Study of Visual Patterns in its Historical Landscape

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KEYWORDS: Remote Sensing, Chalcolithic, Geographic Information Systems, Archaeology, Historical Landscape.

The Guadiato Valley, situated in the province of Córdoba, Spain, is distinguished for its abundant archaeological heritage tracing the course of the river of the same name. The historical impact of mining is evident through ancient mines, bearing witness to the enduring economic significance of mineral extraction in this region. This study unveils findings resulting from the implementation of LiDAR technology in pivotal archaeological sites, including Belmez, Umbría del Águila, Sierra Boyera, Castillejos, and Mellaria.

In the contemporary context, the amalgamation of Geographic Information Systems (GIS) and territorial analysis via remote sensing offers novel insights into these sites of interest. These advanced tools prove instrumental in addressing historical inquiries linked to the surveyed locations. The presentation primarily delves into an in-depth analysis of the aforementioned sites, utilizing LiDAR data as



the cornerstone. A meticulous methodology is crafted, integrating diverse software applications, each leveraging its specific advantages to amass comprehensive data and represent it within the GIS framework with optimal precision.

Subsequent analyses involve the extraction of visualization filters, presenting a detailed planimetry of the archaeological sites. Additionally, the creation of visual basins provides valuable insights into the strategic positioning of these historical sites and their dynamic relationship with the evolving landscape throughout distinct historical periods. This holistic approach, underpinned by the sophistication of LiDAR technology and geospatial analysis, substantially enhances our comprehension and contextualization of the historical narratives encapsulated within these archaeological sites amid the broader historical landscape of the region.

ID: 90327

Beyond the Surface: Remote Sensing Technologies Revolutionize Prehistoric Site Analysis in Southern Carpathian Basin

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KEYWORDS: Remote Sensing, Neolithic and Bronze Age Sites, Settlement Patterns, Satellite Images Analysis, GIS

This presentation explores methodological advancements brought about by remote sensing technologies in the analysis of prehistoric sites, specifically focusing on large Neolithic circular enclosures in eastern Croatia near Đakovo and Osijek. Through satellite image analysis preceding magnetic surveys, the research unveils concealed features beneath the earth surface, providing a more detailed understanding of ancient settlement patterns.

The integration of satellite image analysis, aerial reconnaissance, magnetic surveys, and GIS technology forms the core of this presentation, allowing for the creation of precise settlement pattern maps. By digitally mapping the spatial organization of prehistoric communities, this approach surpasses the limitations of ground-level observations, offering a comprehensive view of landscapes and settlement distributions.

The presentation also emphasizes advanced remote sensing techniques for intra-site analysis, enabling a detailed exploration of internal enclosure structures. By employing innovative methods that transcend traditional excavation practices, the research identifies activity areas and features that may remain undiscovered through conventional means.

Through compelling case studies in Eastern Croatia, we illustrate how remote sensing technologies have revolutionized the conventional approach to prehistoric site analysis. This comprehensive methodology contributes significantly to the scholarly discourse on archaeological methodologies and interpretations, fostering a deeper understanding of prehistoric settlements and their intricate social dynamics.



ID: 89155

Long-term Settled Sites from the First Millennium AD. on the Morava River Basin – Predictive Modelling, Remote Sensing and Non-invasive Geophysics as a Tool of Research

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KEYWORDS: **Cultural Landscape, Predictive Modelling, Germans, Slavs, Hillforts**

In the cultural landscape of Morava River Basin, situated on the border between Slovakia and the Czech Republic, a large number of historical structures have been preserved. The studied region experienced frequent changes in resident populations (Germans, Avars, Slavs) during the first millennium. These populations created distinctive historical structures in the landscape (hillforts, settlements, flat cemeteries, barrows).

Significant points in the cultural landscape of Morava River Basin include sites with very long settlement continuity from the late prehistoric period to the early Middle Ages. This type of area is also associated with specific landscape structures such as levee in valley bottoms, river terraces, or visually dominant elevations. Their basic characteristics provide a good basis for comprehensive interdisciplinary research into human interactions with the natural environment and for modeling the dynamics of settlement network.

In this lecture, we will present the use of three methods that represent three fundamental steps in our research for detecting settlement patterns in historical landscapes: predictive modelling, remote sensing, and non-invasive geophysical methods.

In the first step, we apply predictive modeling to assess the potential occurrence of archaeological sites in the landscape. In the process of predictive modeling, we also utilize ALS data. Based on data from remote land surveys, we further detect potential anthropogenic relics in areas with the greatest potential for archaeological site occurrence. We then use ALS data to study changes in the landscape relief at long-term inhabited sites to understand the extent of human activity impact on the natural environment. As the final step of the research, we will present non-invasive geophysics, which we applied specifically to sites discovered and primarily described using the two preceding steps.

ID: 87872

Still, Mind the Gap! Bridging Theory and Practice in Settlement Pattern Computational Analysis

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KEYWORDS: settlement patterns, cost-based spatial statistics, rural settlement theory, spatial structure, social modelling

The use of spatial statistics in archaeology can be traced back to the advent of geographic quantitative approaches, providing a powerful toolbox for addressing many archaeological problems. In this context, different authors have developed approaches for analysing settlement patterns using different statistical methods, focusing on either the correlation between habitat and socioenvironmental features or neighbourhood dependence between sites. Both approaches are interrelated in that they aim to analyse human occupation strategies and their spatial signatures. Nevertheless, while different mathematical models have demonstrated a number of significant relationships, a settlement theory that generalises regularities in location strategies and spatial behaviours for different historical scenarios is still pending. In this line of research, the appealing discussion carried out in the seventies by authors such as Hudson, Rushton, Birch and Haining in the Annals of the Association of American Geographers on rural occupation and spatial behaviours is worth mentioning. In those works, the authors analysed settlement spatial processes in order to explain changes in habitat locations over time, where social dynamics like colonisation, spreading and competition, among others, were defined in terms of the distribution patterns they generated. Other works in this same direction defend, for example, the influence of urban cores (i.e., sites presenting a concentration of wealth and capital, individual enrichment and class formation, among other aspects) on the spatial structure of rural periphery. The development of models that capture the complex relationships between spatial regularity modalities and social processes can greatly complement ground-breaking methodological advances, allowing a better understanding of past realities. We present various examples in which we have tried to integrate this type of approach, combining the results of enhanced and innovative computational and spatial analysis with a theoretical framework of reference that allows building relevant historical knowledge and dealing with cross-cutting problems.

ID: 89641

Unraveling Megalithic Networks: Exploring Landscape Movement Patterns in the Megalithic Complex of Galicia Through Computational Modeling

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KEYWORDS: Landscape archaeology, Computational Archaeology,

This communication will present an ongoing research project that investigates the spatial dynamics between over 3,000 mounds and natural movement patterns across the landscape of Galicia, situated in northwest Spain. Employing



a computational framework, we construct three geospatial models of pedestrian transportation networks within a GIS environment, encompassing nearly 19 billion potential routes throughout the entire region. The analysis incorporates key mobility factors such as slope, river systems, and land cover to comprehensively capture landscape dynamics. Spatial statistical analyses are conducted to examine the proximity of these sites to locales naturally conducive to pedestrian movement, as well as regions with heightened visibility at both local and regional scales. The results reveal a discernible spatial correlation between megalithic monuments and landscape movement, suggesting a locational factor potentially extendable to other territories, such as the Atlantic facade of Europe. We propose that this spatial relationship could serve as a conduit for connecting daily human landscapes and facilitating the transmission of funerary ideologies along terrestrial routes, thereby fostering interconnected communities across the Neolithic landscapes.

ID: 90281

Defining the Influence of Environmental Variables on the Distribution of Palaeolithic Sites in Galicia

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KEYWORDS: **Settlement Patterns; Palaeolithic; Spatial Statistics; Landscape Archaeology; Computer Archaeology**

This study delves into a comprehensive investigation of the complex array of factors influencing the prediction of archaeological settlement patterns in the Palaeolithic period of the Galicia region, in the northwest of the Iberian Peninsula. Through a careful selection of three study areas, spanning from mountainous regions to depressed areas, the aim is to unravel the interaction between landscape topography and human settlement patterns during this prehistoric period. The choice of these heterogeneous areas allows for a detailed evaluation of how geomorphological characteristics, such as altitude, slope, and proximity to water sources, shape the spatial distribution of archaeological sites.

This methodological approach is based on refining previous predictive models, which employed a wide range of variables, to more precisely identify those factors that exert a predominant influence on settlement location. It is hoped that this approach will allow for a deeper understanding of the underlying mechanisms governing site selection during the Palaeolithic in Galicia. Additionally, the role of second-order factors, and how these affect site location through their interaction with first-order factors, will be explored in shaping archaeological settlement patterns, in order to provide a holistic view of human occupation processes in the remote past.

In summary, this study aims to shed light on the complex socio-environmental processes that guided the distribution of human settlements during the Palaeolithic in Galicia, highlighting the importance of considering a wide range of variables and perspectives in archaeological research.



ID: 90500

A comprehensive study of ancient irrigation landscapes in the arid climate through the application of remote sensing and machine learning methods

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KEYWORDS: **MSRM, TanDEM-X, water management, qanat, deep learning**

How complex societies shaped their environment and managed resources, particularly water in arid environments, can tell us about their development and decline. The main limitation of such studies is the creation of a uniform methodology, for instance, to detect irrigation features or study the landscape as a whole. As each area is different, it requires an adapted set of research methods considering the topography, landscape character and diversity of irrigation features.

This paper aims to present the results of the Under the Sands project devoted to the study of irrigation using remote sensing and machine learning methods in four selected case studies in Iraq, northern Iran and Turkmenistan. The research combines HEXAGON archival imagery, a 12 m resolution Tan DEM-X digital elevation model, synthetic aperture radar (Sentinel-1), and multispectral (LANDSAT and Sentinel-2) multitemporal datasets available in Google Earth Engine. We have prepared a methodology and parameters suitable to map diverse irrigation features in each case. Integrating multi-scale relief models (MSRM) computed with multitemporal vegetation indices (SMTVI) within the Google Earth Engine platform, we could map paleochannels and levees that are the remains of canals. The qanat, which is an underground water distribution system, was mapped using the YOLOv8 deep-learning model.

ID: 90657

Modelling Movement in the Desert – An Egyptian case study

REBECCA DÖHL- Humboldt University of Berlin

KEYWORDS: **Mobility, Spatial analysis, LCP, ABM, Desert**

Reconstructing or anticipating movement across a given landscape in archaeological contexts has been widely attempted through the use of Least-Cost-Paths (LCP) based on various algorithms. The movement costs these paths consist of rely on various assumptions about how people tend to move in an area, often stressing the factor of energy costs and therefore including slope analysis. Based on fieldwork conducted last year in the Central Eastern Desert of Egypt, a re-evaluation of some



of these assumptions will be presented for this particular case of desert movement. Some of the traces of caravans here show that the avoidance of steep terrain, for example, was partly neglected in favour of other advantages.

Similarly, this talk will outline an approach not based on Least-Cost-Paths and GIS, but on Agent-Based Modelling (ABM). ABM provides the ability to incorporate additional factors into a motion model. In this case we are trying to incorporate landmark navigation into the model. This type of navigation is still used in this area. Furthermore, as different groups of people have moved through the area over the millennia, the movement behaviour of different groups (e.g., foragers, herders, caravans) will be included. But landscape characteristics such as surface conditions have also to be considered. As a case study, different movements through part of the Central Eastern Desert will be modelled and tested against the actual traces of tracks and rock art stations found in the area.

ID: 90530

Agroecological Landscapes of Pergamon: Investigating Relations Between Natural Resources and Rural Settlements in the Environs of an Ancient City

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KEYWORDS: **agroecology, natural resources, landscape sensitivity, settlement patterns**

Our contribution addresses the complex relationship between humans and natural resources in the environs of ancient Pergamon (Asia Minor, today Türkiye). We aim to understand how natural dynamics have influenced settlement patterns, evaluating both the risks and benefits associated with settling. Our chronological framework focuses on the period from the 3rd century BCE to the 3rd century CE, which encompasses the societal transformation of Pergamon from the Hellenistic to the Roman Imperial periods, accompanied by changing human-environmental interactions. In this context, the utilization of natural resources establishes a fundamental connection between humans and the environment. Here, socio-ecological systems refer to the succession of adaptive and resilient processes that occur during the mutual transformation of landscape and society, which are closely linked to the cultivation of resources.

As a first step in our work, we investigated the potential impact of climate fluctuations on agricultural suitability in the ancient environs of Pergamon, based on spatial downscaling of the temporally high-resolution climate reconstruction MPI-ESM 1.2. Our results indicate that climate variability is a significant factor in the spatial distribution of suitable arable land, in addition to assumable static topographic parameters. This is particularly important as the natural foundations of settlements can be a fragile support for the development of societies during times of social reorganization. Additionally, point patterns of surveyed settlement



sites show an agglomeration of sites within alluvial plains during the 3rd century BCE to the 3rd century CE, which supports a higher water security with a growing population.

Furthermore, we consider how the integration of landscape sensitivity, which refers to the ability of a particular area to withstand change or disturbance, and agricultural suitability can be combined to gain a deeper understanding of the settlement patterns and population movements that took place during the Hellenistic to Roman Imperial periods.

ID: 90496

Mountain routes. A landscape study of the Sierra Nevada

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KEYWORDS: **Connectivity, Channel Network, Environmental Resources, Sierra Nevada**

This paper presents a study focused on the historical transformation of road-networks, with the aim to reflect on their continuities and discontinuities. Even if seemingly road-networks are characterized by long-term continuities and by environmental characteristics, not always historical inquiry confirms this assumption.

The studied area is located in Sierra Nevada in southern Spain, focusing on the municipalities of Bubión, Pampaneira, and Capileira, which is characterized by the presence of sharing practices.

Through the use of GIS platform, the study is identifying the road directions in this mountainous area that were used to manage the territory, but also to connect the Barranco de Poqueira with other valleys. The research is comparing the paths simulated, only considering environmental characteristics, and verified through field-work to observe the reliability of the simulations, with the ones recorded by historical cartography and documentary sources, which allows to observe how mobility has changed over time, also in relation to the environmental resources management practices.

In this way, it will be possible to assess to which extent, in different periods, natural constraints influenced the communities; choices and to improve the simulations by considering other factors, contributing to a better understanding of the factors that have influenced certain choices made by local social groups.

The purpose of this research is to understand how the community moved within the territory to manage resources and how the mobility network has changed with the changes that have occurred during the last centuries.

The area is part of the Antigone research project (ERC Stg 2019) conducted by the Laboratory of Archaeology and Environmental History at the University of Genoa, aimed at verifying whether the disappearance of the sharing of resource management practices has played a key role in the processes of abandonment of mountain areas between the 19th and 21st centuries.



ID: 89519

Simulation of the Environment and Human Movement Routes Across the East Rim of the Tibetan Plateau in the Late Neolithic Age

YIDAN ZHANG- University of Oxford

KEYWORDS: Human movement routes simulation, Predicting model, Exponential formula, Cultural communication networks

Across the east rim of the Tibetan Plateau, archaeological material dating from the Late Neolithic period shows evidence of both frequent cultural contact and distinct regional characteristics. The research seeks to answer how regions so different in both natural environment and cultural characteristics came to be connected. This study explores the simulation of human movement routes and human-environment interactions that occurred along the east rim of the Tibetan Plateau in the Late Neolithic through GIS analysis and network analysis.

Specifically, this study used the Analytic Hierarchy Process (AHP) to construct the exponential formulas used for subsequent calculations to generate the final river buffer grading maps.

First, the hierarchical model was constructed. The geographical factor index hierarchical model was divided into two levels, the first level was the target level O, which aimed to calculate the simulation index of geographical factors; the second level was the criterion level C, which included four geographical factors, namely river (R), slope (S), vegetation (V) and elevation (H), to reflect the geographical characteristics. The four factors are assigned a value of 0-5 according to common standard, for a total of 6 levels, the higher the level, the better for humans to live.

On this basis, an Objectives-Criteria (O-C) evaluation matrix was constructed to finally obtain the weights of each factor according to their importance, which led to the exponential formula for geographical simulation:

Simulation routes, after being corrected and interpreted by archaeological evidence, shed light on cultural communication networks. Combined environmental computational model and archaeological records, the predictive and simulative model of human movement routes could predict potential archaeological sites and settlement locations, and further reveal hidden archaeological features of the east rim of the Tibetan Plateau.

ID: 90767

Exploring Socio-Political Dynamics in the Bronze Age North-East Peloponnese: A Computational Approach

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KEYWORDS: Spatial Interaction Modelling, Aegean Bronze Age, settlement networks, socio-political organisation, computational archaeology

The political organisation of Bronze Age Aegean societies has long been a subject of study, with particular attention to regions of Crete and the Peloponnese. In this context, the north-east Peloponnese, encompassing the Argolid and Corinthia regions, has garnered significant interest due to the presence of important palatial citadels such as those of Mycenae and Tiryns. While qualitative approaches based on survey data of the north-east Peloponnese have established interpretations of the societal structures and economies, there remains a gap in utilizing computational methods to answer these questions. This study addresses the gap by applying a spatial interaction model on survey data of settlements from this region. The aim is to explore a landscape of inter-settlement socio-political dynamics, hierarchical relationships, and their evolution throughout different phases of the Bronze Age period. Through the simulation of networks within settlement distribution and consideration of the surrounding landscape, the model reveals sites that exhibit hierarchical tendencies over time, offering insights into the socio-political organisation of the region.

The results of the spatial interaction model highlight the emergence of regional interaction networks among settlements, shedding light on landscape transformations manifested by changes in the interconnectedness of Bronze Age communities in the north-east Peloponnese. Despite some limitations, the model utility in simulating networks and identifying hierarchical sites underscores its significance in informing well-established interpretations based on empirical data. Additionally, by grounding the computational approach in the theoretical framework of affordances, this study uniquely integrates qualitative data with quantitative methodology, aiming to inform the application of computational techniques in landscape archaeology. In doing so, it offers a nuanced understanding of Bronze Age socio-political dynamics. This approach not only complements existing qualitative and quantitative studies but also provides novel insights into the socio-political complexities of the Bronze Age Aegean societies and their relationships with the landscape.



LAC 2024

WHAT ARE YOU
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SESSION 08



WHAT ARE YOU DOING HERE?

SESSION ORGANIZERS

MARTA FRANCÉS-NEGRO

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The importance of raw materials in Prehistory was studied early in Archaeological Science. Understanding how communities of the past related to their immediate environment through raw materials studies allows us to infer important characteristics from past human populations: technology, mobility, territory, behaviour, or social complexity. Due to all these implications, its study has been developed from a multiproxy point of view: understanding raw materials source, manufacture processes or technology, permit to be addressed the implications for the livelihoods of the populations.

This session aims to address the different techniques and methods that allow us to know the raw materials and their sources of supply for the manufacture of tools, utensils, potteries, and other key elements in the development of past societies. These can be applied to different prehistoric chronologies, with a varied geographical scope. This session is opened to a diversity of issues about characterizations and interpretation of raw material in prehistoric tools and objects, from analytical techniques (thin section, SEM, XRF, FTIR, Raman, magnetism, micro-CT, isotopic...) which give measurable data and allow to approach the study of the past, through experimental process to comparative recreations. Applications of such methods to different inorganic materials in Prehistoric times are welcomed. Works emphasising integration of results obtained on distinctive features of past societies will be prioritised.

Some examples of topics:

- Raw material characterization.
- Raw material source identification.
- Chaîne opératoire of manufacture process materials.
- Experimental recreation of previous points.

Participation is open to all authors who want to present work on characterization of materials in prehistoric objects. It is intended that works on any prehistoric material (lithics, pottery, metals, glass, beads, colourants, fibres, etc.) and chronologies (Palaeolithic, Neolithic, Chalcolithic, Bronze Age and Iron Age) can participate so interaction between authors may be encouraged.

A debate among specialists will be expected where they could present novel approaches in object characterization and that they could integrate new perspectives (techniques, materials and/or chronologies). The techniques and results presented can help researchers to reflect on their own materials, integrating them to deepen the possibilities of studying their materials.



ID: 90577

Exploring lithic raw materials: a multi-proxy methodological study

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KEYWORDS: **Raw material, CT scan, lithic industry, rock, multi-proxy**

Geological characterization of lithic raw materials is crucial for identifying procurement areas and selection patterns, revealing the interaction between humans and their environment. Traditionally, this characterization has been conducted through optical and geochemical studies, including macroscopic and petrographic analyses to identify features such as texture, mineralogical structures, fabric, or crystallography. However, these studies involve destructive sample preparation and are not suitable for archaeological artifacts. In this study, we present a combined geological study performed through petrographic and Computed Tomography (CT) analysis based on the Mousterian lithic assemblage of Galería de las Estatuas site (sierra de Atapuerca, Spain). Natural samples of the recognized raw materials (sandstone, quartzite, and chert) were collected in the surroundings of Sierra de Atapuerca for comparison with archaeological items. A traditional petrographic analysis was conducted on both samples, allowing for a mineralogical interpretation. Furthermore, CT scanning has provided information about the internal structure of the rocks, such as fractures, metamorphism, porosity, or irregular fabric. This technique contributes to understanding rock composition without their destruction or alteration, enabling the analysis of artifacts with cultural value that should not be modified.

ID: 90783

Raw material procurement strategies of a quartz-based assemblage: the case of Navalmaíllo Rock Shelter

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KEYWORDS: **lithic raw materials, Neanderthals, Middle Palaeolithic, Iberian Peninsula**



Lithic raw materials studies can yield information on hunter-gatherer mobility, knowledge of the landscape and available resources, their characteristics, economic choices, and technological adaptation. Studies' objectives and methodologies can vary in focus, from raw material definition and characterization to procurement strategies, mobility patterns, mechanic behaviour, and constraints.

Traditionally, lithic raw material studies in the Iberian Peninsula focus their attention on describing and determining the origin of cryptocrystalline varieties of quartz such as chert, chalcedony and jasper. On the other hand, quartz, quartzite and other coarse-grained raw materials of metamorphic or igneous origin have been relegated to the background of raw material studies. Recently, studies of raw materials have been varying their objects of study and revealing the potential of studying "other" raw materials to gain a more complete picture of human behaviour and resource acquisition strategies.

Navalmaíllo Rock Shelter is a Middle Palaeolithic site from the archaeological complex also known as the Neanderthals Valley located in the Calvero de la Higuera, a karstic hill of Upper Cretaceous dolomites in the high valley of the Lozoya River (Guadarrama Mountain Range in Madrid – Spain). It has a Neanderthal occupation between MIS 5a and MIS3 characterized by a quartz-based lithic assemblage. Quartz is also the most abundant knappable raw material in the region. However, the assemblage is also characterized by a wide variety of raw materials groups and sub-groups that can point out more complex procurement strategies than initially recognised.

To understand lithic raw material procurement strategies at Navalmaíllo Rock Shelter, we used a multiproxy approach that involved source identification, raw material characterization and actualistic mechanic experiments. We will demonstrate how the combination of methodologies allows us to interpret the exploration, selection, and transport strategies of raw materials in the upper Lozoya River valley.

ID: 89745

Clays and soils for a new city: raw material catchment areas in Punic Qart-Hadasht (South-Eastern Iberia)

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KEYWORDS: Iberian Peninsula, Barcid period, local resources, chemical analysis, petrographic analysis.

The founding of Qart-Hadasht, or 'New Carthage', in 228/227 BC reaffirmed the Carthaginian presence on the Iberian Peninsula. The city would serve as its main political base and military port in the Western Mediterranean before being lost to Rome in the Second Punic War. However, the development of such a city also involved a significant challenge in which the use of the raw materials available in



the local environment was essential. This contribution aims to present the results of the geoarchaeological study of pottery and earthen building materials from the Carthaginian contexts, including military and domestic areas. Our methodology combines traditional and multidisciplinary techniques (XRF, XRD, CHN, TG, Petrography, SEM) to extract comprehensive information regarding socio-economic and environmental data. The results revealed distinct catchment areas for local wares and the use of mid-distance soils selected for mudbrick architecture, reflecting specific strategies and patterns to reconstruct the production mechanisms of local artisans. The heterogeneity of the data obtained and the multi-scalar approach implemented reveal the multiple strategies which were put into practice in the city despite the short duration of Punic control and the in-depth knowledge they had of the nearby hinterland of Qart-Hadasht.

ID: 90762

Disclosing the origin of sparry calcite temper in protohistoric ceramics through stable isotope analysis

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KEYWORDS: **Neolithic-Bronze Age, pottery, calcite temper, petrology, stable isotopes**

Sparry calcite is one of the most common types of temper, but is not commonly found in nature. Sparry calcite in ancient pottery has been interpreted, most of the times tentatively, as deliberately added temper supplied from crystalline calcite veins occurring in carbonate rocks, marbles and calcite alabastres and speleothems. Calcite temper is one of the most common in protohistoric pottery, Neolithic to Bronze Age, in El Portalón de Cueva Mayor archaeological site (Burgos, Spain). The petrological and stable isotope analysis of the calcite temper of Neolithic, Chalcolithic and Bronze Age pottery shards and the most common calcite types outcropping in nearby areas, from hydrothermal mineralizations to speleothems, revealed the occurrence of speleothem calcite fragments as tempers. The isotopic $\delta^{13}\text{C}$ and $\delta^{18}\text{O}$ values of calcite temper points to local speleothem calcite temper use during ca. 4000 years, obtained from the same karstic system where the site is located (Cueva Mayor Karsti System, Sierra de Atapuerca). Therefore, the possible supply region of the calcite used for the production of this pottery could be interpreted as local. Further, the identification of deliberate addition of speleothem calcite temper originating in caves, and its stable isotopic analysis, allows establishing interesting research approaches and inferences for calcite tempered pottery present in many archaeological sites: i) in karstic areas: the existence of calcite exploitation areas in local karstic systems, and the production and/or exportation of locally produced pottery with temper from local speleothems (vessels and/or calcite temper); ii) in non-karstic areas: the importation of calcite-tempered pottery vessels and/or temper.



ID: 90554

Origins of siliceous rocks exploited at Peña Capón (central Spain) and its relevance for understanding large social networks in Southwest Europe during the Solutrean

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KEYWORDS: Human mobility, Geochemistry, Lithic raw materials, Inland Iberia, Upper Palaeolithic

The Solutrean of southwest Europe (25000-20000 cal BP) is an outstanding case for studying human mobility and social networks of hunter-gatherers within harsh environmental conditions, given its coincidence with the Last Glacial Maximum. However, little is known about these topics in the inland territories of the Iberian Peninsula. Although it was assumed that humans avoided the Iberian hinterland during the coldest periods of the Last Glacial, recent research has demonstrated that some interior regions were recurrently settled. Thus, investigating networks connecting these regions with other areas is essential for understanding population dynamics and human-environment-climate interactions.

We present results on chert sourcing and mobility patterns of hunter-gatherers occupying the Peña Capón rock shelter (central Spain) during the Solutrean. We conducted macroscopic, petrographic, and geochemical analyses by means of LA-ICP-MS. The statistical treatment of data has allowed connecting different archaeological chert types with a specific geological source. Then, we used GIS tools to establish the least cost routes potentially connecting the archaeological site with the rock sources. Results show that siliceous rocks exploited at Peña Capón come from a wide variety of regions, including areas well beyond inland Iberia, thus demonstrating the existence of long-distance networks during the LGM.



ID: 89934

XRF portable: a methodological comparison with “traditional” measurements

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KEYWORDS: **X-Ray Fluorescence, Portable, Pottery**

The determination of the elemental composition of archaeological materials can be achieved through the application of various techniques: Raman spectroscopy, scanning electron microscopy (SEM), or X-ray fluorescence (XRF). However, XRF typically involves the destruction of part of the archaeological remain, which is not always feasible. Additionally, it requires well-equipped laboratory and trained personnel. The current implementation of portable XRF allows for on-site measurements in the field or directly on the object, without the need for sample destruction. However, are both methods equal? Do they provide similar measurements that allow for interchangeable use?

This study is based on the results obtained from traditional XRF measurements on a pearl. Additionally, portable XRF measurements have been conducted on the same pearl. Furthermore, measurements have been taken at three points on pottery using portable XRF. From these data, statistical analysis has been conducted to observe variations between measurements or for specific elements.

In this study, pottery materials from the Iron Age hillfort of Castromayor (Los Ausines, Burgos, Spain) have been examined using both techniques. Preliminary results of this study are presented here with a description of measurement choices and statistical analysis of the results. The aim is to provide data for the selection of the most suitable method in each situation.

ID: 91019

“They came bearing gifts”: the “exotic” objects from Horta do João da Moura’s tholoi tombs (Ferreira do Alentejo, Portugal)

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KEYWORDS: **Stereomicroscopy, XRF, XRD, 3rd millennium BC, Southwestern Iberian Peninsula**



Horta do João da Moura 1 is located in the limits of Porto Torrão, a ditched archaeological complex, in southern inland Alentejo. In Porto Torrão human remains have been discovered in pit graves, ditches, rock-cut tombs, and tholos-type tombs. In HJM1 there are at least 5, possibly 6, tholos-type tombs.

Tholoi 1 and 2 were excavated on the course of a preventive archaeology project. Set side by side, these 2 monuments display well preserved contexts, varied mortuary practices, and a chronological range that allows a comparative analysis of the two series and their integration into the new archaeographic datasets from the Baixo Alentejo region during the 3rd millennium BC.

Our multidisciplinary approach to human bones, archaeological objects, and tomb architectures was served by a combination of field methods and post field analyses oriented towards a detailed understanding of the mortuary management of these tombs. Archaeometric analyses such as radiocarbon dating of human bones, petrographic characterization of pottery and lithic objects, and X-ray fluorescence and diffraction of metals and red pigments were all critical to our interpretation.

Referring to the limestone or flint samples that show affinities with the Spanish subbetic system and the Portuguese Estremadura; the valves from marine or estuarine species; the presence of cinnabar; or even to the small golden piece that, based on its mineralogical composition, including platinum and tungsten, suggested provisioning in the north or centre of the Iberian Peninsula, we discuss interaction networks at various scales spanning hundreds of kilometres.



LAC 2024

MOBILITY,
SETTLEMENTS
AND
ARCHAEOLOGY:
HOW ANCIENT
MOVEMENTS
HAVE
SHAPED THE
LANDSCAPE?

SESSION 09



MOBILITY, SETTLEMENTS AND ARCHAEOLOGY: HOW ANCIENT MOVEMENTS HAVE SHAPED THE LANDSCAPE?

SESSION ORGANIZERS

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Movement is a mechanism through which which humans interact, explore and assign an order to the space around them (Ingold and Vergunst, 2008). Therefore, investigate mobility networks is essential to understand social dynamics. This session focuses on the potential outcomes of studying the integration of mobility and settlement patterns to understand the frameworks of Ancient Landscapes. In this sense, the session aims to explore ways to integrate movement and settlements patterns in order to get a better understanding of landscapes in Archaeology. We would like to examine the theoretical and methodological implications of an integrated study of movement, pathways and settlement dynamics. In order to do it, it is also imperative to uncover the temporality of the communication networks in relation to territory as well as their role within the social framework. In addition, when analysing communication networks, it is also imperative to uncover the temporality of the communication networks in relation to territory as well as their role within the social framework. the questions to discuss are: When a communication network between different points started? When the material marks were created and when abandoned? It is possible to identify changes in the movement direction and intensity over time? It is possible to observe the interaction of path networks and settlements patterns at different temporal and spatial scales? These variations can explain the changes in the settlement dispersions over the different historical periods? What methodologies we need to ascertain it and what theoretical approaches we need to explain? What is the contribution of state-of-the-art digital technology?

We welcome papers addressing these questions bringing together different research approaches, integrating a variety of mobility analyses in different chronologies and regions. The session outcomes will be, first of all, an overview of current approaches to mobility in the archaeological study of territorial past dynamics; secondly the session aims to connect methods and theoretical approaches to mobility in archaeology developed for different chronological periods. In this sense the discussion will be useful for researches in different areas with different historical objectives but sharing common methodological issues. Finally, in all these ways, this session contributes to advances in the understanding of territorial formations through the study of human movement.



ID: 90292

A combined GIS and historical approach for the modelling and identification of medieval transhumant routes in South France

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KEYWORDS: **Routes, GIS, pastoralism, medieval, written sources**

This paper presents the results of a multidisciplinary research focused on the medieval transhumance routes connecting the lowland winter pastures of Provence to the Southern Alps summer pastures (France), using different sources. The study aims to compare the geographical information about shepherd's journey's recorded in written sources with the theoretically optimal routes obtained using GIS-based digital tools. To do this, we first localised the places mentioned in the medieval documents related to transhumance including the departure and arrival of different routes and places through which the herds passed. Next, we modeled different possible layouts between the start and ending point of each route using GIS-based methods: Namely, least-cost path calculation and focal networks. Then, we compared the digital layouts with the places crossed by the shepherds according the documents. Our goals are, for on the one hand, to assess the soundness of GIS procedures to model ancient seasonal pastoral routes. In this regard, another important goal is to explore the importance of physical constraints and socioeconomical factors in choosing a route for seasonal migration of herds from plains to the uplands and vice versa. On the other hand, we build a proposal of most probable pathways to carry out the seasonal displacements addressing the 'who and why' questions concerning medieval transhumance. Finally, our ultimate objective is to understand the role of seasonal pastoralism in the human-making of medieval landscapes in the Provence

ID: 90693

Routeways of the North York Moors: Towards a Typology

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KEYWORDS: **Routeways, Holloways, Movement, Landscape, Settlement**

Historic routeways have often been overlooked by archaeologists. To date, discussions of mobility in archaeological studies have focused on isotopic and material evidence, rather than the physical manifestation of movement. The unusual spatiality of routeways means that they cannot be categorised into either a 'site' or a 'find' which governs most of archaeological practice. The omission of



routeways from the archaeological discussion is particularly true in Britain.

An area of Britain with many ancient routeways – engineered and erosional - is the North York Moors National Park. These routeways are both remarkably well preserved and nationally known, but are yet to be comprehensively mapped. Through a series of community archaeology projects, my research aims to map and characterise these features in the North York Moors for the first time.

This paper discusses the results of the first of these projects: a LiDAR survey. It revealed a dense network of routeways which cover great distances, connecting diverse sites. The most significant discovery has been the variation between routeways; they differ drastically in morphology, some single, erosive routes, no more than a few meters long, others large complexes incorporating engineered and erosive elements, upwards of a hundred meters across, and multiple kilometers in length. There is an imminent need for a typology to organise these varying routeways.

As such I will outline a provisional typology for these features in the national park, describing two major families - individual routes and complexes - and their further subcategories. This discussion will serve as the jumping off point for a broader discussion of these routeways, particularly their creation, chronology, and relationship with features of archaeological interest. It is further hoped that this typology will also contribute to a growing discussion of novel methodologies and theoretical frameworks for the discussion of movement in the landscape.

ID: 89688

An archaeobiographical approach of the river valley of the Schijn (Antwerp-Belgium): interdisciplinary research into the transformission of its landscape features in a suburban context

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KEYWORDS: **river valley, mobility, transformission, long-term, interdisciplinary**

The river landscape of the Schijn valley east of the present city of Antwerp is currently almost a “lost landscape”. The rapidly increasing urbanization of the metropolis hides the multilayered landscape features and structures that were the result of the permanent interaction between people and landscape. The river itself was both a frontier that had to be crossed as a corridor that connected larger and smaller worlds, intraregional communications, and upland hinterlands. The Schijn river thus formed a lateral communication axis between Antwerp and the eastern hinterland. The river mouth and its alluvium were an important aspect of the general landscape setting of Roman to medieval Antwerp. The river heritage contains dams, brooks, crossings, but equally local governance structures typical



for wetlands. Further upstream we find settlements at river crossings, and rural riverscapes defined by wetlands as well as sandy ridges. In the early modern period, the valley was the carrier of water supply systems that provided Antwerp with fresh water.

Today the landscape is damaged, the current urban landscape is a heavy layer that hides the historic and archaeological landscape features. However, an interdisciplinary retrogressive reconstruction of its defining features between the iron age and today by combining data from written sources, archaeological sources, place names, micro-topographical surveys and environmental sources, allow us to understand the general landscape dynamics. This result allows us to understand and interpret the role of the river as corridor and border, including the interaction with power-structures, and thus (the control) of movement in the landscape in a long-term perspective.

ID: 92330

A zooarchaeological approach into husbandry differences between riverside and hilltop settlements during the early Iron Age in the north Iberian Peninsula hinterland

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KEYWORDS: **Iberian Peninsula, Iron Age, Zooarchaeology, livestock, husbandry.**

In the first millennium BCE the north Iberian Peninsula hinterland went through a climatic transition from subboreal to subatlantic at the same time as a cultural transition locally known as the Cogotas to Soto culture transition, marking the shift from the Bronze Age to the Iron Age. This could led farmer-herder groups settle to take advantage of the environment. Agriculture was focused on river plains, while herding expanded to mountain regions. Consequently, two types of settlements emerged: hilltop villages (castros) and riverside villages. This study aims to contribute with additional zooarchaeological data for understanding livestock differences between that two type of villages. For this purpose, faunal remains of Castromayor site (Los Ausines, Burgos) (ca. 2700-2350 cal. BP) were studied and compared with additional data obtained from a bibliographic review. This site is one of the richest in faunal remains from the early Iron Age in the Iberian Peninsula. This fact, combined with its geographical location, makes it an important example of a hilltop village for study.

The study results reveal a faunal record dominated by domesticated livestock (cattle, ovicaprine and pigs), with hunting species present in all sites. Kill-off patterns suggest comprehensive use of secondary products throughout the animals life. However, breeding for meat consumption predominates in sheep and



pigs. Upon analyzing the settlements, significant differences emerge. Riverside sites show a higher percentage of wild species and a prevalence of ovicaprine livestock. Conversely, in hilltop villages stands out cattle, with higher proportions of pigs and horses. This would imply a differentiated livestock management and husbandry at Iberian Peninsula hinterland during the early Iron Age. As a result, this data points to the early Iron Age as a key era for herding dynamics, leading to the emergence of populations characterized by a central oppidum surrounded by small producer villages.

ID: 88609

Borders, routes, territoriality – late Bronze and Early Iron Age hoards in landscape. Polish examples

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KEYWORDS: **hoards, borders, routes, territoriality, Late Bronze and Early Iron Age**

Are all archaeologically observable relics of human activity part of the landscape? While the answer seems obvious, studies on the deposition of metal item hoards have for many decades neglected – of course, with a few exceptions – the issue of the relationship between the places of hoard deposition and various natural and man-made elements of the surrounding space. Such research was launched only in the early 21st century.

The paper shall present several examples of Poland's Late Bronze and Early Iron Age hoards, showing that the hoard deposition sites were critical landscape-creating elements and facilitating a better understanding of cultural processes manifested in other spheres. Those processes are, e.g., connected with demographic pressure, increasing territoriality, the establishment of routes and control over them, the erection of monumental structures, and the use of the existing landscape and the structures within it.

The discussed aspects are all the more crucial in that the Late Bronze and Early Iron Ages were the time of extraordinary mobility of ideas, raw materials and objects, so presumably people as well. While the former three have long been discussed in the archaeological literature, the latter are difficult to trace in the available sources. The research presented here is part of the project titled "A Biography of Late Bronze and Early Iron Ages Hoards. A Multi-faceted Analysis of Metal Objects Related to Monumental Constructions in Poland" (UMO-2021/41/B/HS3/00038), funded by National Science Centre, Poland.



ID: 90433

Ancient Pathways: The Achaemenid Royal Road and Roman Roads Unveiling Movement Dynamics on the Anatolian Landscape

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KEYWORDS: **Achaemenid, Royal Road, Roman roads, Anatolia, Landscape**

This study undertakes a comparative analysis of the courses taken by two prominent ancient road networks the Achaemenid Royal Road of the Persian Empire and segments of the Roman roads that traversed Anatolia. The aim is to elucidate whether the itinerary of the Achaemenid Royal Road laid the groundwork for subsequent developments, notably influencing parts of the Roman road network in Anatolia. Also, have the functions served by the superimposed sections changed over time?

Both Empires renowned for their vast territorial expanses, established strategic settlements that played crucial roles in governance, trade, and cultural exchange. Therefore, the Achaemenid Royal Road, spanning from Susa to Sardis and the intricate network of Roman roads present fascinating case studies in landscape integration as connected disparate regions. This research underscores the significance of considering superimposed linear settlement patterns from the Achaemenid and Roman eras in Anatolia as a valuable source for reconstructing movement direction. Also, a nuanced understanding of the complex tapestry of ancient landscapes has been enhanced by employing a comprehensive methodology, combining archaeological evidence, historical accounts, and geographical considerations. The results indicate that the proposed course of the roads commences from the northern part of Anatolia, navigates the center, and then passes through the southeast of the region. Focusing on the trajectories of these thoroughfares as integral components of the broader landscape, the study sheds light on the societal impacts of these road systems. They not only facilitated military conquests but also served as conduits for trade and administrative cohesion. Furthermore, The Anatolian landscape, as a canvas for these infrastructural endeavors, reflects the convergence of these ancient civilizations, emphasizing the lasting impact of Achaemenid planning on the Roman road network in Anatolia.

ID: 90681

From place-based to path-oriented approaches to interpreting pastoralist landscapes: Examples from eastern Africa

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KEYWORDS: **Paths, Patsoralism, Mobility, East Africa**



Interpretation of archaeological landscapes is inherently place-based. While landscapes are comprised of differently valued points and nodes, they are equally constituted through networks of paths and other lines of connectivity. In mobile societies, especially pastoralist communities, to borrow observations from Deluze and Guattari, while points can determine the orientation and destination of paths, from an ontological perspective, points are always subordinate to those paths they determine – which is the reverse for sedentary populations. As noted cross-culturally and ethnographically, the flexibility intrinsic to pastoral ways of life commonly lead to more fluid notions of personhood than in sedentary communities, and renderings of space are unlikely to create social identities through attachment to fixed places. Instead, as noted by Chris Tilley, daily movements through a landscape become forms of biographic encounter that simultaneously reiterate and recall past activities and events through the traces encountered along different paths. Writing more path-oriented interpretative archaeologies remains challenging, however, especially given the common ephemeral nature of the traces of mobility. Drawing on examples from different parts of east Africa, this paper is intended to offer some suggestions as to how to overcome these challenges.

ID: 87101

Ancient Port Towns of Malabar Coastal Plain in India: From Manuscripts to Landscapes

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KEYWORDS: **Urban centre, Amphora, Muziris, Port Town, Sangam Text and Maritime Trade.**

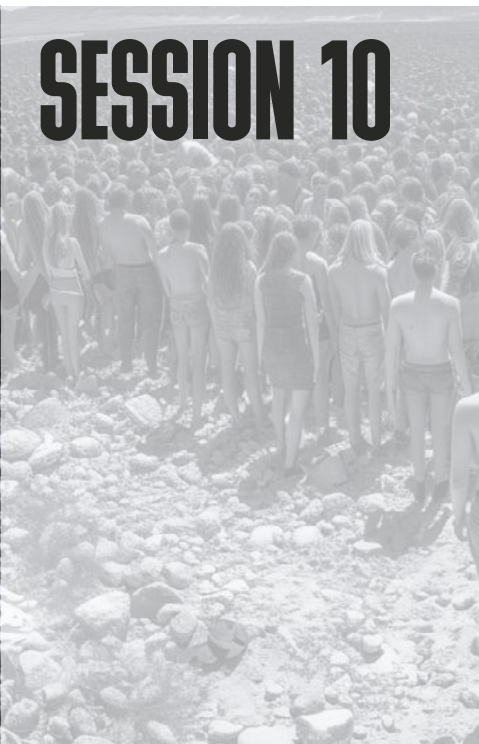
The landscape of Malabar Coastal Plain was paved way for the growth of maritime contacts with foreigners. Pepper was the important exported item from here because this region only having pepper production on the West Coast of India. The paper is attempting to analysis the available references regarding the port towns of Malabar Coastal Plain in Kerala. It is merely preliminary investigation about Early Historic urban centres with the available literary evidences and excavations reports that would help us to understand the ancient port towns in Malabar coast. There were number of ancient port towns mentioned in classical Greek and Sangam literatures. For instance, Naura, Tyndis, Nelcynda, Bacare and Muziris were the major sites of Malabar Coastal Plain which represented only in the text but not able to locate these sites on the ground so far. There are lot of studies on site based as well as state based regarding the various aspects of ancient port towns. But, it is mainly focussed on factual narration and theoretical interpretation.



LAC 2024

ARCHAEOLOGY
OF THE
UPLANDS:
SEARCHING FOR
MODELS AND
METHODOLOGY
IN HIGH
ALTITUDE
HUMAN-SHAPED
LANDSCAPES

SESSION 10



ARCHAEOLOGY OF THE UPLANDS: SEARCHING FOR MODELS AND METHODOLOGY IN HIGH ALTITUDE HUMAN-SHAPED LANDSCAPES

SESSION ORGANIZERS

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Upland archaeology is a field that has gained increasing attention in recent years due to its potential to uncover unique insights into the lives of communities, living in mountain landscapes and environment. Anyway, there are certain models that scholars tend to repeat uncritically: Is there greater resilience in the uplands that makes the mountains more suitable for times of crisis? Why so often in Italian mountains Middle Ages sites insist over bronze age occupations? Is it possible to trace the network of late prehistoric ephemeral pathways? Is it true that the importance of the uplands is decreasing over the classical age and the Early Middle Ages? Can we really talk about cultural backwardness for mountain regions in the Middle Ages?

Starting from a common geographical framework, the proposed session will focus on the peculiarities of mountain landscapes compared to lowland ones. The aim is to bring together researchers to explore the multifaceted aspects of upland archaeology. We invite diachronic contributions, from late prehistoric times, through the classical age, to the Middle Ages, that delve into the various aspects of archaeological research in upland regions, spanning from methodology and technology to interpretations and implications.

SESSION OBJECTIVES:

- **Methodological approach:** This section will focus on methodologies and technologies that have enhanced our ability to investigate upland archaeological sites. Presentations on cutting-edge remote sensing techniques, GIS applications, and interdisciplinary approaches are encouraged.
- **Cultural Significance:** Explore the cultural and historical significance of upland regions. How do upland communities adapt to their environments, and what can we learn about their cultural practices and traditions from the archaeological record?



- **Environmental Context:** Investigate the impact of climate change and natural processes on upland landscapes. How have these factors shaped the archaeological record in these areas, and what insights can we gain into past environmental adaptations?
- **Community Engagement:** Discuss community involvement and stakeholder collaboration in upland archaeology projects. How can we effectively engage with local communities, and what are the ethical considerations in conducting research in these regions?
- **Interpretation and Synthesis:** Share case studies and findings from upland archaeological projects, emphasizing interpretations, and synthesizing data to develop comprehensive narratives about the past.

WHO SHOULD ATTEND

This session is open to researchers, practitioners, and PhD students interested in upland archaeology, as well as those from related disciplines, such as anthropology, geography, and environmental science.

BENEFITS TO THE FIELD:

By exploring the unique challenges and opportunities associated with upland archaeology, this session aims to advance our understanding of human-environment interactions in elevated landscapes. It will also foster collaboration, knowledge exchange, and methodological innovation in the field.



ID: 90365

The language of living mountains: livestock settlements and occupation dynamics in the Puigpedrós massif, Duran, Vallcivera and Llosa valleys (eastern Pyrenees, Spain)

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KEYWORDS: Landscape archaeology, archaeological survey, cultural landscapes, high mountain areas, c14 dating

Due to the increase in research on the main European mountain systems, many of these spaces are currently recognized as cultural landscapes with historical significance. From a theoretical perspective of landscape archaeology, the Landscape Archaeology Research Group (GIAP-ICAC) has conducted archaeological surveys on the Puigpedrós massif, Vallcivera, Duran, and Llosa valleys (la Cerdanya, Spain) since 2018. This survey aimed to characterize human occupations in these highlands throughout history and integrate the data into the framework of the team research in the Eastern Pyrenees.

As a result, 240 structures at 66 archaeological sites have been meticulously inventoried in the area. Test pits were made in 27 of these structures, between 2300 and 2500 m, to specify their functionality and obtain reliable dating material. Almost all of these studied structures were livestock occupations, dry-stone huts, and enclosures. There were also settlements surrounded by dry-stone walls with differentiated occupation phases in an excellent state of conservation.

With the data provided by the radiocarbon datations, we reconstructed a chronological model reflecting the variations in long-term occupation of the different valleys of the area. Additionally, the individual study of these structures provides a greater understanding of the mountain exploitation in this section of the Pyrenees throughout history, showing the importance of livestock activities in terms of the anthropization of high mountain spaces and the subsequent reconstruction of mountain landscapes.



ID: 90607

“There are Prehistoric cities up there”. Methodological insights on fortified hilltop sites in southern Albania

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KEYWORDS: **hilltop fortified sites; survey; spatial analysis; Albania.**

Analyzing settlement dynamics and land use in southern Albania, the region that during classical antiquity took the name of Epirus, necessarily requires dealing with the geomorphological peculiarities of the area. The mountain reliefs branching from north to south for almost the entire extent of the territory, combined with the scarcity of lowland plains, have major implications on the study of these areas from a theoretical, methodological as well as a practical point of view. These elements become particularly striking in the study of highland fortified sites. Accessibility to these sites is often reduced due to their location on uneven surfaces at high elevation and along steep hillsides. Moreover, archaeological visibility is reduced as a result of slope erosion and runoff activities, which also increase the scattering of archaeological artifacts. All of which makes the intra-site survey and interpretation of these contexts in the broader regional framework further challenging and sometimes lacking.

The presentation aims to expose the problems faced and the solutions applied during field surveys of three such sites, Badhra, Karos, and Kukum, located along the rocky coast between Porto Palermo and Borsh. These were investigated in 2023 as part of the activities of the FortNet Project, which aims to reassess these sites by implementing the available documentation with non-invasive methodologies to better understand their function and development dynamics from a diachronic perspective.

ID: 90638

The Method of Archaeological Analysis of Architecture applied to Rural and Mountain Contexts. The case of Seppiana

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KEYWORDS: **Ossola, Archaeology of Architecture, Mountain Archaeology, Interdisciplinarity, Global Archaeology**

The results and reflections derived from a two-year study are presented, which examined the construction culture of Seppiana, a mountain village in the center of the Antrona Valley, one of the valleys of the wider Ossola Valley (northern Piedmont, in Northern Italy). The study involved 70 buildings, one of which was ecclesiastical, for which architectural, planimetric and stratigraphic analysis of the relevant elevations were carried out.



From the outset, the study was conducted with an approach based on principles from global archaeology; starting, therefore, from the assumption that each building is the outcome of a complex system of knowledge and techniques, connected to the historical context and social structures, I chose to conduct the study with an interdisciplinary research method.

The study has highlighted the urgency of documenting a heritage of material culture that is disappearing due to the abandonment of mountain contexts or, on the contrary, invasive modernization interventions; furthermore, it highlighted the need to reconsider and implement the application, to mountain contexts, of the archaeological analysis method of the construction and the consequent interpretation of the data.

The investigations have, in fact, highlighted how the homes were designed according to a predominantly functional scheme, linked to an agricultural economy, and built based on the knowledge transmitted from generation to generation by local labour, who used local materials.

Read in this light, the different wall typologies identified can be interpreted not only as the product of a chronological evolution, but also as coexisting walls, the result of a reasoned choice by the bricklayers who, over time, apply a construction method identified as effective, in relation to the location and the construction material available.

ID: 90446

The Emilian Apennines in the 2nd millennium BC: new perspectives on the settlement pattern

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KEYWORDS: Upland Archaeology, Bronze Age, Settlement Pattern, Viewshed Analysis, GIS

In the past decades, several works have attempted to reconstruct the Bronze Age settlement pattern in the mountain regions of Emilia (Northern Italy). These studies have provided a fundamental basis for drawing general historical trajectories and highlighted the existence of at least two territorial districts, characterized by different aspects of the material culture that seems to reflect distinct regional networks east and west of the Taro River valley. However, most of the previous achievements relied on surface finds, chrono-typology of materials, and limited methods of topographic analysis.

By recalling the theoretical approach of David Clarke three analytical scales, we will present the preliminary results of our ongoing research at the micro, semi-micro and macro scales, carried out in the upland areas of four river valleys (Reno, Panaro, Secchia and Taro). The application of different methods, such as extensive surveys, manual coring, detailed photogrammetric surface modelling from drone, spatial analyses in a GIS environment (viewshed analysis, LCPA, percolation analysis), and



the results of the excavation at Monte della Croce, dated at the 13th-11th century BC, are currently providing new data about the settlement pattern, the internal morphology of the fortified sites and their differentiated territorial functions.

ID: 89852

Architecture in and on the mountains: adaptation and innovation of the historic built environment

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KEYWORDS: historical building archaeology; mountain architecture; construction techniques; topography; GIS.

The role played by the mountain reality, as a context characterized by an extraordinary variety and wealth of heritage, not only environmental and relating to the landscape, but also historical-cultural and therefore architectural, has become central in recent years. In particular, historic buildings constitute a fundamental component of the present-day mountain communities, and have a significant impact on them, both in quantitative and qualitative terms: they represent a resource that proposes settlement models that are still relevant today, but also offer ideas for contemporary urban planning with a view toward protection and enhancement.

Studying mountain architecture thus makes it possible to outline a very precise profile not only from a historical-architectural point of view, but also from a socio-economic one, since it is, to all intents and purposes, intelligent and sustainable architecture: it is realized, today as in the past, by exploiting local raw materials and natural resources, thus respecting the environmental and landscape context in which they are inserted, with the awareness that they are neither unlimited nor infinite. It is an architecture capable of rationally and consciously "choosing" the best place for construction, an indicator that over the centuries has allowed the survival and preservation of this heritage. The technologies employed are based on a precise knowledge of materials (stone, wood) and construction processes, coming from knowledge passed down through generations and defining the distinctive features of a building, which becomes "traditional", with an important cultural, technological and architectural continuity.

The focus of the presentation will be on the territory of the high valleys of Bergamo (Brembana Valley): through the methodologies proper to the archaeology of architecture, functional case studies will be presented to grasp the occupational dynamics of this wide context, which data will be managed through GIS for a clearer understanding of the landscape transformations.



ID: 89969

“What are [humans] to rocks and mountains?” Some self-reflective notes about archaeological practice in mountainous and upland landscapes

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KEYWORDS: upland archaeology, landscape archaeology, geoarchaeology, theoretical approaches, methods

There is a growing recognition of the need for bespoke landscape archaeology methodologies for upland and mountainous environments. The archaeology of these landscapes is traditionally seen as ephemeral (read less important), due to the seasonal nature of many of the activities taking place here. Survey methodologies honed and tested in plains and valleys are not always suitable, not only in strategy (i.e., cost, time, labour), but in the types of archaeology they are focused on locating (e.g., permanent settlement). Therefore, to undertake surveys and investigations that are more sensitive to the specific geographies and ecosystems of these environments, it is crucial that we adapt our methodologies to focus on activities, or the material remains of the interactions between humans and their resources. We would also argue that we need to revisit our theoretical approaches. Mountainous environments are still often seen in either/or terms. They are either a barrier or a corridor, dividing or unifying – but they may be one or the other, both or neither at different (or even the same) time. Therefore, to generate more sensitive understanding of past landscapes in these environments, we need to take into consideration the variables of time, space, and place, and adapt our methodologies to consider these variables from multiple perspectives (ecological, human). Using examples from our own surveys and projects, we will reflect on these questions, and on the value of multidisciplinary approaches (landscape archaeology, ethno-anthropology/archaeology, geoarchaeology etc.) to investigating these landscapes.

ID: 89332

A place for gods and men: Tor dei Pagà (Vione, Valcamonica - Italy)

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KEYWORDS: Brandopferplatz, Iron Age, Fortification, Later Middle Ages (13th/14th century AD)



Since 2011 annual archaeological excavation campaigns have allowed us to reconstruct the historical events that occurred at the site known as Tor dei Pagà, situated in upper Valcamonica at elevation of 2250 m asl. The site was frequented during two distinct phases: the first in the Iron Age when ritual fires (Brandopferplatz) were lit there and the second in the Later Middle Ages (13th/14th century AD) when the site became a fortified refuge for men-at-arms. The selection of the site was not random in either period: a prominent rise made the Iron Age fires visible from the valley floor while the location would have been difficult for potential attackers to reach during the Middle Ages. Unique cases of use or part of a network in one or both cases? What reasons drove the choice of this place and caused its abandonment?

A possible reason in both cases – although much more likely in the case of the Middle Ages – is that climatic conditions became unfavourable to human habitation at higher elevations.

We address these issues using both traditional archaeological tools and also bioarchaeological data.

ID: 90617

An analysis protocol for mountain areas and rock structures: preliminary results on post-medieval landscapes in the Underlandscape project

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KEYWORDS: rock structures, mountain landscape, non-invasive techniques, environment studies, postmedieval archaeology

Over the last two years, the University of Pisa and the CNR conducted a multidisciplinary and diachronic study on the mountain landscapes as part of the PRIN; project, aimed to the fine-tuning of an analysis protocol to be used for hypogean structures and based on non-invasive scientific techniques, operating mainly in situ. The territory selected as a sample to test and implement this methodology corresponds to the area of Lunigiana, Garfagnana and Mediavalle del Serchio (north-west Tuscany): this present several examples of caves and rock shelters in different landscapes and historical contexts, which can be studied by acquiring a deeper knowledge of these structures and the environment where they were and are currently located.

The experimented methodology intends to integrate the technical-scientific and historical-archaeological approaches through the application of non-destructive diagnostic methods and digital and multimedia technologies for archaeological, geo-historical and palaeobotanical research, including 3D modelling and aerial photography from drones. Part of the project involves also the collection of oral sources and the sharing of the research progresses with the local population.



On this occasion we intend to present the research strategy adopted in the UNDERLANDSCAPE project, together with an initial analysis of the data collected, introducing the first result of the study about the use of these hypogean structures and their landscapes in Modern and early Contemporary Age. For these chronological ranges, written and cartographic sources combined with archaeological and botanical surveys and 3D reliefs, have provided some interesting insights into the possible connection between the use of the caves with road system and transhumance, as well as with specific productive uses of the forest that changed over time, between the 16th and 20th centuries.

ID: 90068

Testing survey strategies in marginal and remote areas in the Apennine uplands. The case of the MoLuLaP project

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KEYWORDS: Archaeology of Uplands, Landscape Archaeology, Mobile GIS, Artifact surface survey, Apennine Landscape

The Monti Lucretili Landscape Project (MoLuLaP) explores an Apennine upland landscape northeast of Rome from a diachronic perspective. The main goal of the project is to examine the range of socio-economic and cultural activities that have defined and shaped the historical rural landscape over the centuries, as well as to assess the impact of human activities on the environment.

The upland areas are difficult to investigate and are hardly accessible due to geomorphological characteristics that inevitably impact field research. Consequently, archaeological surveys in mountainous contexts require special attention to methodology, as evidenced by the growing number of survey projects focusing on upland regions in the past decade.

The aim of this paper is to emphasize how surveying diverse forested and rocky landscapes can offer an opportunity to reconsider and reframe survey strategies, with the goal of establishing best practices for upland archaeology.

On one hand, on-field research is complemented by laboratories aiming at community engagement, which is particularly essential in contexts where the archaeological record is scarce or hardly visible and/or accessible. On the other hand, considering the environmental challenges, survey activities in marginal contexts require continuous experimentation, testing new strategies daily to select survey areas and overcome critical issues, primarily related to visibility. In this respect, we will discuss the self-critical approach developed, which enables reflection on the challenges and potential of the various strategies employed. For instance, in addition to the traditional line walking survey, we experimented with the point sampling method as well as with the combination of extensive and intensive survey along mountain routes and paths. Moreover, we will discuss the benefits and limitations of using a GIS mobile application in these remote contexts.



ID: 90272

An innovative approach to the mapping, characterisation, and dating of Hong Kong's terraced upland landscapes.

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KEYWORDS: **Terraces, LiDAR, HongKong, OSL-PD, Geoarchaeology**

The research presented in this paper is using an innovative GIS-based interdisciplinary approach combining historical research, geoarchaeology, aerial remote sensing, and geoscientific dating to elucidate the character and evolution of pre-colonial land use in Hong Kong's mountainous uplands.

Of particular note are the thousands of boulder-faced cultivation terraces, which despite modern afforestation are clearly imageable in LiDAR data and were prominent features in high-resolution 1960s' aerial photos on the then denuded slopes. The cultivation terraces are conventionally associated by local historians with ancient tea growing on the mountains of the central New Territories (NT) and Lantau Island, which was mentioned in 17th-to-19th-century (Qing dynasty) documentary sources. However, until recently the terraces had remained uninvestigated, undated, and poorly understood by archaeologists. Moreover, they were also uninventoried and unmapped by the heritage authority and therefore potentially at risk.

In order to address this archaeological gap in knowledge, a programme of systematic mapping and characterisation of the terraces was initiated by the writer, but ground-truthing, sampling and dating were also clearly desirable. To that end, a campaign of fieldwork in late 2023 targeted four blocks of cultivation terraces identified in remote sensing data: three in the central New Territories (NT) between Tai Mo Shan (957m) and Grassy Hill (647m), and one block on Nei Lak Shan (751m) on Lantau Island. In total, sixteen terraces were sampled using optically stimulated luminescence profiling and dating (OSL-PD). Based on the OSL field profiles, further samples were collected for OSL dating back in the lab at St Andrews.

The paper presents the results of the recent geoarchaeological fieldwork, explores the OSL dating results in light of the morphological contrasts between terraces in the NT and on Lantau Island, and for the first time offers a scientifically dated chronology for upland land use in Hong Kong.

ID: 89581

Sacred Landscapes: Cairns in Hills and Highlands of Uruguay

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KEYWORDS: **cairns, indigenous people, hills, sacred places, Uruguay**



A variety of archaeological sites are located in the highlands of Uruguay, in prominent areas with expansive visibility over the landscape. Within this record, we have chosen for this study a particular type of site composed of cairns and ringcairns. Based on previous research, our interpretation is that these elevated locations and their mounds were sacred hills for the indigenous people. Archaeological interventions, European documents from the conquest of the Río de la Plata, indigenous oral tradition, and place names form the foundation of our record.

Through surveys, we have identified spatial organizing aspects of the sets of stone mounds. Prominent summits of the topography were selected for their placement. These locations have visual connection over wide and clear horizons, as well as over valleys and other mountain ranges. They are not characterized by immediate access to resource concentration zones and productive areas, although they visually control them. The cairns, spatially integrated with outcrops and other physiographic features, are located at the highest point of the hill and at other points resembling balconies.

Despite the absence of detailed chronologies, these sites were constructed by indigenous peoples as funerary spaces, ritual and ceremonial sites, places of worship, and periodic gathering places for communities. The constructions reveal forms of spatial organization reflecting territorial appropriation by a kinship group or community, serving as indicators of social relations. The desire for longevity and their broad spatial scale suggest a worldview that constructed a sacred landscape through an extensive network of hills and highlands. The sacred nature of many of these hills persists and reaffirms itself today under different modalities.



LAC 2024

CHALLENGING
LANDSCAPES
AND HUNTER-
GATHERERS
SUBSISTENCE
AND MOBILITY

SESSION 11



CHALLENGING LANDSCAPES AND HUNTER-GATHERERS SUBSISTENCE AND MOBILITY

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Prehistoric hunter-gatherers inhabited regions with challenging landscapes across the globe, from high-altitude mountains to deserts. Many of the sites found in these regions are small and ephemeral, and usually associated with specific landmarks that most likely created a more favorable ecological niche within the landscape, whether springs, caves, rock shelters, or passes across mountains.

Prehistoric research traditionally focuses on the environmental, climatic and ecosystemic changes, and their influence on the subsistence and mobility of hunter-gatherers. While the landscapes, considered constant and stable over time, receive less attention. Attempts to explain the presence of sites in extreme and challenging settings often rely on refugium models, suggesting population contraction and isolation during times of climatic deterioration. These models are, however, somewhat limited, and seldom consider issues such as human choice. Thus, clearly, more research is needed in these contexts.

To incorporate the landscape into prehistoric research, it is necessary to unravel the links between the sites, their location and the mobility dynamics of human groups, as well as the availability of resources. Only then can we begin to evaluate the role of challenging landscapes in human subsistence. Today, with the abundance of digital tools, such as remote sensing and advanced GIS techniques, we can discuss issues relating to the use of space within sites and in relation to their location. To do this, it is necessary to incorporate data from different proxies, both geological and environmental, as well as cultural material from the archaeological sites.

In this session, we invite researchers to join us for an open discussion on extreme and challenging landscapes and their relationship to the presence of prehistoric groups. Some of the topics we would like to address include: 1) correlating regional geomorphology with settlement patterns and 2) atypical site locations in proximity to specific resources 3) landscape evolution and human responses. Our objective is to discuss the outlined topics with an emphasis on the methodological issues and advantages of using digital geographical tools to address such topics. A focus is placed on studies of Pleistocene and early Holocene sites that encompass different disciplines and allow us to know and deepen our knowledge of the on-site activities in relation to challenging landscape localities.



ID: 89835

Local resource management at Abri du Maras from MIS7 till MIS 3

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KEYWORDS: Lithic raw materials, Ardèche, Neanderthals, procurement strategies, quartz and quartzite

The availability and diversity of local resources are one of the main factors that determine the definition of a settlement area. Some of these resources generally analysed in this context are the availability of freshwater sources, food and physical characteristics of the landscape that allow for intervisibility, control or forms of shelter. However, the availability of knappable lithic raw materials and how they have been exploited are rarely included in local resource exploitation and occupation models.

Abri du Maras is a karstic rock shelter located in the Bas-Viverais, SW of the Ardèche region, which corresponds to a substratum formed by sedimentary rocks, mainly Cretaceous limestone, at c- 170 m a.s.l. The rock shelter is crossed by a karst valley through which groundwater ascends, flows seasonally and digs the limestone in the direction of the Ardèche River, less than 1 kilometre away.

Today, the shelter is at an altitude of c. 70 metres above the average level of the River Ardèche. Nevertheless, the local landscape suffered alterations between MIS7 and MIS3 that might have had effects on the access to local lithic resources. Archaeological and paleoenvironmental archives show significant changes in the Ardèche valley during the Middle and Late Pleistocene that could influence both proximity to river banks/terraces and the natural transport of raw materials in a secondary position.

To understand local strategies of resource selection and transport at Abri du Maras we focused on the quartz and quartzite elements of the assemblage on a multiproxy approach. The characterization through geological observations, surveys and determination of possible areas of procurement and the analysis of the evolution of the landscape allowed us to interpret human adaptation and behaviour changes through time. Overall, this study contributes to advancing models of landscape occupation, exploitation of local resources and understanding of Neanderthal adaption strategies.



ID: 90349

Animal and human use of landscapes and resource availability in Late Pleistocene Mongolia and the Altai Region

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KEYWORDS: **Central Asia, Paleolithic, faunal complex, hunting strategies, 87Sr/86Sr ratio**

Mongolia and the Altai Region are mountainous areas surrounded by expansive open steppes where highlands were occupied intensively by Pleistocene humans up to 2000 m asl, but mostly between 600-1500 m asl. This altitudinal range is most salubrious for large ungulate species, too. Human mobility in these highlands depended on resource availability and abundance, especially high-quality lithic raw material, large game prey species, and fresh water. Here, we consider open-air and cave sites in the Altai Mountains and Mongolia yielding evidence of human mobility, mostly during the Middle and Initial Upper Paleolithic. We analyzed the faunal composition of each layer in the cave sites to better understand the "carnivore-large and medium ungulate" trophic chain, revealing species interdependence and carnivore-human competition. Correlation revealed that hyaenas and humans had similar diets, and that hyaenas focused on equid predation. Other carnivores, such as large cats and wolves, mostly hunted medium-size ungulates such as Siberian goats and mountain sheep. We also studied the Sr isotope composition of modern plant samples from the Altai Mountains and Mongolia, and sediments and ungulate bones and teeth from Middle and Upper Paleolithic sites. Preliminary results indicated that some samples were redeposited and their Sr isotope composition altered, so such samples were discarded. The 87Sr/86Sr ratio of the remaining samples revealed that the remains of some ungulates may have been transported to sites or the animals died during migration, because their Sr isotope composition fell outside of regional isoscale maps or sedimentary isotopic composition. Some animal bones represent local ungulates. Our data indicate all carnivores were specialized predators, while humans employed a wider range of hunting strategies and could transport animal body parts over significant distances. Research is supported by RSF #19-78-10112.



ID: 90483

Desert Dynamics: Neolithic Hunter-Gatherers of the Negev Desert

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KEYWORDS: **Neolithic; desert adaptations; Hunter-gatherers; Mobility; Paleoenvironment**

Prehistoric research of the southern Levant has long been fascinated with the Neolithic period. The advent of agriculture, sedentarism, and complex societies – have all been subject to rigorous investigations and debates. The Neolithic of the southern Levantine deserts, on the other hand, has been less intense: these desert populations remained highly mobile and continued to rely on hunting and gathering. Thus, marked as ‘Paleolithic relics’, they remained mainly out of popular scope.

Still, these ‘archaic’ desert populations were in no way static. On the contrary, their settlement and subsistence patterns display complex adaptations to a dynamic and contrasted environment. Indeed, although hyper-arid at least since the Pleistocene, the Negev desert is comprised of diverse micro-environments and niches, each with its unique returns and constraints on human exploitation.

Through a high-resolution study of human activities, the micro-environment, and how the two were intertwined, we shed light on the complex adaptations of the Early Neolithic populations of the Negev desert. We will discuss how the differential exploitation of distinct niches within the hyper-arid environment contributed to the resilience of these groups, and how, in turn, they contributed to the wider Neolithisation processes in the region.

ID: 90653

Upper Paleolithic blank cutting edge efficiency within the Tolbor Valley, Mongolia: an eastern steppe landscape

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KEYWORDS: **Initial Upper Paleolithic, bladelets, microblades, cutting edge efficiency, Mongolia**



Across much of Eurasia during the Upper Paleolithic a general technological trend is recognized within disparate environmental contexts, which begins with large blade production, followed by an emphasis on bladelets, and then in some cases microblades. While this trend is thought to indicate a general shift in landscape use in response to global climatic changes during Marine Isotope Stages 3 and 2, the question remains as to whether the adaptive impact of bladelet and microblade production within different environmental contexts was similar or distinct. Here we use a linear regression model to diachronically analyze blank cutting edge efficiency, an ecologically sensitive parameter, from four lithic assemblages recently excavated from the Tolbor Valley, Mongolia, each representing a different technological strategy ranging from the Initial Upper Paleolithic to the appearance of microblades. We observe a significant increase in small blank cutting edge efficiency during the Early Upper Paleolithic associated with increased bladelet production, as well as with the appearance of Late Upper Paleolithic microblade technology. Remarkably, our results indicate that during the Upper Paleolithic in steppe landscapes of East Asia human groups increased the cutting edge efficiency of their toolkits during Marine Isotope Stages 3 and 2 in a manner similar to that observed within the Upper Paleolithic record of the Levant, and possibly Europe.

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ID: 90734

Bilma- a menu for the Central Sahara. Present-day and Late Pleistocene/Holocene food resources and food strategies

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KEYWORDS: Central Sahara, Late Pleistocene, Holocene, Saharan food resources, traditional alimentation

The Bilma-pollen record (NE-Niger)-reaching down to the Late Pleistocene-evidences that up to the 7th millennium BP the Central Sahara was dominated by a mixed plant cover out of Acacia-savannas and some Sudanian vegetation units around lakes and along rivers. However, these Sudanian elements reached only to 20° N and disappeared around 5000 BP. The Acacia-Panicum –savannas - of various densities - dominated from that time on. Achabs (short time- grass and herb floras) could reach to large extensions and represented the aleatoric component of vegetation – and food resources. Climatically these regions were characterised by an intensive interaction of monsoon and harmattan giving chances for rainfall the year round. Fire was a permanent phenomenon in the various landscapes.

People had two main food sources:

1. As hunter-gatherer they could base on various plant resources and fishing and game.

From surveys on the traditional plant use and alimentation in the desert of northern Niger we could estimate the collecting resources for the human population in the Late Pleistocene and Holocene. For grasses it was possible to quantify them. Wild millets and sorgos could provide up to 250 kg grains/ha. Panicum turgidum-stands gave chances of 70kg grains/ha, whereas Aristida- or Eragrostis- species might have reached to 40kg/ha. Trees represented an important source of food especially from the Sudanian typed river vegetation. Game and fish were additional sources. However, they were not to quantify. 2. A rising pastoralism from about 8000 BP on introduced food production and provided milk and milk products as a second base of nutrition.



ID: 89914

Revisiting the Middle Palaeolithic in the Nile Valley: new insights from the western low desert, Thebes

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KEYWORDS: **Middle Palaeolithic, Nubian Levallois, Egypt, desert, mobility**

The Nile Valley has been identified as an important corridor in the dispersal of modern humans out of Africa; however, the relationship between Late Pleistocene occupation of the river valley and its adjacent deserts is not well understood. Previous archaeological investigations of the Nile floodplain, the High Desert and Western desert oases have revealed Middle Palaeolithic (MP) occupation, yet the low desert – a key intermediary zone – has received relatively little attention.

We present the results of new surveys under the New Kingdom Research Foundation's work in the wadi systems to the west of Thebes, which have identified a rich MP presence on the landscape. Specifically, Nubian Levallois technology is a classic and abundant technological indicator of this period. The occurrence of Nubian Levallois cores in comparable arid landscapes across a contiguous biogeographic zone spanning North Africa, the southern Levant and Arabia has sparked recent debate on the role of this technology in Late Pleistocene modern human behavioural adaptation and dispersal Out of Africa.

Based on quarry sites on the Nile floodplain, Nubian technology in Egypt has been framed as reflecting a specific hunting-adapted mobility system, but this interpretation is unsupported by archaeological evidence from the Western High Desert. The abundance of Levallois point production at strategic points in the intermediate western low desert provides new insights into mobility that bridges these two zones. We propose that patterns of MP site distribution in Thebes are explained by increased water availability in MIS 5, with the extension of large palaeolakes into the western wadi systems providing a favourable landscape niche to MP hunter-gatherers.

ID: 89545

Evidence for hominin activity in the Be'eri Badlands (Israel): Preliminary geo-archaeological results

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KEYWORDS: Human-environment interactions, Pleistocene, Badlands, Hominin dispersal, Southern Levant

The Be'eri Badlands Nature Reserve, also known as the Be'eri Crater, presents a unique landscape in the NW Negev, Israel. This region exhibits a distinctive badlands topography, characterized by hundreds of small ravines, and exposes a thick (<20 m) Quaternary sequence of eolianites, sand, clays, and loess. Ongoing erosional processes play a crucial role in reshaping the landscape and exposing archaeological artifacts, which have been collected by amateurs over the years, revealing Pleistocene fauna and lithic artifacts. However, formal prehistoric research and excavations had not been undertaken until the current project.

In 2020, we initiated fieldwork campaigns in the Beeri Badlands. These included systematic surveying, geological trenching, and test excavations, marking the first extensive study of the geology, geomorphology, soil formation and prehistoric fauna and hominin activity. More than 1000 lithic implements were collected from over 17 findspots, indicating occupations during the Lower and Middle Paleolithic periods, including several non-bifacial Large Cutting Tools indicative of the Early Acheulean Technocomplex. Excavations at three localities yielded elephant tusk and teeth fragments, lithic implements and non-local unmodified pebbles.

The Quaternary sequence revealed through these investigations is composed of coastal and terrestrial sediments. The basal units are eolianite ridges, overlain by a sand-rich unit. A clear unconformity separates this unit from the overlying dark clay-rich unit characterized by several calcic horizons. The clay unit most likely represents a temporary, seasonal water body. The ubiquitous Negev loess caps the sequence, and unconformity overlain the clay unit. The presence of different coastal and terrestrial units, including evidence for a temporary water body, suggests a mosaic of available resources making it attractive to the ancient hominins and animals.

The integration of the emerging cultural and environmental information shows challenges and promising potential for shedding light on the way hominins interacted with this regionally unique landscape feature.

ID: 89985

How to live the high life – Contextualizing Late Pleistocene human occupations of the Afroalpine (Bale Mountains, Ethiopia)

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KEYWORDS: Ethiopia, Middle Stone Age, Afroalpine, high altitudes, networks

Ethiopia hosts over 80% of the African landmass >3,000 meters above sea level. Paradoxically, its well-known Stone Age record is almost exclusively associated with prominent lowland sites, e.g., within the Rift Valley, the Afar Depression, or the



Omo Valley. This bias is even more astonishing given that questions of past human refugia guide archaeological research, especially on the regional Middle Stone Age (MSA). These overarching questions can only be meaningfully addressed with more medium-scale data from the Ethiopian Highlands. This particularly refers to its highest-altitude mountain ranges – aptly characterized as “mountains on top of mountains”.

Here, we use Africa’s largest alpine ecosystem – the Bale Mountains of southern Ethiopia – and its dynamic landscape evolution during the Late Pleistocene to approach multiple contexts of past human occupations. New dating results from archaeological contexts allow us to assess whether these reflect migrations to higher elevations. A comprehensive set of studies on lithic material (geochemical obsidian sourcing, as well as technological analysis, use-wear and residue analysis of artifacts), flanked by zooarchaeological and anthracological investigations, reveal more facets of intricate interactions between MSA humans, endemic fossorial rodents, and the high-altitude Afroalpine ecosystem.

Preliminary results suggest that successful MSA occupations of the high-altitude Bale Mountains – even under maximum glaciation conditions – were rooted in their persistent function as integral parts of past land use systems of mobile foragers. Far-flung, interconnected networks must have existed and played a decisive role in the cultural transmission between forager groups, transcending the mosaic of landscapes and ecologies in Ethiopian high- and lowlands. These networks’ deliberate creation and maintenance form a more parsimonious explanation for long-term and repeated human occupation in these harsh environments than climatic or demographic “pushes”.

ID: 89344

Availability of flint and water in dry sandstone canyons: Paleolithic investigations in the western Hisma Basin, southern Jordan

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KEYWORDS: **Paleolithic, dry land, Jordan, flint, water**

Prehistoric investigations by the late Prof. Donald O. Henry between the 1970s and 1990s in southern Jordan have established several models of mobility, particularly seasonal transhumance, by Paleolithic foragers and Holocene herders as their behavioral adaptation to dry sandstone canyons in the western Hisma Basin. These models are based on archaeological records of more than 100 sites as well as environmental settings of the study area, such as geomorphology, vegetation, climate, and the availability of flint and water.



In this presentation, we report some results of our recent re-investigations on the availability of flint and water in the area. Although the western Hisma Basin is dominated by extensive exposure of sandstone, our geological survey found patchy distributions of small-scale sources of flint, including outcrops of flint beds, nodules, and conglomerates, where Paleolithic artifacts were strewn on the surface. We are also conducting geochemical analyses of geological samples and flint artifacts from Paleolithic sites, and the preliminary results support that flint could have been locally obtained within the western Hisma Basin. In addition, we present our ethnographic and GIS studies to clarify the availability of water in the Jebel Qalkha area, where Paleolithic rock-shelter sites are particularly concentrated. Lastly, we report our on-going excavations at a Middle Paleolithic site of Tor Sabiha and a newly found Initial Upper Paleolithic site of Aswad Terrace to discuss foragers' mobility in these time periods.

ID: 90613

The raw materials catchment in the northwest zone of Sierra Morena during the Middle Paleolithic: The Sima Cave (Constantina, Seville) and their quartz exploitation

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KEYWORDS: **Middle Paleolithic, raw materials, quartz, Sierra Morena, La Sima**

The Sima Cave, located in the urban area of the town of Constantina (Seville, SW Spain), is an archaeological site known since the beginning of the 20th century that has been systematically excavated during the last decade (2011 to 2022). These research have permitted to recover a Middle Paleolithic lithic assemblage (40 ka-50 ka BP), in which quartz is predominant and it is complemented by others raw materials, such as quartzite and flint.

The aim objective in this work is the lithological characterisation of the raw materials used during the Upper Pleistocene in the northwestern area of Sierra Morena, which is based on the study and identification of the predominant lithological elements in the lithic series recovered in The Sima Cave. Therefore, this research was based, on the one hand, a geological reconnaissance of the area surrounding the site was carried out by reviewing the available geological cartography, applying the information thus obtained in a geographic information system, and, on the other hand, a macroscopic review of the lithic materials recovered.

Based on this information, an approach to the mobility strategies of the human groups in this territory is proposed, identifying possible routes for obtaining these lithological resources, both in outcrops close to the cavity, in the case of quartz, and for obtaining other raw materials such as quartzite, possibly in the fluvial terraces of the Guadalquivir River.



ID: 89722

Far'ah II, a late Middle Paleolithic site in the Northwestern Negev, Israel: Revisiting the 1976-78 excavations

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KEYWORDS: **Paleolithic, Negev, GIS**

The way in which past hunter-gatherers chose and used the localities they occupied in a given landscape provides insights into how they adapted to changing climates and a variety of environments, their social structure, functioning, technological abilities and behavior, amongst other factors. The analysis of finds recovered from sites in the fluvially deposited loess sediments of the Nahal Besor (northwestern Negev, Israel) has opened a window on short-term occupational events and elucidated many of these issues. The rapid burial of sites in low-energy fluvially reworked loess, results in well-preserved archaeological assemblages.

The site of Far'ah II was first discovered and excavated in the early 1970s by Price-Williams as part of the British Western Negev Expedition (Price-Williams 1975). Between 1976-78, three field seasons led by Gilead (Gilead and Grigson 1984) uncovered an area of 70 m² with two archaeological layers, a combustion feature, and a rich assemblage of lithics and faunal remains. An additional season in 2017 by the senior author constrained the age of the site to 49-48 ka (Goder-Goldberger et al., 2020).

In this work, we examine hominin behavior and adaptation by analyzing the spatial patterning of assemblages from the 1976-1978 seasons. This has been possible due to the large area excavated and the fact that all lithics and bones larger than 2.5 cm were recorded using three coordinates. By combining lithic refitting studies and spatially mapping artifact distribution using GIS technology, we have dissected the occupation history and demonstrate that the upper archaeological level defined during the excavations consists of at least two occupation events. They partially overlap in the central area of the site, indicating the presence of a palimpsest (overlapping occupations), with the combustion feature clearly associated with the upper occupation event.



ID: 89452

Living along the big river: landscape use, settlement and mobility patterns during the Initial Upper Paleolithic of Transbaikal and northern Mongolia

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KEYWORDS: South Siberia and Central Asia, Paleolithic peopling, subsistence, settlement patterns

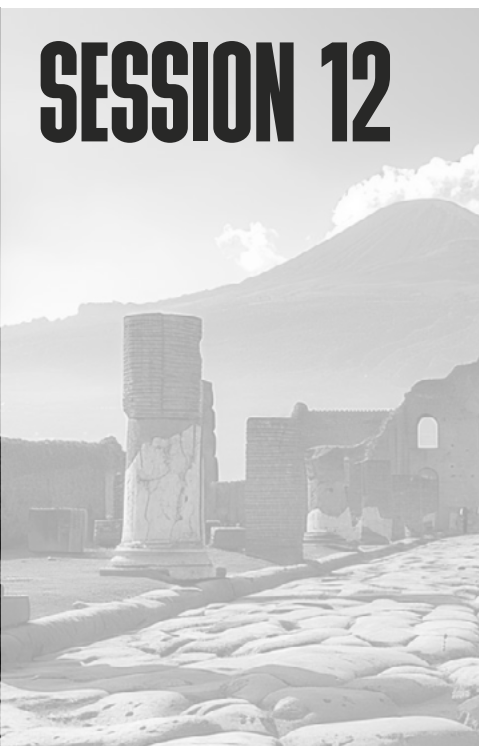
Modern Mongolia and Russian Transbaikal occupies a midpoint position in the mountain belt system of southern Siberia and eastern Central Asia. On their supposed dispersal routes, Initial Upper Paleolithic hominin groups had to pass different landscape-geographical zones having various ecological conditions, that suggest these populations had a considerable adaptation ability. Among the routes, the Selenga River basin was of particular importance for it connected the Siberian boreal physical-geographic province belonging to the Arctic Ocean drainage area and the inland region of arid mountain ranges and highlands of Inner Asia. The clusters of Initial Upper Paleolithic sites are known along the Selenga River basin, major fluvial input of the Lake Baikal. This highest for the North and Central Asia peopling intensity can be explained by the strategically beneficial geographical position allowing them to move along the ca. 800 km of valleys of the Selenga and its tributaries. Here, nodal clusters of sites occupied either a sections of river valley, several closely adjacent valleys, a closed inter-montane depression, or system of depressions. Within those topographic boundaries, movements of social groups followed the known habitation areas of steppe ungulate prey. According to the available zooarchaeological evidence, animals were hunted in proximity to occupation sites which usually had outcrops of high-quality stone raw materials located nearby. Human settlement systems were associated with routine movement supported by cycles of hunting migratory herd animals. The location of analyzed sites in the Selenga-Orkhon mid-altitude zone and the geomorphologically homogeneous landscapes of this region spanning open taiga and steppe ecotones is one reason for interregional dispersal event(s) during the Initial Upper Paleolithic. This study was supported by the Russian Science Foundation grant No. 19-78-10112



LAC 2024

EXPLORING THE
INTERACTION
BETWEEN
HUMANS
AND THEIR
ENVIRONMENT:
THE ROMAN
ROAD
NETWORK AND
ASSOCIATED
STRUCTURES
THROUGH
LANDSCAPE
ARCHAEOLOGY.

SESSION 12



EXPLORING THE INTERACTION BETWEEN HUMANS AND THEIR ENVIRONMENT: THE ROMAN ROAD NETWORK AND ASSOCIATED STRUCTURES THROUGH LANDSCAPE ARCHAEOLOGY

SESSION ORGANIZERS

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Since ancient times, humans have approached the environment with the aim of occupying it, using it and, especially, moving through it. The environment has been both the impediment that hindered communication and the “medium” through which people travelled. During the Roman era, the primary relationship between the landscape and its inhabitants was facilitated by the developed road network and the roadside establishments that emerged in its vicinity. Vicus, mansiones, mutationes, castella, turris or villae are some of the examples that make interaction with the territory visible through the roads. Over the past few decades, the development of Landscape Archaeology, in conjunction with the implementation and evolution of remote sensing techniques, has enabled researchers to go beyond the old study of road networks and tackle the challenge of understanding how the Romans occupied, managed, and traversed a territory. Following this line, the objectives that we hope to achieve are closely linked to the application of remote sensing techniques and the results that they can offer to researchers in the knowledge of roads and their environment. The aim is also to create a forum in which the various GIS applications for the dynamics of mobility and visibility over a territory can be shared. Furthermore, our goal is to integrate methodology with the results of historical knowledge, allowing us to approach the Roman logistics within a territory and the construction of both public and private infrastructure in rural settings. In general, we seek to generate debate among researchers on the tracing of roads as axes of wealth and their relationship with the Roman economy, particularly in rural areas.

These objectives will help us to achieve the main potential of this session, which lies in bringing together scientists from different academic branches and with different research backgrounds, allowing for a multidisciplinary exchange of ideas in which the various approaches to Landscape Archaeology are given voice. In this way we hope to generate a platform for multidirectional learning between the different branches of knowledge that come together in their research.



D: 90432

Cartographic research and surveys for the reconstruction of the ancient road system in the western Vercelli area

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KEYWORDS: **Vercelli area, Cartography, Ancient road system, Survey, GIS**

Since 2017, the University of Pavia, in agreement with the competent Soprintendenza and the municipality of Livorno Ferraris, has been working in the Vercelli area (Piedmont, North-West Italy) with the landscape archaeology project Before the rice fields (scientific director M.E. Gorrini). The research, whose first results were presented during the LAC 2018 and 2021 conferences, is conducted with an interdisciplinary methodology and aims to reconstruct the historical landscape of the western Vercelli area from a diachronic perspective, from the Iron Age to the late Middle Ages. The examined area has its core in the present-day municipality of Livorno Ferraris, most probably a settlement of the pre-Roman Libui tribe. Of primary importance among the objectives of the project is the reconstruction of the Roman and Medieval road system, its evolution, and its relationship with the current landscape. In fact, the anthropic, natural, and agrarian landscape has been deeply modified by the canalization systems built to allocate areas for rice cultivation.

ID: 89689

The Roman military presence in the hinterland of the Roman Limes. The casus of the Flemish part of het provinces Gallia Belgica and Germania Inferior

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KEYWORDS: **Roman army, LiDAR, VAT/LCP-analyses, orthophoto**

Although there are various indications of the Roman military presence in Flanders (Belgium), there is still no clear overview of how the hinterland in the Flemish part of Gallia Belgica and Germania Inferior is organized. At the end of 2023, a study into the military component of the various sites (settlements, burial fields, vici, villae etc.) was started. Through a combination of a literature study on one hand and the use of elevation models, (multidirectional) hillshade, LiDAR, orthophotos, VAT-analyses, LCP-analyses on the other, known and yet unknown sites with a military component are searched.

The research is guided by a number of themes: 1) the importance of the road and riverine network as a connecting infrastructure in the defense system and as a means of transport in supply; 2) the organization of the military landscape over



time: top-down and diachronic analyses of where which military elements are located, or can be expected; 3) the change in military focus throughout the Roman period; and 4) organized supplies from the hinterland to the Limes (soldiers, food, (raw) materials).

This paper fits within the first theme, and will be a first presentation of the ongoing research into the importance of the road and riverine network as a line of connection on which almost everything is dependent: military presence, fortifications and defense systems, transportation, supplies and trade... Which elements related to the military infrastructure (castella, fortlets, guard posts, mansiones, burgi...) are located along the roads/ivers, which are located further inland? Which elements do we already know, and which are missing? Can we predict where these missing elements can be expected, based on the reconstruction of the military landscape and research techniques such as LiDAR, VAT, LCP etc.? Are there locations to be pinpointed along the roads where goods were stored/transshipped (horrea...)?

ID: 89891

The routes of Betic oil

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KEYWORDS: **baetican olive oil, Via Augusta, optimal routes**

The economic factor had a great influence on the settlement of the Betic territory in Roman times since the initial presence of the Caesarian armies in this environment. Although it was during the Caesarian period that the typical Roman road began to take shape, following the advance of the militias and controlling the mining centers of Sierra Moreno and Riotinto, it was Augustus who promoted the development of the communications network necessary for the integration of the new occupied territories and their exploitation. He will be the one who gives the name to the backbone land route of the Betic province, but also the one who enhances the waterways to optimize the use of resources.

The olive oil industry is exemplary in the use of roads from an economic point of view. This sector is structured around two different types of facilities: the oil mills, where the oil is being extracted from the olives; and the potteries, in which the containers in which the product is packaged for marketing are produced. While the olive oil mills are spread throughout the territory, the potteries occupy two very specific areas, which are the banks of the Guadalquivir and Genil rivers, from where the amphorae are shipped for shipment to the consumption areas. The transfer by land of the olive oil from the oil mills to the packaging areas is taken for granted, and in this work the possible connection routes between these enclaves are presented on the basis of a GIS that has updated data on both types of facility. In this way, the interrelationships between both productive areas can be observed, being able to use the information to look for connections between the characters that star in this productive sector.



ID: 89947

The evolution of the archaeological landscape and the road network in the south of Roman Cantabria

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KEYWORDS: **Cantabria, Ancient Landscape, Roman road, Iuliobriga, Spatial Analysis**

The “Campoo-Los Valles Historical Landscape” project, developed since 2014 by the UC AHIR group, focuses on the evolution of the archaeological landscape of the southern region of Cantabria. Located in this territory, the Campoo-Los Valles region has historically been a transit area between the Cantabrian coast, the Meseta, and the Ebro valley. This paper aims to present the results of recent archaeological surveys and spatial analysis that help us understand the landscape in interaction with the road network. The diachronic analysis has identified four major stages. 1) The period of the Cantabrian Wars is characterized by the advance of the Roman army from Segisamo towards the coast. In this context, the origin of the road that will cross the territory along the corridors of the Pisuerga and Besaya rivers occurs. Visibility studies have allowed us to explain the location of certain military camps. 2) In the early years of Roman domination, the military character was still maintained: Iuliobriga is located on a hill, in a strategic position for controlling communications, and spaces were maintained for the army, such as the prata of the legio IV Macedonica. 3) Since the Flavian period, new settlements have emerged, such as Camesa-Rebolledo, oriented towards road services and the exploitation of the territory. The intensification of agricultural production is documented through pollen analysis. 4) In the Late Antiquity, new variants of roads were used, and changes occurred in the settlement. Some population centres experienced a process of ruralisation, others disappeared, and new sites emerged far from the main road axis. These changes denote the emergence of new exchange networks and the search for self-sufficient productive solutions.

ID: 90686

Roman road network, centuriated landscape and settlement patterns in the Empordà plain (North-Eastern Catalonia): archaeomorphology and geoarchaeological research

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KEYWORDS: **Road network, centuriated landscapes, archaeomorphology, geoarchaeology, Ampurias**

Current researches on Roman road networks offer new evidence on territorial structuring systems and their impact on landscape morphology over time. Archaeomorphological analyzes have completely renewed studies on the importance of centuriated systems and settlement patterns in Roman times. These studies include photointerpretation, archaeomorphological survey, historical geography, geoarchaeology and palaeoenvironmental analyses. They offer important insights on the effects that road systems and centuriation networks had on the landscape. The results of these new perspectives are presented by assessing a case-study located in the Empordà littoral plain, which was the hinterland of ancient city of Emporion-Emporiae (Ampurias) Graeco-Roman town. The area is a highly diverse and dynamic littoral ecosystem subjected to sea influence and fluvial flooding contributing to the formation of beach-barriers, marshes and lagoons and, ultimately, the plain in-filling. Environmental data show a complex relationship between Roman field systems, settlement and landscape change. Centuriated networks stress the existence of a remarkable landscape organisation of this area, which are also characterised by both, a complex settlement evolution and land-use systems. Paleoeological data shows the remarkable imprint of the Roman occupation in the littoral plain, with the expansion of wet pastures and cultivation lands in an increasingly drained floodplain. These methods have allowed moving beyond the pure description of the traces and exploring the concepts behind the making of road networks and centuriated landscapes and the structuring and territorial implementation of ancient cities. The high impact of these landscape macro-structures makes them visible in modern land arrangements and defines them as an outstanding evidence of Roman impact in the shaping of present-day cultural landscapes.

ID: 90221

Unravelling Roman Connectivity between the Strait of Gibraltar and the Western Baetic System

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KEYWORDS: **Baetica, GIS, Focal Mobility Network (FMN), settlement patterns, mobility dynamics.**

The Baetic System served as a gateway to the Iberian interior from the Campo de Gibraltar. Carthage and Rome strategically adapted this geographical space, as did the surrounding cities. The coastal-interior connectivity between the Strait of Gibraltar-Sierra de Cádiz and Ronda is a determining factor and a reflection of these processes, explaining settlement patterns and the evolution of enclaves. Despite the potential, there are still uncertain traditional proposals with undefined routes



and historical connections. In this contribution, we will present the results of the initial spatial analyses, specifically the Focal Mobility Network (FMN), to shed light on emerging spatial patterns and historical mobility between the coast and inland, arising from the interconnectedness of specific variables within the south Iberian landscapes. Moreover, we aim to analyze the relationship of settlements with the Roman communication networks for subsequent verification through remote sensing techniques and archaeological field surveys. The results offer new insights that enhance our understanding of the spatial network configuration within this region, which holds strategic connections in a broader Western Mediterranean context.

ID: 87692

Itinera per Alpes: planning and building Roman roads through the Alpine landscape

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KEYWORDS: Alpine environment, Northern Ital, Roman Roads, Road Planning, Landscape structuring

The studies on Roman roads and mobility are not frequently interested in routes passing through the Alps. And, even when they are, the interest is mainly addressed to a general path reconstruction of the main transalpine itineraries, identifying the major centres along the route, recognizing the post stations possibly mentioned in the ancient Itineraria and indicating the mountain passes potentially used. However, these studies hardly deal with road layouts, their technical features, and the relations with the natural environment, being unable to understand the main aspects of Roman mobility in the Alpine context. Besides, there is a generally trend to exclude the existence of secondary paths. Despite their interest is mostly local, anyway these paths existed and played a quite significant function in connecting the main urban centres located in the sub-alpine and pre-alpine sectors with those settled areas in charge of control and management of the important natural resources offered by the Alpine environment.

This paper wants therefore to try to change this trend, facing the reconstruction of the road network developed in Roman times on the Italian side of the Alps and functional to connect northern Italy (corresponding to the Republican provincia of Cisalpine Gaul) to the provinciae located trans Alpes. Following the precepts of Landscape Archaeology, the study will use remote sensing data and will exploit the large potentiality offered by GIS applications. The will is to analyse the relationship between Roman roads and geomorphological features of the Alpine area to understand how and how much, on one hand, Romans adapted to the natural environment and, on the other, they faced it for adapting it to their traffic needs. Furthermore, it will consider the relationships among the itineraries (main and secondary), to suggest the possible ways employed by Romans in occupying, structuring, and managing the Alpine territories.



ID: 89895

Newly discovered roman routes in the eastern hinterlands of thebes: the coptite and theban desert eastern hinterlands project

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KEYWORDS: **Landscape Archaeology, Roman Routes, Thebes, Eastern Desert, Quarries, Desert, Egypt, Networks**

According to our recent knowledge, the Roman route network in the central and southern parts of the Eastern Desert of Egypt always was centralised around the ancient city of Coptos (Qift) and crossed the desert towards the Red Sea harbours of Quseir el Qadim and Bernice, or what is known as Via Hydreumata. Another route network started from Edfu. The known Roman network in the Eastern Desert of Egypt so far lacked any contact with Thebes, considering that its eastern desert hinterlands blocked access to the Red Sea by the massive mountain formation of Gebel el Nezzi and Gebeleen. At the same time, little is known about the short-range routes within the city hinterland.

In 2023, A new project started to investigate the eastern hinterlands of Thebes and Coptos. The Coptite and Theban Eastern Desert Hinterlands survey (CTEDH) is hosted by Humboldt University zu Berlin. The first mission took place in September 2023. This project documents and analyses the ancient desert landscape within the area in the eastern hinterlands of both the Coptite and Theban nomes in Upper Egypt, in order to explore and reconstruct the evidence of human activity, especially coexistence and mobility within the frame of this unexplored part of the Eastern Desert, using the developing technology of digital documentation, Remote Sensing, GIS, and spatial analysis.

In this talk, the discovery of a network of new routes coming from Thebes into the southeast and the south will be exhibited. Also, a discussion about the significance of these new results and their connection to the Roman route network in the Eastern Desert will be presented.

ID: 89919

Roman road network around Primitiva Complutum: relationships between countryside and city

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KEYWORDS: **Primitiva Complutum, Roman roads, remote sensing, Q-GIS, countryside.**



In recent years, the ancient Roman city of “Pimitiva Complutum” (located on the hill of San Juan del Viso, Villalbilla, Madrid) has emerged as a key site for understanding the process of Romanization in the central Iberian Peninsula. The city, covering an area of over 35 hectares, was founded between the late 1st century BC and the early 1st century AD, being dismantled and relocated on the plain during the latter half of the 1st century AD. Situated at a significant crossroads of communication, it served as the starting point of the road that connected the central Iberian Peninsula with Carthago Nova. Although we will include some references to the relationships of this Roman urban center in the lower Henares valley with other cities along this road, we will focus our analysis on the surrounding territory, crucial for understanding its relationship with nearby rural settlements. Through the application of various remote sensing tools such as aerial photography and LiDAR, combined with the results of the latest survey campaign conducted in 2023, we will propose a Roman road network around “Primitiva Complutum” outlining the city connection to its rural surroundings, depicted in Q-GIS.

ID: 89204

Roman road (re)construction in germania inferior as an environmental and economic proxy: the case of cuijk and utrecht (the netherlands)

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KEYWORDS: **Roman roads, spatial network analysis, flooding, connectivity, logistics**

Over the past three decades, various segments of the Roman road system in the Netherlands have been investigated, revealing diverse construction and maintenance practices influenced by local topography and overarching military-political considerations.

This paper delves into two comprehensive studies that have yielded fresh perspectives on transportation networks and hydrological phenomena. The initial study centres on the Roman road at Cuijk, a crucial segment of the main route linking Atuatuca Tungrorum (present-day Tongeren, Belgium) to Ulpia Noviomagus (Nijmegen, The Netherlands), which largely followed the Meuse. Notably, this road exhibits signs of flooding during the first centuries AD. Earlier research indicated increased hydrological activity in northwestern Europe during the Roman period, attributed to shifts in land use and climatic conditions. At Cuijk, these occurrences prompted subsequent reconstruction and repair of the road.

The second study analyses Roman ceramic building material from two sites near Utrecht. The tiles and bricks were applied in the construction of the Limes during the late first and early second centuries. Macro- and microscopic examinations and XRF-analysis revealed a connection to the 15th legion stationed at Castra Vetera (Xanten, Germany) between 43 and 69 CE. The likely origin of the material meant that it was transported approximately 130 km downstream along the Rhine,



highlighting the importance of rivers in long-distance transport.

This paper explores how road (re)construction can be a proxy for economic and environmental events during the Roman period and how humans adapted to their environment. Furthermore, these results underscore the intricate nature of Roman roads and emphasize the promising outcomes derived from a multidisciplinary approach. Additionally, it provides novel insights into Roman transport logistics, network analysis, and human-environment interactions.

ID: 90671

Reassessing the Roman roads between Augusta Emerita and Olisipo: A remote sensing and GIS-based analysis for a proposed route in Alto Alentejo (Portugal)

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KEYWORDS: **Roman roads; Connectivity; Landscape Archaeology; Alentejo; Lusitania**

The road network represents a conspicuous element of the Roman political and economic systems. In Portugal, this tradition can be traced back to the 16th century, with the Humanistic interest in the material remains of the Roman Period, and continues to this day, as hypothetical traces of Roman roads are a recurring topic in territorial studies and academic outputs. Older and new studies have, however, mostly been somewhat constrained by mystified conceptions of the nature of these structures, frequently assuming any old-looking stone paved road as Roman, while actual ancient roads remained largely undetected. Recent research undertaken in the past decades has been providing new insights into the nature of the Roman road network, particularly in terms of engineering, construction techniques, connectivity and, subsequently, human mobility. As physical elements in the landscape, roads also had a significant impact on the surrounding environment during the Roman period and beyond. Employing an interdisciplinary analysis based on legacy data, remote sensing techniques and Geographical Information Systems (GIS) analysis, this paper discusses a stretch of Roman road identified in the region of Alentejo, southern Portugal, then part of the province of Lusitania and explores its impact on the structuring and organisation of the landscape in this region during the Roman period. In particular, it aims to examine how settlement patterns and resource exploitation were related to aspects that can be modelled using GIS, such as optimal roads, travel times or the reconstruction of secondary roads. This is a novel approach for this region, following methodologies that have not hitherto been applied in this context. Ultimately, this paper offers the first comprehensive perspective on this stretch of road, while also stressing the potential of complementary approaches and digital datasets for a better understanding of the road network and surrounding landscape in the Roman period.



ID: 90670

Plant-processing activities and spatial distribution in the Eastern Pyrenees: first phytolith studies of grinding stones

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KEYWORDS: Eastern Iberian, grinding stones, cereals, phytoliths, spatial analysis.

The study of food processing and consumption have long been key issues to reconstruct socio-economic and cultural dynamics. Although these issues have been long investigated through functional and archaeobotanical evidence from grindstones, there is a lack. This presentation will focus on recent interdisciplinary research at the Castellot de Bolvir (Cerdanya, Spain) spanning the Iberian to the Roman times of the third and second centuries BC. The current study focuses on a selection of rotative grinding stones, we will examine how plant and cereal microremains, together with other archaeobotanical data approaches, in an effort to gain a better understanding of functional and economic analyses of grinding tools, as well as to the reconstruction of dietary patterns and areas of domestic activity and spatial distribution at the time of the Roman arrival in the Pyrenees. The study of grinding stones and other aspects of the domestic life of the Ceretani society can be developed based on the microarcheological records. This presentation aims to contribute to the establishment of plant-processing activities and spatial distribution in the Eastern Pyrenees.



LAC 2024

TRACKING (IN)
VISIBLE STATES
AND DOMESTIC
SPACES
THROUGH
MICROARCHAEO-
LOGY FROM
PROTOHISTORY
TO ROMAN
TIMES: IBERIA
AND NORTH
AFRICA

SESSION 13



TRACKING (IN)VISIBLE STATES AND DOMESTIC SPACES THROUGH MICROARCHAEOLOGY FROM PROTOHISTORY TO ROMAN TIMES: IBERIA AND NORTH AFRICA

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KEYWORDS: Domestic waste, social organization, energy supply, microarchaeology, phytoliths.

Although microstratigraphic analysis is being increasingly applied to reconstructing domestic dynamics within built environments from the Protohistory to the Roman times, its integration particularly in archaeological research programs based on historical periods, is far from systematic. The aim of this session is to bring together different perspectives derived from multi-proxy techniques applied to a varied range of domestic archaeological contexts and social organization, from early built environments to complex urban societies in the Iberia and North Africa landscapes. Further, it intends to

(1) review current methodologies, recent applications, and advances in the study of the microarchaeological record; (2) to address the challenges of integrating high-resolution approaches; (3) to evaluate the contribution of experimental and ethnoarchaeological comparative records; (4) to discuss the role of microarchaeological records in exploring major research questions; and (5) to suggest possible future perspectives and directions.



ID: 90771

New perspectives on the Mauritanian urban phenomenon through microstratigraphic evidence: The Eastern Quarter of Tamuda (Tetouan, Morocco)

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KEYWORDS: Mauritanian towns, Microstratigraphy, Urban biography, Micromorphology, μ -XRF

The lack of vertical stratigraphic sondages and open area excavations constitutes a challenge to understanding Mauritanian urbanism. This makes the characterization of the spatio-temporal evolution of Mauritanian towns a difficult task. Systematic excavations carried out in Tamuda by several research teams in the twentieth century provided vertical and horizontal views of Mauritanian urbanism. Our study offers, for the first time, a high-resolution geoarchaeological analysis of Tamuda's urban sequence (third through first century BC). The microfacies analysis, by means of micromorphology and μ -XRF of Spaces E18 and E20 of the Eastern Quarter revealed a complex interaction of deposits and site formation processes that resulted from changes in everyday urban life. In this respect, the overlap of different construction phases and the alternation of episodes of active use and abandonment is highly significant. This study examines the functional characterization of urban spaces, including the identification of midden activities, a roasting pit, and a milling site (possibly) linked to fish flour production. These activities leave traces on beaten floors and occupation surfaces, and several features indicate abandonment periods between short-term occupations. The result is a complex urban biography of this Mauritanian town, in which human occupation was not constant over time.

ID: 90236

What can micromorphology bring to studying domestic spaces? Occupation deposits vs occupation layers

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KEYWORDS: microarchaeology, floors, northeast Iberian Peninsula, Iron Age, Roman period

The present study deals with the application of micromorphology in sediments and archaeological sites, mainly domestic spaces. Taking undisturbed samples and producing thin sections should allow us to see microlayers and micro remains that go unnoticed during excavation. In this case, we will compare contexts of different nature: fills and occupation levels. The first one comes from the Costa de la Serra



(La Secuita, Tarragona) archaeological site. This is a 2nd-1st century BC fortified enclosure. On the outside of the building, a sample of a sedimentary fill (which could be an occupation deposit) has been taken, inside a structure interpreted as a quarry from an early period of the site. The occupation layers come from two Iberian sites. One of them, El Vilar (Valls, Tarragona), has provided a series of different floors and what appear to be preparations from an archaeological point of view. These contain micro remains that are currently being studied, in order to see if they have an anthropic origin or whether natural phenomena or processes have intervened. We will also compare these layers with a sample from a mudbrick bench from the same site. The last study-case is Antic (Amposta, Tarragona), where different levels of use (floor) of a space associated with a combustion structure were documented and sampled. We will present the results of the micromorphological analyses to see the differences between the microstructures and the micro remains found in the different samples. This will help us to identify which micromorphological features are the most indicative for each of them and how this technique can help us to interpret domestic spaces.

ID: 90674

What was found embedded in the floor? Domestic activities at Las Eras del Alcázar (Úbeda-Jaén) through phytolith and calcitic microfossil evidence

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KEYWORDS: Bronze Age, Southeastern Iberia, Phytoliths, Calcitic faecal spherulites, wood pseudomorphs

The archaeological site of Las Eras del Alcázar is located in a difficult-to-access area, in Úbeda (Jaén).

The site spans a chronological sequence from the second quarter of the 4th millennium cal. BC to the first quarter of the 2nd millennium cal. BC.

The main aim of the current work is to present the pilot results obtained from integrated microfossil analyses, including both phytoliths and calcitic plant and faecal microremains from a Bronze Age household, displaying three well-defined stony floor sequences.

An overall good state of preservation of the phytoliths was found. Elongated dendritic phytoliths and epidermal appendages, often considered as fragile morphologies, were common in the samples. The phytolith assemblages were dominated by



short cells produced by grasses from the Pooideae subfamily, including cereals such as wheat (*Triticum aestivum/durum*) and barley (*Hordeum vulgare*), which are common in the macrobotanical records.

Of particular note is the presence of echinate spheroid phytoliths. These are characteristic of palms (Arecaceae), likely belonging to *Chamaerops humilis*, which is native to Mediterranean areas. This is noteworthy as these are fragile plant remains that are widely missing in the macrobotanical assemblages.

In addition to palm phytoliths, calcitic wood pseudomorphs morphologically resembling to those produced by the *Quercus* genus were also recorded, suggesting the introduction of these plants for fuel purposes, among other uses.

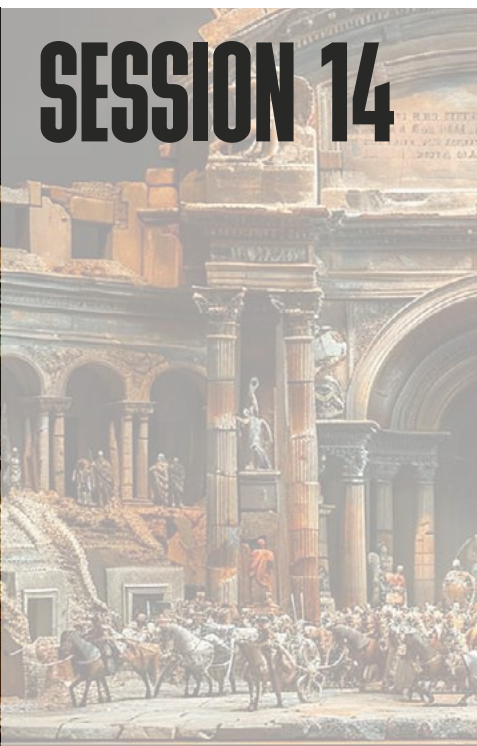
Overall, these results allow us to obtain a more complete picture regarding plant use and domestic activities within Argaric households from a diachronic perspective.



LAC 2024

QUESTIONING
RUINS, DEFINING
TOWNSCAPES.
LATE ROMAN
URBAN CENTERS
AT THE SIGHT
OF NEW, HIGH-
RESOLUTION,
INTEGRATED
ARCHAEOLOGICAL
METHODS AND
THEORIES

SESSION 14



QUESTIONING RUINS, DEFINING TOWNSCAPES. LATE ROMAN URBAN CENTERS AT THE SIGHT OF NEW, HIGH-RESOLUTION, INTEGRATED ARCHAEOLOGICAL METHODS AND THEORIES

SESSION ORGANIZERS

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This session aims to critically assess the impact of recent theoretical and methodological innovations in the archaeological research of Late Roman townscapes. In the last half-century, historiography has witnessed significant changes in the theoretical and methodological paradigms applied to archaeological research of Late Antique urban landscapes. These changes have focused on three key stages: the rupture from classical city models, topographic continuity emphasizing Christian centers of power, and the material perspective in archaeological research of urban transformation processes (reduction of urban perimeters, street occupation, intramural middens, suburban space growth, etc.). Presently, “urban transformation” is widely accepted as a historiographical concept, but there is ongoing debate about the conditions under which it occurred. Recent research has shown that transformation was not exclusive to the Late Antique town, as the classical Roman city also underwent similar dynamics, such as changes in the use of public and private spaces, intramural areas for agricultural purposes, and the presence of undeveloped lots or occupation forms without architecture. This raises questions about whether by focusing on processes of change, we are creating a narrative that necessitates the destruction of forms and functions of the classical city to explain the emergence and character of the late antique townscape.

Furthermore, new historical narratives examine the influence of socio-economic and environmental crises on the configuration and disappearance of the Late Roman townscape, such as wars, financial devaluation, diseases, and natural disasters. This raises issues about how these new studies integrate into long-term historical narratives and whether we are projecting contemporary challenges onto our interpretation of the past, which could indicate a historiographical shift toward environmental determinism.

From a methodological perspective, the understanding of the Late Roman townscape has primarily been built from inorganic and macroscopic archaeological evidence, especially architecture. While Late Antique archaeology has not been oblivious



to the spectacular boom in methods and techniques of Archaeological Sciences (microstratigraphy, geochemistry, paleobotany, zooarchaeology, paleoparasitology, biomarkers, ancient DNA, ZooMS, etc.), their application in studies on Late Antique urbanism has been geographically scattered, uneven in terms of techniques used, and inadequately integrated into historical narratives, despite their relevance. In this session, we aim to explore: 1) which high-resolution methods allow us to delve into the temporality and forms of human occupation that gave rise to late antique urban landscapes; 2) how to integrate these microscopic analysis methods with macroscopic archaeological information, such as architecture and material culture; and 3) whether we are overlooking forms of occupation in cities and their territory due to the lack of suitable methodologies to identify them.

The objective of this session is to encourage multidisciplinary work that integrates data at various analytical scales to define townscapes from a diachronic perspective, comparing case studies with current theoretical paradigms, and exploring new methodological approaches for the study of late antique urban landscapes. This includes evaluating whether processes of change and transformation are truly exclusive to the Late Antique period, exploring the projection of Late Roman town into the suburbs and the territory, and proposing holistic and integrative approaches to the archaeological reality of the Late Roman townscapes from multiple sources of evidence.



ID: 90776

Kilns, rubbish dumps and forums: on the heterogeneity of the early medieval city as a reflection of new relations of production

JAIME SASTRE-JIMÉNEZ- Universidad Autónoma de Madrid

KEYWORDS: **urban transformation, late Roman Antiquity, Visigothic cities, production, heterogeneity.**

This work focuses its interest on a comparison of the elements that mark the urban evolution in the central sector of the Iberian Peninsula between the 4th and 6th centuries AD. Through an analysis of the urban evolution/involution in specific areas of the centre of the Peninsula (Madrid, Guadalajara, Toledo, Segovia) a comparison is made with other peninsular areas in order to delve deeper into the characteristics of a heterogeneous and diverse social and urban landscape. All of this is the result of a social and economic dialectic with specific territorial patterns. In contrast to the traditional interest in housing spaces, our research uses productive areas as the main thread, establishing that at the microspatial level, productive changes are detected as a reflection of changes in the economic scale, which generate new urban landscapes, with new urban areas of transformation and pollution.

ID: 89551

Archaeological Architectural Space Research on the Urban Center Bathhouse of Lugdunum in the Early Roman Empire

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KEYWORDS: **Roman Empire; Lugdunum; Public Bathhouse; Architectural Space; Comparative Study**

The early Roman Empire (27-200 BC) witnessed the emergence of a highly developed urban civilization in ancient Rome, characterized by remarkable economic and cultural prosperity as well as intricate political circumstances. Lugdunum, situated in the Pyrenees mountain range, stands out among the renowned Roman towns with its well-established transportation system and abundant archaeological relics including temples, bathhouses, and Senate buildings. Although the construction of public edifices experienced a significant slowdown towards the end of the Julio-Claudian Period (60s A.D.), it regained momentum during the late 2nd and early 3rd centuries due to extensive repairs and new constructions following a major fire that ravaged the town center. Among these structures was an essential bathhouse located at its heart. This article employs spatial syntax research theory to analyze



this archaeological site from an architectural perspective, dividing it into three chapters: elucidating on both its architectural significance and cultural importance along with exploring its social functions within ancient Roman society; examining how residents of Lugdunum perceived their bathhouse space; investigating differences between attitudes and concepts regarding bathhouse spaces held by ancient Roman Lugdunum residents compared to those of modern urban dwellers.

ID: 90548

The role of waste management in the shaping of townscapes and urban biographies during Late Antiquity: a multiproxy microstratigraphic approach

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KEYWORDS: **Urban waste, townscapes, Late Antiquity, microstratigraphy**

The transformation of urban areas from the Early Empire to Late Antiquity in the Western Mediterranean is a historiographic topic with a long history of development. From the 2nd century onwards, the archaeological record within urban environments became more diverse due to a new conceptualization of urban spaces. These spaces underwent secondary uses and episodes of abandonment, leading to the proliferation of intramural middens, pits, and reflooring sequences. Many of these transformations and changes in urban life were driven by shifts in habits and dynamics related to the management of solid and liquid waste. While written sources do not definitively establish whether there was a regulated system for urban waste disposal in every city during the Early Empire, solid archaeological evidence points to the existence of evacuation systems such as sewer networks and urban and suburban middens. In Late Antiquity, however, middens became prevalent within inhabited areas, obscuring streets, public spaces, and private buildings, thereby affecting urban mobility and the utilization of urban space. This contribution examines how the evolving dynamics of urban waste management significantly influenced the conceptualization of cities in southern Hispania and North Africa, highlighting that crucial insights into human practices, habits, and attitudes towards urban waste are only discernible at the microscale. We have employed a multiproxy microstratigraphic approach to analyze several urban middens in Hispania and North Africa, incorporating micromorphology, physical-chemical analyses, geochemistry, paleoparasitology and lipid biomarkers. This integrated approach enables us to investigate questions such as the frequency and nature of discarded materials in urban middens, which are essential for understanding the evolution of these features. In sum, understanding urban waste practices turns essential to unravel town biographies from the Early Empire to Late Antiquity in the Western Mediterranean.



ID: 90117

The Space In-between: Environmental transformation of the Eastern Caelian Quarter in Rome from the Late Antique to Early Medieval Period

PHYLLIDA BAILEY- Newcastle University

KEYWORDS: Late-Antique Rome, borehole survey, urban landcover reconstruction, urban geoarchaeology

The ERC-funded project “Rome Transformed” aims to further our understanding of the religious, military and political transformation of the Eastern Caelian Hill from the 1st to 8th centuries C.E. Within this period, the Eastern Caelian Quarter of Rome departed from its past as a home to elite quasi-rural horti to a district dominated by imperial palaces and military bases before, becoming the centre of Catholic Christendom with the building of the world’s first cathedral and the palace of the Bishop of Rome.

By the early medieval period, the quarter hosted a selection of peri-urban properties complete with vineyards, orchards, and cultivated plots all with a focus on self-sustenance. To this day, the pace and process of this transition remains archaeologically under-explored. Previous research of the quarter has tended towards monumental structures. Due to the challenge posed by urban deposits, the few existing landscape studies focused on pre-occupation phases with only small pockets of archaeobotanical research. This paper confronts this gap, exploring alternatives for landcover reconstruction in the heart of an urban setting when direct vegetation proxies are not available.

Combining literary, archival, and historical resources with an extensive geophysical and geoarchaeological survey, we seek to produce a 4D approach to the Eastern Caelian that goes beyond isolated studies of individual structures to understanding the evolving landscape as a whole.

Using physical and geochemical stratigraphic profiles collected from fifteen cores across a 68-ha area, the project explores how pivotal transformations manifested on the landscape in terms of landforms and vegetation cover. This will grant the opportunity to not only significantly expand our knowledge of the city but also synthesise existing data into an invaluable diachronic visualisation of the landscape in a key quarter of Rome during a time of unprecedented change that echoed throughout the Empire.



ID: 91141

Flaviaugusta, a Roman settlement on the banks of the Homino River

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KEYWORDS: **Late roman town, Ground-penetrating radar, spatial analysis, Burgos**

In the town of Poza de la Sal, archaeological sites from all historical periods, ranging from the Paleolithic to the present day, are recognized. Its undeniable magnificent natural conditions have facilitated the settlement of different human communities, among which stands out the great settlement of Flaviaugusta on the banks of the Homino River.

This large urban nucleus, recognized by Julio Martínez Santa-Olalla in the last century for its partial destruction during the construction of railway works, has been subject to looting and continuous destruction since then, until in the new century a group of researchers resumed the investigation of the site.

Ground-penetrating radar, lidar, spatial analysis, aerial and terrestrial survey, along with excavations at the site, are part of a comprehensive multidisciplinary research project currently being carried out under the auspices and sponsorship of the Poza Town Hall and the Burgos Provincial Council.

ID: 90760

An approach to studies on chemical residues applied to Late Antique and medieval ceramics and their relationship with urban contexts

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KEYWORDS: **chemical analysis, productive and habitational spaces, Middle Ages, ceramics, chemical residues, residues**

Studies on chemical residues have developed exponentially in the last ten years. The combination of different analytical methods, as well as the application in different materials that make up ceramics, flooring or production structures, are helping to shed light on new aspects of life, food, manufacturing processes and economic aspects. However, data acquisition is one of the aspects that largely determines the results. In this paper we review the various contributions on the contents of ceramics in medieval contexts, and their possible relationship with specific productive activities in urban areas. At the same time, a review of the main limitations is carried out, and indicators to be set for future research are established.



LAC 2024

INTEGRATED
APPROACHES
TO HERITAGE
LANDSCAPE
STUDIES

SESSION 15



INTEGRATED APPROACHES TO HERITAGE LANDSCAPE STUDIES

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KUILI SUGANYA CHITTIRAI BALAN

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Landscape archaeology today has more of a role for society than ever before. Understanding past landscapes through archaeological research is useful in helping stakeholders address many contemporary landscape issues in both rural and urban contexts. Heritage management, rural abandonment, commercial agriculture expansion, urban encroachment, and natural disasters are all themes where landscape archaeology can provide new perspectives for more effective decision making for future sustainability.

Archaeologists have a plethora of (interdisciplinary) approaches to gather, process, and analyse both empirical, qualitative (spatial) data as well as 'soft' ethnographic data, which helps them interpret and add further depth of understanding of heritage landscapes and their diachronic, long-term transformation. Integrating such spatial datasets, while at times challenging, can help to address the criticism of some landscape research in that it lacks a 'bottom up', human perspective. Most importantly, this quantitative and qualitative spatial data integration can allow for more effective field verification, resulting in greater local stakeholder support of archaeological projects as well as facilitate the transfer of knowledge mutually between researchers and the public.

However, the abundance of available (remote sensing) data necessitates the use of new strategies, such as machine learning techniques and participatory methods that include (local) stakeholders (e.g., Citizen Science or Participatory Mapping), to effectively and efficiently map landscape features, including tangible and intangible landscape attributes, values, and ultimately analyse these in Geographic Information Systems (GIS).

We feel that we are at the juncture today, with the tremendous amount of available data, the complications of limited availability of archaeological experts for analysis and (field)validation, and the landscape which is in a continuous process of transformation due to natural and anthropogenic influence. The landscape is transforming every minute and the manner in which the past is being interpreted by the present is continuously and rapidly changing and existing as an **active landscape**.



Relevant thematic questions to be answered are:

METHODOLOGICAL APPROACHES

- How are the active landscape changes documented and incorporated into (archaeological) landscape research?
- How can the active landscape and its transformations be evaluated with remote sensing, machine learning, and/or participatory methods such as Citizen Science?
- How are scholars and database managers incorporating these active landscape changes and keeping space for recording and documenting the change that is taking place on the field?
- How do researchers incorporate participatory methods to their quantitative temporal landscape analysis? What methodologies are used? What kinds of challenges have there been with incorporating these seemingly incongruent spatial datasets?
- What strategies have been successful at developing new sustainable uses for heritage landscapes that combine both site preservation and local interests for land use?

We are hoping to learn from global examples as to how active landscapes have been analysed with scientifically grounded methods and valued by the public. Can the field inform both science and the stakeholders, and if yes how? We encourage international submissions that seek to develop a multi- perspective, interdisciplinary understanding of diachronic heritage landscape development. Contributions that combine 'bottom up' participatory approaches (e.g., participatory GIS, participatory-action research, citizen science, indigenous archaeology) that engage the public with top down tools and methodologies encompassing RS, GIS, and ML are especially encouraged.

KEYWORDS: Remote sensing, GIS, Machine learning, Participatory methods, Citizen science, Heritage landscapes, Interdisciplinary approaches, Sustainability, Knowledge transfer, Valorisation

SESSION THEMES FOR LAC 2024:

- Places, people and identity: a conceptual challenge for Landscape Studies
- Cutting-edge technologies and theories: a new perspective from Landscape Archaeology



ID: 88990

Landscape impact assessment of Sukur cultural landscape, northeast Nigeria

AKINBOWALE AKINTAYO- University of York, United Kingdom

KEYWORDS: **landscape modelling, GIS, Sukur cultural landscape, heritage management, Climate Change**

This research will examine the impact of environmental and cultural threats on Sukur Cultural Landscape (SCL) – Nigeria, first World Heritage Site (WHS) and Africa first Cultural Landscape to be inscribed into the WHS list,¹ which was ravaged by armed banditry 9 years ago. At an elevation of 1045 masl, SCL consists of a hilltop settlement (covering about 764 ha) which is famous for iron smelting technology, flourishing trade, and strong political institutions that date to the sixteenth century CE, and an adjoining lowland settlement which covers an area of about 1178 ha.² In December 2014, Boko Haram sect launched an attack on Sukur in the night, raiding about 173 houses, destroying traditional stone buildings with thatched roofs and granary covers, paved walkways, ritual sites which are the features for which Sukur was inscribed into the World Heritage List.

Using a multidisciplinary approach to studying heritage landscapes, the result of this research will produce an assessment of landscape change over the last fifteen years, using a combination of state-of-the-art GIS and remote sensing technologies combined with field survey, and landscape modelling to examine how SCL has been negatively impacted from cultural terrorism on the one hand, and Climate Change on the other hand. This work is imperative as part of the preservation of an important cultural landscape and will provide crucial information for both local policy makers, community activists, and international heritage organisations.

ID: 90784

Value of Find Spots in Understanding Heritage Landscapes in Estonia

GRETA-KRISLIN LUTTER- National Heritage Board of Estonia, HELENA KALDRE- National Heritage Board of Estonia

KEYWORDS: **citizen science, valorisation, heritage landscapes, heritage conservation, landscape analysis**

In 2019 the term 'protected archaeological site' was introduced within the new Heritage Conservation Act as a means to protect find spots discovered by members of the public more efficiently.

The main idea of introducing such find spots to heritage management was to protect possible sites (their scientific value) and prevent removing artefacts



without context. However, it also has a chance to bring archaeology closer to local citizens with increasing the interest in local heritage, as well as supporting local development. Furthermore, it presents an opportunity for cooperation between scientists, heritage management and residents.

In addition, both quantitative and landscape-based analyses of such find spots can provide us with a more complex view of past landscapes and give archaeologists an opportunity to construct a more complex database with additional help from members of the public. Landscape analysis of the sites has shown its challenges – for example, how big has or even can the area be to be considered eligible to be declared as a protected archaeological site or what are the reasonable restrictions that should be applied on these sites?

There is also the question of properly defining find spots. Is only one archaeological find enough? And has this method been proven successful in combining heritage conservation and local interests for land use?

In this presentation we discuss the meaning of and defining such find spots, along with analysing already established protected archaeological sites, the different reasons or criteria their legal conservation is based on and if it has been an effective measure to manage heritage landscapes in Estonia. Case studies involve the protected archaeological sites of Matka and Mullutu villages, as well as Valga city.

ID: 89362

Cultural heritage as medium and outcome. Citizen science and the role of the expert

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KEYWORDS: Cultural heritage, citizen science, cultural values model, archaeology, public participation

The cultural values model highlights the relation between past and present values and meanings through the relation of cultural and embedded values. Both the former and the latter are primarily provided by local communities, which sustain them in a variety of ways through their daily activities, beliefs and expectations. In the present, those values are as alive as the people that hold them. The embedded values, however, require the concurrence of expert knowledge to understand. Archaeology provides just that. What role can the newly uncovered 'old' information have in the relationship between local communities and their cultural values is precisely what this paper will address. In this framework, it is necessary for those very communities to become involved in the investigation so that they may own it as their own, and be empowered enough to become the protagonists in the creation of new values.



ID: 90728

Enhancing Mountain Cultural Landscapes as a resource for sustainable territorial development: transfer knowledge through Cultur-Monts European project (Interreg Sudoe)

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KEYWORDS: Heritage, knowledge transfer, sustainability, cultural landscapes, Eastern Pyrenees.

In recent decades, archaeological research carried out in European high mountain areas has shown that they constitute cultural landscapes shaped over time and that they contain an important cultural legacy resulting from an intense human activity. However, this outstanding archaeological and cultural heritage is little known and has been undervalued as a tool for revitalization, innovation and sustainable territorial development. The Cultur-Monts project, funded by FEDER funds through the Interreg Sudoe program, proposes to enhance high mountain cultural landscapes to offer new avenues of development to local communities.

The project, led by the ICAC-CERCA, is formed by a consortium of 10 beneficiary institutions from Spain, France and Portugal. The creation of an international network between the regions of southwestern Europe linked to mountain cultural landscapes is an important milestone for the development of joint strategies between these countries to enhance mountain cultural landscapes as a resource for sustainable development. This is especially relevant in a social context marked by depopulation and aging. The project proposes, through various pilot cases, to enhance these cultural landscapes as a tool for social innovation and territorial development and cohesion of mountain communities. The actions planned in the pilot located in the Eastern Pyrenees in the Ripollès and Cerdanya regions will be briefly presented.



ID: 90240

Combining historical aerial photography, cartography and satellite-based data for the detection of sites and archaeological features in the Kambos area (Thessaly, Greece)

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KEYWORDS: Remote Sensing, GIS, Cultural Landscape, Archaeological Survey, Thessaly (Greece)

The Western Thessalian Plain, in central Greece, is part of the country largest lowland plain and one of its most fertile regions. During the late Quaternary, the area has been subject to changes, either due to its geomorphology and the alluvial dynamics of the area, with episodes of flooding, or due to the extensive land modification of the last century, which completely transformed the agricultural landscape. These factors have also had an impact on the preservation, visibility and detection potential of archaeological sites, and, consequently, on the perception by scholars that the region was sparsely occupied in the past, especially in comparison with the Eastern Plain.

The interdisciplinary project ;Long Time, No See: Land Reclamation and the Cultural Record of the Central-Western Plain of Thessaly; has provided a glimpse into the richness of Western Thessaly past. The project was conceived and carried out by a large international team under the auspices of the Local Archaeological Service, focusing on the heart of the area, the regional unit of Kambos.

This paper will focus on the landscape study performed by the project members and illustrate how the use of a range of historical and modern remote sensing and cartographic data and the application of various techniques and methods within a GIS environment, together with their validation in the field, have proved particularly effective in enabling the long-term and up-to-date reconstruction of the rich heritage landscape of the study area and our understanding of it.

It will also be demonstrated how the development of the project geodatabase can support the application of archaeological legislation, as the resulting archaeological map will play an important role in making decisions about planned infrastructure and agricultural expansion in a sustainable way, as well as monitoring the impact of natural disasters such as flooding on the archaeological record.



ID: 90227

The characterisation and future sustainability of a rural landscape: using integrated approaches for temporal heritage landscape analysis in NW Spain

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KEYWORDS: Temporal LULC analyses, Participatory mapping, Historic Landscape Characterisation, Landscape abandonment, Heritage landscapes

Using a regional case study, this research utilises an interdisciplinary approach that incorporates ethnographic landscape perception, participatory mapping, and Historic Landscape Characterisation (HLC) to characterise and temporally analyse the land use and land cover (LULC) evolution of a rural region of north-western Spain. Informants provided detailed, georeferenced land use and history, toponymic information, as well as their perceived evolution of the landscape. HLC utilising archaeological, archival, historical, and contemporary information was aided by the perception interviews and participatory spatial data set which facilitated the demonstration of more detailed temporal LULC changes. Together these combined approaches, covering the early 20th century to the present, underscore a rural landscape marked by demographic decline, abandonment, subsequent increased vegetative growth, nature conservation measures, and ultimately marred by a rise of forest fires. This study highlights the value of an interdisciplinary approach to analyse and understand temporal landscape change.

ID: 89976

Culture, nature or beyond? Integrated landscape studies from an archaeological and anthropogeomorphological perspective. Lednica Landscape Park (Poland) case study

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KEYWORDS: anthropogenic transformations, integrated survey, remote sensing, historical cartography

The aim of this paper is to present a series of interdisciplinary interpretative issues that have arisen during the study of landscape changes in the Lednica Landscape Park in central Poland. The Park was established in 1989 to protect the landscape of the Lake Lednica with its natural and cultural heritage. Since the 19th century, however, the main archaeological focus in the area has been on the medieval residence of the first royal dynasty of the Piasts, which is considered the cradle of Polish statehood. This has led to a research programme in the area focusing entirely on this period. It resulted in the perception of the Lednica landscape as a static



entity that was formed in the Middle Ages and has remained unchanged to the present day. However, recent research into the Lednica landscape has challenged this interpretation. In particular, analysis of Airborne Laser Scanner (ALS) data has revealed the complexity of the landforms. The ambiguity of the identified forms, often resulting from the interaction of human activities with natural processes, led us to seek help from an anthropogeomorphology, whose approach focuses on humans as a geomorphic agents of landscape transformations. The integration of these different perspectives helped us to understand the Lednica landscape as a dynamic entity, which has been formed in continuous processes over centuries, but which has accelerated considerably in the last two centuries. Using a range of remote sensing methods and field survey results, we will present an integrated approach that is essential for understanding processes that shape the landscape, where culture and nature are so intertwined that is often impossible to separated them. This also requires a change in our understanding of the archaeological heritage, and raise the question of how to protect forms that defy convenient, if often simplistic, archaeological categories.

ID: 90703

Values of the archaeological heritage landscape in Sweden

MATTHEW NELSON

Linnaeus University, GRASCA, Sweden

KEYWORDS: Values, Contract Archaeology, Critical Heritage studies, Heritage Landscape, Community Participation

In this paper I'm looking at how different values of landscape, heritage and contract archaeology relate in what I call the archaeological heritage landscape, using the theoretical concept of critical heritage studies. This is done with the aim of showing how the practice could be used in a more beneficial way for strengthening heritage work and becoming a valuable resource for the wider society. By looking at previous research from an interdisciplinary viewpoint together with conducting a survey directed towards the county administrative boards in Sweden, I analyze the concept and values of contract archaeology and the archaeological heritage landscape to get a better understanding for how multivocal perceptions and evaluations are formed and the underpinning dynamics. I also look for deficiencies in, and forces that impact on, the often polarized view on contract archaeology in Sweden and how this heritage-making process can compromise diverging views while becoming more relevant for the wider current society. I furthermore argue for improving the awareness among colleagues for the potential beneficial or negative impacts contract archaeology might have on society, both for the values of the archaeological heritage landscape and for cultural and economic effects. I conclude that the view and values of the archaeological heritage landscape must improve recognition of a wider array of subjective values beyond antiquarian and economic perspectives, and instead be more attuned to for instance identity or community interests, together with the understanding that the landscape values are dynamic and always changing.

The Danger of a Single-sided Archaeology: Viewing (Pan)Kofyar through Ethnoarchaeological Lenses

10-14 JUNE. ALCALÁ UNIVERSITY. SPAIN



ID: 89735

The Danger of a Single-sided Archaeology: Viewing (Pan) Kofyar through Ethnoarchaeological Lenses

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KEYWORDS: **Ethnoarchaeology, citizen-science, heritage, Pan(Kofyar), Jos-Plateau.**

The Jos Plateau in central Nigeria is famous for its rugged geography. Often described in historical writings as a region of isolation due to insecurity caused by raiding for captives in the nineteenth century, this region houses some of the most ethnically diverse groups in West Africa. My current doctoral research is set in the Pan (Kofyar) area of the Jos Plateau. This region is defined by an almost inaccessible range of hills where a well-distinguished cultural landscape and material culture lie. However, this region lacks archaeological documentation. Predicated on a hypothesis about (Pan)Kofyar confinement to a difficult hill terrain due to heritage connections to this landscape when similar hill settlements elsewhere in Nigeria have long been abandoned. My research is focused on creating background archaeological data based on scientific and local narratives of landscape and the archaeology of this region. By integrating aerial survey, systematic fieldwalking and local knowledge in the identification of archaeological and heritage sites, this study has recorded hundreds of these sites within a targeted region which were input into GIS to produce maps of the region archaeology. Ethnographic interviews within the villages surveyed provided key information in the interpretation of surface material culture and on local perception of the landscape. In addition to a better understanding of individual features of living and non-living landscapes, this paper seeks to show how ethnographic data especially citizen science is a valuable tool in the identification of key historical points and their meaning through the Pan (Kofyar) example.

ID: 90147

Challenges and opportunities of heritage conflicts: the World Heritage landscape of Las Médulas (Spain)

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KEYWORDS: **participation, heritage management; conflict**

Participatory approaches to cultural heritage are widespread at public policies. These approaches recognize the existence of different perspectives regarding how heritage should be defined and managed. A collaborative way to deal with this diversity of perspectives into landscapes is crucial to get coherent and integral management strategies of archaeological heritage. Drawing on research into the



World Heritage site of Las Médulas as a case study, which is a complex landscape heavily shaped by Roman mining, this paper discusses the disputes arising from the heritage management of the site. The literature of conflict resolution has informed this research. In particular it is based on semi-structured interviews and a collaborative assessment of these disputes by local populations themselves in order to 1) identify conflicting dynamics in current uses of this archaeological landscape and 2) propose alternative solutions to them. This analysis has revealed that the current heritage management generates significant social tensions as to constrictions on land uses and a perceived unequal and unjust distribution of the burdens and benefits associated with tourism. These tensions are already affecting heritage decisions on the landscape and its conservation. Although disputes involving archaeological or cultural heritage in general are attributed to opposing heritage values, this research highlights the complexity in approaching this phenomenon. In particular, the lack of recognition of traditional government entities, deficient appropriate communication channels among stakeholders and differing perspectives as to management of land uses become key issues in dispute analysis and the starting point to adopt an integrated and adaptative management system for heritage landscapes.

ID: 90382

Safeguarding heritage in the outer plains of Jammu: A synergistic endeavour between academia and non-academic communities

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KEYWORDS: South Asia, Jammu, Remote sensing, Heritage assessment, Heritage conservation.

Heritage, an amalgamation of tangible and intangible elements, is a pivotal and indispensable part of the society. The Indian subcontinent, particularly the northwestern part, has an assortment of rich cultural heritage commencing with the Indus Civilisation, one of the first Bronze Age civilizations (3300-1300 BCE). This enduring legacy persists to the present day in the form of archaeological sites, religious and secular architecture, and diverse craftsmanship. However, these 'fragile properties' suffer from many threats and risks that contribute to an irreparable loss of their historical and cultural value. The region of Jammu in India is no exception as its archaeological landscape is subjected to various risks embodied by both natural and anthropogenic causes, the latter mainly due to high urbanization and the Indian Green Revolution. The heritage loss is further prompted by other activities like the extraction of soil from mounds, their usage as dumping grounds or recent infrastructural developments, among others.



Here we present the remote-based results of RIVERINE, a project focusing on the detection, mapping, and monitoring of ancient mounds by the integration of archaeological and historical legacy data with large series of multitemporal and multisource satellite imagery. We will discuss the historical and present-day land use trends and anthropogenic disturbances that put the cultural heritage of Jammu at risk. Additionally, we have conducted field visits to further validate and understand the remote-sensing results in the area. These field visits incorporated documentation of the sites where examples of initiatives taken by local stakeholders in successfully safeguarding cultural heritage are witnessed. One such exceptional example is the case study of the mound at Biyan. This distinctive 'bottom-up' conservational approach, a departure from the conventional heritage conservation models is a blueprint of an individualistic strategy to preserve the legacy of cultural heritage for posterity.

ID: 89931

Ecological and Cultural Significance of Traditional Groundwater Harvesting in Sand Agroecosystems in Mediterranean and Adjacent Regions

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KEYWORDS: **Important Heritage Agricultural System, Agroecosystem, Navazos, Masseiras**

Plot-and-Berm (P&B) Agroecosystems are traditional agricultural systems developed in dune ecosystems. These systems display a common landscape pattern, characterized by sunken cultivation plots surrounded by man-made sand berms or natural dunes. This form brings the plot surface closer to a superficial aquifer often supplying moisture directly in the roots of the crops. P&B agroecosystems can be found in coastal dune systems, such as the Masseiras in the Apulia region in northern Portugal, the Navazos on the Atlantic coast of Andalusia, Spain, or in sandy deserts, like the Ghouts in the Valiato of El Oued, Algeria, or the Chale Sobak in the Rigboland Desert, Iran.

The archaeological discovery of Early Islamic P&B Agroecosystems systems on the Mediterranean coast Israel by ancient Caesarea, where 140 km to its south in the Gaza Strip and the Mawasi system also exists as a contemporary version, underscores the antiquity of these systems and their importance in the history of agriculture. These agricultural landscapes connect the cultural and the natural and their role in the contemporary world must be determined. This work, after diagnosing the impacts suffered by agricultural modernization and urban expansion on these systems in more modernized regions, addresses heritage issues through the concept of Important Heritage Agricultural System, evaluating it based on the principles of complexity, vitality, and externality. It also explores ecological implications through considerations of energy and water efficiency, as well as natural and cultivated biodiversity coexistence. In summary, our aim is to address the question: Can this transculturally shared agricultural legacy, supported throughout the centuries in terms of sustainability, teach us something today to develop more sustainable agricultural systems?



ID: 91047

Agricultural archaeology and heritage education as tools for rural development

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KEYWORDS: **scientific transfer; heritage education; landscape archaeology.**

In the last decades, the LLABOR-Arqueología Agraria research team has been developing a line of research on the historical formation of rural landscapes in Asturias (Spain), through archaeological, historical and ethnographic studies, and tools such as agricultural archaeology. The philosophy of the group understands cultural heritage as a process of social construction, as well as a space for debate and transformation for social innovation. Archaeological research and agricultural archaeology can provide new perspectives for the management of cultural heritage, and materials to develop initiatives to address problems such as the crisis of the rural environment or depopulation.

One of the lines of work of the group, which we have developed in recent years, is the transfer of knowledge through open science strategies and innovative forms of heritage education in rural Asturias. Currently, the group is carrying out the project ConCiencia Histórica. Archaeology as a tool for scientific dissemination in rural areas (FCT-22-18102). The main objectives of this project are to bring science closer to schoolchildren in rural areas, to promote greater knowledge of their territory, and to generate feelings of attachment and the search for alternatives within the communities themselves. In this way, the didactic proposal aims to contribute to the management of the current problems of the rural world: depopulation, inequality in relation to the urban environment, ageing and the crisis of production models, using archaeology and heritage as a basis.

ID: 89533

Heritage Quest: A two-tier citizen science research project analysing LiDAR data from the central Netherlands

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KEYWORDS: **Citizen Science, LiDAR, Netherlands**

In this paper, the results of the first large-scale citizen science project in Dutch Archaeology, named Heritage Quest (Erfgoed Gezocht in Dutch), are presented.



The goal of this project was to record archaeological remains at a large scale in forested areas in the central Netherlands.

The Citizen Science project consisted of two parts. First, in 2019-2020 more than 6500 citizen researchers participated in an online project, run on Zooniverse, in which they were asked to mark three classes of archaeological objects, namely barrows, Celtic fields, and charcoal kilns in small snippets (300x300 m²) of LiDAR data from the Veluwe and Utrechtse Heuvelrug regions. The system provided these snippets in two different visualizations, hillshade and Simple Local Relief Model, to aid the volunteers, many of whom had little prior archaeological knowledge. To achieve comparable results across the datasets, every snippet was classified by 15 (Veluwe) or 60 (Utrechtse Heuvelrug) individuals before it was retired.

This online project resulted in over 22.000 potential barrows, 38 km² of previously unknown Celtic fields, and over 900 potential charcoal kilns. While some of these locations were marked by only a few people, others were marked by many, indicating a varying degree of consensus among the citizen researchers.

Subsequently, in 2021-2022 a coring campaign by citizen researchers and students from Leiden University was conducted to validate a representative selection of the detected barrows, covering the full range from few to many markings in the online project. The results of the fieldwork indicate a clear correlation between the number of markings and the probability that the marked location was indeed a barrow. Based on this, a plausible probability can now be assigned to the many other potential barrow locations, thus helping regional heritage managers to assess the value of the new archaeological dataset.

ID: 90796

Early medieval settlement cluster at Ciepłe (Northern Poland). Human – environment interactions and land use dynamics

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KEYWORDS: **Early Middle Ages, settlement, landscape archaeology, land use**

At the turn of the 10th and 11th centuries, the Piast state began to take shape along the Vistula. At present, historians believe that the territory of Eastern Pomerania belonged to Mieszko state at an early stage of his reign, but in fact there are no clear archaeological sources to support this. There must have been a centre of power in Eastern Pomerania from which the Piasts were able to conquer new territories. This centre could have been Ciepłe.

The Ciepłe complex consists of three strongholds, two cemeteries and several open settlements. All these sites date back to the 10th and 11th centuries. The complex stands out from other sites in early medieval Poland because nowhere else were three fortified settlements, each about 500 m² in size, built so close together. The cemeteries, on the other hand, contained rich burials – both Slavic and Scandinavian.



Settlement cluster at Ciepłe was very well situated. It was built near the Vistula and the Wierzyca rivers.

The aim of the research is to explore environmental background of the development of the significant centre. No less important role should be assigned to research on the economic foundations of this center success. The basic factor here was undoubtedly environmental conditions. The study includes both multidisciplinary archaeological research as well as paleoenvironmental study consisting of geology, geomorphology, zooarchaeology, archaeobotany and palynology. All the data is integrated in the GIS environment.

We will explore the complex interactions between early medieval societies and the environment, and how these interactions drive land-use changes.

ID: 90765

Maritime landscapes of Rocha, Uruguay: first approach to the underwater cultural heritage of Cabo Polonio and La Paloma

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KEYWORDS: **maritime landscapes, maritime heritage, shipwrecks, Uruguay, Atlantic coast**

Maritime cultural heritage of Rocha department in the east of Uruguay, South America, is mainly related to shipwrecks that occurred in the area of the National Park Cabo Polonio and the Santa María Cape (La Paloma) and the maritime cultural landscapes that they are part of. Given the dangerous waters for navigation of the Atlantic coast, in this region there are over a hundred shipwrecks recorded for the period between the 16th and the 20th century. Some of them are well known by local divers or fishermen who identify them as good fishing spots. They also make an important part of local stories and memories. Coastal communities, in particular, small towns, have shown a deep interest in these shipwrecks and stories. This paper presents a first approach to the maritime cultural heritage of this region, beginning to enquire about the shipwrecks and the stories behind them, archival documents, associated collections, relationships between wrecks and local settlers, and the potential for the study of Uruguayan underwater cultural heritage they present, particularly in the context of marine protected areas. This research is initiating and expects to contribute with keys and recommendations for the management, conservation and monitoring of underwater and coastal archaeological sites, as well as local collections with archaeological artifacts and practices linked to these collections and sites.



LAC 2024

LANDSCAPES
OF DESERTIONS.
SOCIAL
MEMORIES,
POLITICAL
PRACTICES AND
IDENTITIES IN
A LONG-TERM
PERSPECTIVE

SESSION 16



LANDSCAPES OF DESERTIONS. SOCIAL MEMORIES, POLITICAL PRACTICES AND IDENTITIES IN A LONG-TERM PERSPECTIVE

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The session aims to discuss new theoretical, methodological, and conceptual frameworks for studying settlement shifts and desertions in landscapes regarding the transformation of social identities. Our ambition is to inquire how micro-regions have evolved not only in terms of foundations and new occupation trends but mainly considering desertion patterns and their implications in everyday people's social practices.

As a consequence, the core idea is not to investigate the causality of settlement abandonment but the comprehension of deserted sites as arenas of dense social interactions and political practices. Traditionally, desertions are related to economic and political crises, such as the Late Medieval epidemics or the end of the Western Roman Empire. However, some scholars have suggested that desertions are a normal pattern and recurring phenomenon in any settlement system. Furthermore, it can be suggested that abandoned settlements are not just inactive features of the landscape but rather played an active role in the construction of politics through political practices involving these spaces within wider social agencies. In this regard, the study of desertions and the transformations of land uses can be seen as an ideal lab for studying issues such as taskscapes, perceptions, and social grouping transformations, favoring the construction of the landscape as a process of negotiation among different social groups.

In particular, we welcome papers that explore the topic by considering four major research areas:

- 1) People's mobility and social identities. New scientific evidence shows unexpected patterns of people's mobility, and different sources, such as written evidence or cultural biographies of settlements in the desertion process, offer new ways to understand people's identities.



- 2) Transformation of landscapes, land uses, and social conflicts. Settlement desertion occurs in a wide range of situations, circumstances, and environmental conditions, while there is no direct connection between the abandonment of the domestic areas and the productive spaces. Usually, desertion meant conflicts between nearby communities and the expectations of different agents to take advantage of new opportunities.
- 3) Social memories of desertions. The reuse of landscapes and the creation of social memories represent a pivotal aspect in studying the post-abandon period of any settlement. Forgetting and remembering processes are two sides of the same coin in this context.
- 4) Ecological and environmental impact of desertions. The interplay between ecology and social memories and identities in deserted sites and landscapes provides new avenues for the revision of the topic.
- 5) The construction of politics through the insertion of abandoned settlements in new landscapes and changes in their functions as a reflection of social practices and agencies.



ID: 90669

Memories of the landscape. Visions through materiality

ANTONIO CHAÍN GALÁN- Universidad Complutense de Madrid, Escolapios Soria, *DANIEL MÉNDEZ GARCÍA*- Universidad Francisco de Vitoria, *FRANCISCO RODRÍGUEZ PLAZA*- IES Ribera del Jalón, *CÉSAR GONZALO CABRERIZO*- Escolapios Soria

KEYWORDS: **landscape, memory, Irrico, tradicion, materiality**

This paper presents the first results of the Origins project, developed in the environment of Quintana Redonda (Soria). This study proposes the survival of different memory formulas associated with a landscape in continuous evolution during three millennia with the aim of understanding the dimension of “materialized memory” in the creation of cultural identities and ethnic distinctions through the integration and manipulation of material culture and past traditions.

The project asks whether it is possible to trace the ancestors of a human group, the Irrico (a Celtiberian language name found as an anagram in the Villa Romana de la Dehesa and in several Roman inscriptions) through the different phases of occupation of the territory that are marked in several sites; El Cerro de San Cristóbal (6th-4th century BC), Castiliterreño (3rd-I century BC) and the Roman villa itself. The aim of this study is to analyze the formation and expression of ethnic identity through the dynamic interaction of the natural and cultural characteristics of the landscape that contribute to the complex and multifaceted construction of “landscape memories”.

ID: 90131

Deserted settlements as arenas of struggle in the age of supermodernity: a case study in rural northwestern Iberia

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KEYWORDS: **Modernity; social conflict; identities; Northwestern Iberia; industrialization**

Deserted settlements have been a common feature in the landscape in all historical periods, acting as recurrent mechanisms for expressing social and political identities. All in all, it is in the contemporary Era when abandonments and ruins have increased their number at levels never known before. They have, indeed, been incorporated into our everyday landscapes and routines as a consequence of the failures of modernity and the structures of current capitalism, what in Spain has been named as the “emptied Spain” (España vaciada). Thus, deserted settlements in the contemporary era are being introduced in the social and political relationships in original ways and used by a variety of agents, both human



and non-human, which can be potentially studied from an archaeological and anthropological point of view. In this paper, we will reflect on deserted settlements as vehicles for social competition and conflict in the rural world. For this matter, we will be using a case study located in northwestern Iberia, in the current village of Casaio (Ourense). This settlement, progressively abandoned between the 50s and the 90s as a consequence of the industrialisation of the area, have been recently the material centre of a rather traumatic conflict between the local community of Casaio, a group of new rural and migrant returnees. Through an archaeological approach, we will tackle both the process of desertion of the settlement and the conflict between these agents in relation to implementation of modernity in the last century.

ID: 90503

Forgotten Early Medieval Landscapes: The Archaeological Analysis of the Village of Combarro (San Vicente de Trigás, Mondoñedo)

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KEYWORDS: Early medieval archaeology, Domestic space, Rural settlements, Long-term perspective, Galicia

The northwest of the Iberian Peninsula, particularly Galicia, poses challenges in analyzing early medieval rural societies and landscapes. Despite limitations, professional archaeology and research projects unveil valuable insights into the “forgotten landscapes” of early medieval Galician history.

This contribution presents the preliminary results of the archaeological research on the village of San Vicente de Trigás, in Mondoñedo, Lugo. This study focused on three specific areas by means of archaeological probes allowing us to address different aspects of its occupation in the Early Middle Ages.

The ceramic studies, chemical analysis and stratigraphic sequence have made it possible to define a living space with an early medieval oven associated with a level of use in one of the test pits, as well as a funerary space from a later phase in another of the excavated areas. As a result, an initial chronological sequence has been drawn up for the whole site, focusing on the 6th-7th centuries for a possible early medieval village phase, including a funerary space from around the 8th-9th century, and which is currently located in an occupied rural area.

All in all, the analysis will expose the different methodologies used for the investigation of this territory (archaeological, historical and toponymic analysis) allowing to shed light on the people who occupied this place in the early Middle Ages and its evolution over time from a transhistorical perspective. The aim is none other than to offer a first approach to the study of everyday life in this forgotten early medieval setting, which today is a village that is taking its first steps towards becoming, once again, a depopulated area.



ID: 90411

Enforced desertion and displacement, a landscape archaeology of destruction and disruption, re-location and re-habitation

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KEYWORDS: **destruction, identity, rootedness, resettlement, migration**

The desertion, abandonment and destruction of settlements can all too easily be seen in historical and archaeological research as a purely mechanical process. The impact on people – both initial as well as much longer term – is often difficult to discern in non-historic periods (and even in historic periods, the dispossessed rarely having loud voices).

‘Devastation’ (Devastation, dislocation and (re-)settlement: Breaking/replacing the people-place connection in landscape) is an interdisciplinary research project funded by the DFG-AHRCUK UK-German Funding Initiative in the Humanities, centred on the Käte Hamburger Centre for Apocalyptic and Post-Apocalyptic Studies in Heidelberg University, Germany and the McCord Centre for Landscape in Newcastle University (UK). The project starts from new analysis of the (relatively) well-documented ‘burning’ by French armies of the towns and villages of the Rhineland Palatinate in the 1680s and ‘90s and its aftermath down to the present day. From that core it expands to consider other examples of the deliberate destruction of landscapes, the enforced abandonment and replacement of settlements. The aim is less to examine the causes of violent, abrupt and deliberate human-made devastations - all too common in the historical record, and even in the present day - or to catalogue the material destruction that resulted, than to consider how mainly-sudden devastations break the people-place connection, the relationship between landscape and social identity, and how the survivors and successors coped through many generations with the resultant traumas and responded to their new situations by creating new mental or material landscapes.

Lessons learnt could well be applicable to current and future devastations (and ‘natural’ disasters too). Looking backwards, we also hope that better understanding of enforced depopulation, and of its ubiquity in human history, will enable events in the more distant past to be identified in the archaeological record and to be reappraised.



ID: 88006

Eventual rural landscapes versus secular rural landscapes between the end of the Ancient world and the Middle Ages: the cases of Campo de Hellín and Balazote River Valley (Albacete)

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KEYWORDS: **Off-site surveys, agrarian practices, Late Antiquity, Campos de Hellín, Balazote River Valley**

In this contribution, we present a comparison of two rural landscapes in the southeast of the Iberian Peninsula, where the dynamics of occupation have differed since the end of the ancient world in terms of both the degree of resilience of settlements and the land use. Our purpose is to explore the social, political, economic, and environmental factors that could explain why there has been a long-term cross-cultural occupation of some resilient sites and landscapes for almost a millennium, while there have been only very specific temporary occupations in other areas. The first part of this contribution describes the archaeological investigations carried out by means of intensive survey methods, geophysics, and some excavations in peripheral and peri-urban spaces. In the second part, based on the archaeological record obtained with the same methodology, we reflect on the possible causes that make societies sustainable (or not) over time, addressing issues such as the attachment of rural communities to the land, influence of political changes, the peripheral location or not of the settlements occupied for centuries, etc.

ID: 90799

How green was my valley: Challenges and proposals for the management and revaluation of the heritage submerged in Spanish reservoirs. Memory reparation and restitution

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KEYWORDS: **Memory restitution, Heritage management, Reservoirs, Forced displacement, Submerged landscapes**

The construction of reservoirs during the Spanish Franco dictatorship led to brutal changes in the landscape and notable heritage losses, intentional or accidental, but also forced displacement of thousands of people, with the consequent loss of the communities; memory of their landscape.

The recent periods of prolonged drought have resulted in the emergence of sites hidden under the waters of the swamps, such as the Guadalperal dolmen, with the



consequent increase in public and academic interest in the management and study of this heritage. However, there are remarkable deficiencies regarding the study of this submerged landscape and its more contemporary rural and ethnological heritage.

Reviewing study methodologies for increasingly adverse environmental conditions due to climate change must be combined with the review of current legislation on heritage.

The work with the displaced becomes especially urgent as there are few survivors of this phenomenon. The compilation of their memory is essential for the reconstruction of the submerged landscapes, gathering the toponymy and identifying the sites and landmarks of the landscape. It is also key for the necessary restitution of their memory and enhancement of their submerged heritage, as well as to understand the links between communities, their settlements and the spaces lost after forced relocation.

The communication will try to unify all these different aspects, creating dialogue proposals for the construction of methodologies and action plans, that allow rebuilding lost landscapes, repairing the memory of the displaced and conserving heritage in an uncertain future of climate change and rural abandonment.

ID: 90735

Abandonment or Persistence? Rethinking Landscapes of Desertions in the Czech Republic

LUKAS HOLATA- University of South Bohemia

KEYWORDS: **Medieval desertions, Rural milieu, Resilience, Continuity, Social dynamics**

Traditionally, deserted medieval villages in the Czech Republic have been viewed as stagnant remnants of past crises. A deeply rooted narrative of 'stopped life' and 'zones of destruction' prevails. However, recent investigations have challenged these conventional perceptions, revealing a more intricate reality characterized by the persistence, transformation, or resource diversification within supposedly abandoned spaces. Even those areas far from the centers that are now afforested were, in fact, full of life long after the village disappearance and were effectively used under the given socio-economic conditions. By adopting diverse data sources, this research illuminates the intricate interplay between social dynamics, ecological processes, and human agency. It unveils a nuanced understanding of rural landscapes, highlighting the resilience and adaptability of rural communities. This paper contributes fresh insights to ongoing discussions by reframing desertions as sites of continuity rather than rupture. By acknowledging the transformative potential of deserted landscapes, we gain previously unappreciated insights into social interactions, patterns of mobility, or collective memory of rural communities.



ID: 90672

Continuity and Transformation: Evolution of Rural Landscapes in the Aftermath of Medieval Desertions (South Bohemia)

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KEYWORDS: Medieval desertions, Rural landscapes, Continuity, Resource exploitation, Landscape evolution

This study delves into the dynamic evolution of rural landscapes in the aftermath of medieval desertions, focusing on the continuously exploited landscape of farmers and foresters since the early Middle Ages. Through a multidisciplinary approach integrating historical, archaeological, and environmental data, we trace the trajectory of landscape evolution from early medieval settlements to the emergence of villages and intensified resource exploitation practices.

Our findings reveal a complex interplay of human activities, ecological changes, and social adaptations shaping the landscape over centuries. Evidence of tar production, forest grazing, and charcoal burning from the High Middle Ages onward underscores the intensive utilization of natural resources, leading to significant alterations in forest composition and land use patterns. Despite the gradual disappearance of villages in the late Middle Ages and early modern period, certain areas continued to sustain agricultural and pastoral activities until the 19th century.

We demonstrate how the persistence of certain villages influenced landscape dynamics, with contrasting patterns of resource exploitation emerging in their vicinity. In areas where villages endured, intensive agriculture coexisted with relatively moderate forest exploitation, preserving the original landscape structure to a greater extent. Conversely, regions affected by village desertions witnessed intensified forest exploitation alongside declining agricultural activity.

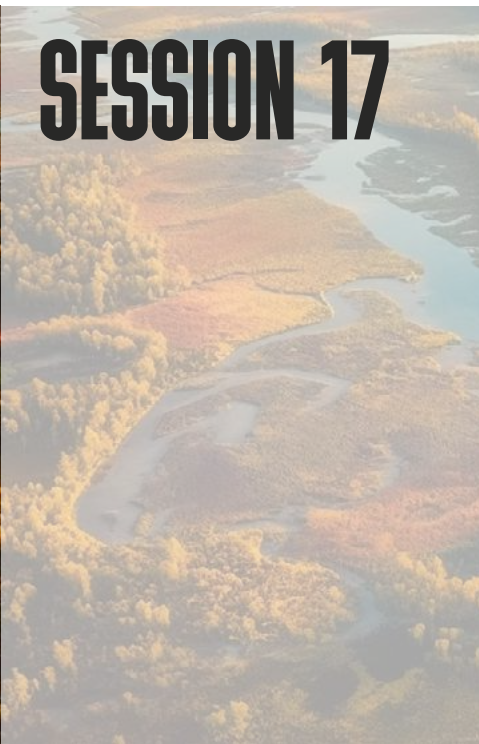
This study highlights the resilience of rural communities and the transmission of knowledge across generations, shaping landscape management practices even in the wake of demographic shifts and settlement abandonments. By unraveling the intricate connections between human societies and their environments, we gain insights into the long-term trajectories of landscape change and adaptation in response to medieval desertions.



LAC 2024

BRIDGING
HISTORICAL
LANDSCAPE
ECOLOGY AND
LANDSCAPE
ARCHAEOLOGY:
COMMON
QUESTIONS AND
CHALLENGES
IN A RAPIDLY
CHANGING
WORLD

SESSION 17



BRIDGING HISTORICAL LANDSCAPE ECOLOGY AND LANDSCAPE ARCHAEOLOGY: COMMON QUESTIONS AND CHALLENGES IN A RAPIDLY CHANGING WORLD

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A more nuanced interdisciplinary understanding of the deep history of cultural landscapes and the influence of changing human-environment interactions on the current state of the environment is required to develop sustainable ways of dealing



with landscape changes in the future. Particularly important for landscapes are their relations to long-term history because cultural identities and values of landscapes are embedded in their historical and ecological development. Events and processes taking place over the last decades are currently considered as the baseline for addressing issues of landscape management, while archaeological and ecological research highlights that human impacts on the environment have a much longer history. This provides a significant common ground for historical landscape ecology and landscape archaeology, as there are fundamental questions and challenges that are easier to handle by bridging the two disciplines. This joined session of IALA, IALE and IHOPE brings together landscape archaeologists and landscape ecologists to learn about each other's methods and approaches and to identify common research interests and the possibility for a joint collaboration between researchers of these two disciplines. An increasing need for adaptation to current and future landscape processes requires integration of the natural sciences with the humanities and social sciences. This session is calling for abstracts on research using methods that contribute to narrowing the bridge between disciplines, e.g. landscape ecology and landscape archaeology, applying either contemporary or historical sources. A platform will be given to inspiring research examples focusing on the historical use and management of natural resources and how it has changed the landscape, how to use these historical experiences to plan the future, and on challenges of modelling future processes based on trajectories and pathways over a longer time span. For the results of this session a publication or special issue will be organised, to which session presenters can contribute.



ID: 90543

Identifying major phases in land use and changing landscapes by Agrarian Societies (7000 cal BP-Present) in Cantabrian Spain, based on cultural changes and anthropogenic signals

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KEYWORDS: Cantabrian Spain, Human impact, Climate evolution, Energy Regimes, Holocene

Enacting transitions towards more sustainable management and use of land, energy and natural resources poses multiple challenges for human societies. Such transitions have been a constant throughout human history and therefore there is a need to learn from them and apply that knowledge to current land-use policies and management. Significant human impact on landscape and environment in Cantabrian Spain has been documented in alignment with the Neolithization (ca. 7,000 cal BP). Cantabrian Spain is well known for its long mining history. Key processes historically shaping landscapes in the region include the implementation of mining/metallurgy industries and extraction of forest resources. These historical processes were characterized respectively using heavy metal pollution contents (Hg, Zn, Cd, As, Ni, REE, Pb and 206Pb/207Pb) and total arboreal pollen percentages in peat bogs, providing global trends of human impact on the environment. These trends were then compared to climate (temperature and precipitation) and natural vegetation evolution modeling through time. Results show seven phases of major human impact on the environment: 1) the Copper phase ca. 4400-4100 cal BP, 2) the Middle Bronze phase ca. 3500-3150 cal BP, 3) the Iron phase ca. 2800-2500 cal BP, 4) the Roman phase ca. 2200-1750 cal BP, 5) the Medieval phase ca. 1250-1000 cal BP, 6) the Colonial phase ca. 650-400 cal BP, and 7) the Industrial phase ca. 150 cal BP-Present. Four phases are tightly related to substantial changes in land use and subsistence strategies: 1) Production, with the appearance of productive economies during the Neolithic, 2) Specialization, with the appearance of specialized activities and trade during the Middle Bronze phase, 3) Urbanization, with the first urban centers during the Roman phase, and 4) Globalization, with worldwide colonialism and capitalism economies during the Colonial phase.



ID: 90749

A country-level assessment of long-term grassland changes since the 18th century in Hungary

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KEYWORDS: grassland loss, direct drivers, 18th century, ancient grasslands, biodiversity

The importance of historical changes and long-term processes are increasingly recognized in ecology as habitats and species continue to decline in Europe despite the strengthening of nature conservation. Knowing the quantity and type of ecosystems in the past can help us understand the environment in which people lived in the past and maintained outstanding grassland biodiversity over centuries. Our aim was to assess changes of natural ecosystems since the 18th century, focusing on different types and continuity of habitats, and also on dominant trends, trajectories, and drivers of habitat loss.

Historical and recent data sources were used to build a country-wide geoinformational database that contains habitat-level site histories for seven time periods. To more precise habitat level interpretation for the 18th century, we reconstructed travel routes from Kitaibel travel diary and the exact locations of over 2400 species lists surveyed by the traveling botanist. Habitat estimation was carried out using iterative information transfer between historical and recent sources.

The country-wide analysis showed that about 1/3 of current grasslands are ancient in Hungary. We found that the loss of natural grasslands was higher than 80% over the last 200 years. Seven habitat types lost more than 90% of their area since 1783, and the highest losses were experienced by two grassland habitats (Pannonic loess and sand steppes, 98, and 98% respectively). The grassland area reached its minimum extent of about 20% in the 1980s. The main direct driver of the grassland loss was ploughing, and the most influential indirect drivers behind this were the European population growth with the related increased demand for grain in the 19th century, and the technical developments in the 20th century. The forest minimum was 13% in the first half of the 20th century. The maximum of cultivated land was in the mid-20th century.

ID: 89578

Applications of Landscape Archaeology and Landscape Ecology in inland Sicily during the last two millennia

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KEYWORDS: **Historical Ecology; Vegetation Series; GIS; Land-use change**

The study of landscape trajectories adopts two methodologies: reconstructing vanished landscapes and analyzing contemporary landscapes as palimpsests of historical layers. This approach views landscapes as complex mosaics, revealing both temporal dynamics through historical stratification and the unique characteristics of individual patches within various ecotopes.

Despite recognizing the potential of historical approaches for understanding ongoing and future landscape trajectories, achieving full interdisciplinary integration remains challenging. True interdisciplinary work transcends simultaneous study by different disciplines, advocating for a more integrated merging of methodologies. From this perspective, Sicily represents an ideal space for understanding the relationship between historical stratifications over the last two millennia of the current era. The rural landscape of the inland areas has been the subject of interdisciplinary applications between landscape archaeology, landscape ecology and vegetation science. Employing surveys, archaeological excavations, studies on land use changes, vegetation dynamics, environmental archaeological studies, and GIS-based spatial analyses, this approach offers a comprehensive analysis of long-term human-environment interactions and a deeper understanding of historical rural landscapes.

In this paper, we present the results of several applications of interaction between landscape archaeology and landscape ecology in the inland areas of Sicily, where it has been possible to understand the ecological trajectories of the landscape and relate them to the strategies of territorial occupation and exploitation of natural resources over the centuries.

ID: 90802

Merging archaeology and ecology in studies of extensive pastoral systems in Sweden. Further concerns for heritage management in a rapidly changing world

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KEYWORDS: **archaeology, ecology, heritage, identity, extensive pastoralism.**

Contemporary food-producing landscapes still contain long-lived practices of animal breeding and keeping, and practices such as reindeer herding, and other forms of pastoralism. Customs related to these are on the UNESCO intangible heritage list, under labels such as transhumance, or alpine pasture season. -At an even deeper level, cultural traditions are tied up with particular landscapes through tacit knowledge about land management and the sustenance of life across several generations: An example, concerns indigenous groups such as Sami and reindeer grazing, and traditional practices that might have a broader sustainability



application. This inherited knowledge – traditional ecological knowledge (TEK) is written in the landscape as well as in human bodies and memory, but it can easily be lost. Ways of life of farming communities are about to be threatened by significant change; among longer-established communities and families, the disappearance of the tangible results of the labour of several generations of ancestors can have extremely negative effects on identity and sense of belonging. Patterns of grazing that sustain current biodiversity (itself a form of heritage) and bio-cultural values are likely to change. The negative results of such change might in the event be insignificant when the full effects of the climate crisis start to be felt. In this presentation, the status of rein deer grazing areas in Northern Sweden, respectively semi-natural and highly diverse semi-natural grasslands in Southern Sweden, is addressed. The mutual benefit merging landscape archaeology and landscape ecology for the understanding of such areas, is discussed, but also the more complex perspectives on their heritage is discussed, such as ethics and identity. The question is not only which knowledge we are gaining a merged approach, but also what other initiatives we need in landscape planning and management, or order to face the challenges of a rapidly changing world.

ID: 90816

Reshaping Landscapes: how to unravel the threads of prehistoric landscape transformation

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KEYWORDS: **agriculture, cattle breeding, databases, landscape changes**

The history of land development and the formation of cultural landscapes are closely intertwined, and shaped by a combination of a pattern of changing natural frameworks, the evolution of economic strategies, and the cumulative effect of these combined transformations in a particular region. While pollen data has proven invaluable for reconstructing landscapes over extended periods, bridging these reconstructions with the history of land development necessitates integrating data from multiple archaeological sources that gather data on the development of economic patterns of land use.

In this paper we want to present an example of a research approach based on combining the results of landscape REVEALS modelling on pollen and BIAD: Big Interdisciplinary Archaeological Database. The BIAD standardises and consolidates a wide range of archaeological data, providing a pan-European perspective on prehistoric processes from the Balkans to the Scandinavian peninsula and from the Atlantic coast to the Urals. As a relational database, BIAD integrates many sources with qualitative and quantitative information and links them with occupation phase, chronology and other archaeological data to ensure accuracy and consistency over time and space. By utilising BIAD archaeobotanical and archaeozoological data, we aim to trace the timing and intensity of introducing different cultivated plants



and domestic animals in model regions. Through correlating paleo-landscape reconstructions with changes in herd composition and crop packages with associated weeds over time, we seek to understand the extent to which agriculture and livestock husbandry reshaped pristine forest landscapes and which economic activities have had significant impacts at different time intervals.

ERC synergy project "COREX"

Better for session 17

ID: 89030

Applied historical ecologies in Kenya: What to do with 200-years of human-environment interaction?

NIK PETEK-SARGEANT- University of Cambridge

KEYWORDS: **applied historical ecology, community engagement, Kenya, weather, Africa**

Few regions offer as much potential as Africa for interdisciplinary study of the past through analysis of archaeological, historical, ecological, ethnographic, and anthropological sources. Particularly for the recent history, the varied sources offer the possibility to weave together a detailed interpretation of past landscapes and its people from multiple strands of independent evidence. Making the most of these fertile grounds now is especially important. Climate change is causing significant changes in weather patterns in East Africa, for example, which is impacting people's livelihoods and local ecologies and resources, but also shapes the biocultural traces communities leave in their environment.

This paper will discuss the long-term human-environment interaction in Kenya's Baringo lowlands, following the changes in habitation, land use, and ecologies caused by climatic and social forces over the last 200 years. Combining methods and sources that include remote sensing, spatial statistics, oral histories, archaeology, photographic and ethnographic archives, and (palaeo)ecologies, it will show how lifestyles and habitation practices shifted to make the most of "good" or "bad" weather conditions, how changes in climate and environment shaped perceptions of the 'landscape', as well as how people perceive ongoing environmental, weather, and climate changes. As the aim is to make the past and this knowledge usable to the communities where we work, the paper concludes on the successes and challenges of engaging communities on these topics and making the past relevant to their current issues and experiences.



ID: 90467

Integrating historical, pedological and archaeological methods for forest habitat protection

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KEYWORDS: **nature restoration, forest succession, slash-and-burn cultivation, soil charcoal**

Efforts to restore natural habitats must encompass a minimum of 20% of the EU's land and sea areas by 2030. To meet these objective, EU Member States are tasked with devising comprehensive nature restoration plans. This presentation aims to explore the role of fire in the succession and restoration of dry pine forests, focusing on Natura areas in south-eastern Estonia.

In the boreonemoral region, dry oligotrophic pine forests have a tendency to transition into spruce forests. Understanding the conditions under which these forests have evolved is essential for their maintenance and restoration. It is widely considered that fires play a significant role in shaping these habitats. Traditionally, slash-and-burn cultivation has been attributed to soil depletion, creating conditions favouring the dominance of pine trees. Historical maps were used to identify areas where rotational slash-and-burn practices were practised. Characteristic landscape features such as field terraces, rock heaps, and pits dug for turnips can indicate former cultivation sites in the absence of maps.

Our study revealed that mesotrophic *Oxalis* forests, rather than oligotrophic forests, are common in mapped slash-and-burn sites. However, determining the effects of natural fires, single cultivation events, or prescribed burns for alternative purposes remains a challenge. For example, historical records describe burning for bee pastures in medieval times.

Soil excavations are needed to examine fire rotation intervals and forest succession. In former rotational slash-and-burn fields, the upper layers with scattered charcoal fragments were dated to the 16th-18th century. The charcoal from the lowest layers indicating natural fires was dated back to -2471 calBC. In the case of a single slash-and-burn event, such a distinction is not obvious. Therefore, various mechanisms of pedoturbation must be considered. Spatial analysis of archaeological findings helps to interpret the results. By examining the fire regime, we can better determine appropriate methods for restoring forest habitats.



ID: 90748

How to capture landscape pathways? Combining insights from historical maps, aerial imagery and oral history as a mixed-method approach

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KEYWORDS: **landscape change, land use trajectories, agricultural landscapes**

Agricultural landscapes in Europe changed drastically during the last century, resulting in a variety of landscape trajectories. Developments range, for example, between increased conversion to cropland and land abandonment, or between intensification of landscapes to optimize for new machinery and trends toward extensive land use. In both landscape ecology and landscape archaeology landscape forms the overarching context where daily practices are being constructed and modified into patterns and processes, which at their turn influence human action and perception of their landscape. To have a better grasp on how the practices of the past formed the landscapes of today, how they transformed through time and how this change impacted livelihoods is one of the key aspects that bridge geography and archaeology.

This contribution is located on the intersection between both disciplines by looking at landscapes with a large spatio-temporal scale based on a combination and triangulation of sources to illustrate landscape pathways from the beginning of the 1800s until today. The aim of this contribution is to underline the importance of a temporal perspective using different sources (historical maps, archival documents, aerial imagery, oral history interviews), their methods (both quantitative as qualitative) and the major/fundamental add-on value of the resulting triangulation as for the analysis. We present two illustrative case-studies located in Switzerland and in Italy that are examples of agricultural intensification in central Europe and abandoned agro-silvo-pastoral systems in the Mediterranean respectively.

Both cases were part of the research project SIPATH (Operationalizing Sustainable Agricultural Intensification Pathways in Europe) funded by the Swiss National Science Foundation. More information on the project is found here:<https://www.wsl.ch/de/projekte/what-is-sustainable-intensification/>



ID: 90763

The historical landscape of north-western Asturias (Spain) and its recent transformations: cultural heritage as a resource for the future

SANTIAGO RODRÍGUEZ-PÉREZ- Universidad de Oviedo

KEYWORDS: **Asturias, landscape archaeology, building archaeology, agrarian archaeology**

The techno ecological adaptation of local communities to the environment entails the transformation of the landscape and its conversion into a human habitat, using cultural tools such as architecture, in a long-term process. This work focuses on the study of western Asturias (NW Spain), where we find a rural agrarian landscape structured around the *casería*, the basis of rural settlement since the Middle Ages. This forms the living and productive space of the peasant family, and groups together domestic spaces (housing), and productive spaces (barns, stables, cellars, auxiliary buildings, etc.), as well as arable and grazing land, rights over common land, mills, forestry areas, etc. The traditional agrarian landscape includes elements such as road networks, high pastures and *brañas*, terracing and irrigation, sacred places, spaces for socialisation, etc.

Since the 19th century, the Asturian countryside has undergone a profound transformation. The traditional agricultural model was transformed into industrialised agriculture, specialising in dairy and meat production. This conversion had profound impacts on the landscape, such as the conversion of cultivated areas into fodder monocultures; the transformation of forests into intensive logging operations; or the disappearance of the peasantry as a social group, and depopulation. The current geopolitical context has shown the weaknesses of this model, which is heavily dependent on fossil fuels, fertilisers, and international markets, as well as profound soil degradation.

Facing this panorama, archaeology and the study of rural heritage can offer analyses and tools that can serve as inspiration for an alternative future for the rural environment: in-depth knowledge of the territory and its historical uses, the role of rural communities as managers of the landscape and ecosystems; or cultural heritage and the material and immaterial record, which can be key factors for future sustainability.



ID: 90685

TerraNova: Natural ecological baseline evolution from deep history to the present inform the urgency of current and future landscape management

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KEYWORDS: Biodiversity, Archaeology, Ecological baselines, Landscape management, Scenarios

The urgency of today's state and projected future of biodiversity, climate and landscapes (IGES, 2019, IPCC 2021, IPBES, 2022) is calling for an unprecedented understanding with interdisciplinary research on landscape processes that are affecting the current landscape crises and offer an understanding of potential scenarios and solutions. Therefore we present this cross-cutting paper showing a breadth of research demonstrating urgency and impact on (global) future landscape management and will integrate the following three perspectives: i) insights from past natural and near-natural baselines of relevancy for current and future landscape management, notably with respect to vegetation, wildlife, and climate, ii) insights in changing environments and climate, loss of nature, growing human impact (via changing energy regimes), and lessons we can learn for current and future landscape management, iii) how scenarios and socio-economic valuation are important tools to discuss with stakeholders the management of landscapes under abandonment (or under transition).

ID: 90691

Towards a Comprehensive Theory of the Anthropocene

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KEYWORDS: **Anthropocene, Comprehensive Theory, Transformation, Incremental Steps**

What is the Anthropocene? This paper deals with the search of a theoretical base of the Anthropocene, the time in which humanity has a greater influence and impact on our planet than all natural forces combined. This paper addresses a review of overarching disciplines and research addressing planetary boundaries and social and humanitarian crises and is exploring transdisciplinary collaboration for sustainable change. The dominant influence of human forces on our planet's land, water and atmosphere has already overstepped biophysical planetary boundaries, and is threatening to increase and worsen its conditions if politics, society and economy are not adjusting their forces. The Anthropocene nowadays is clearly visible in society, politics, justice and the economy. The problem we face in the Anthropocene can be summarized in the most recent international reports and publications spanning from the IPPPC, IPBES, UNESCO, ENECE and United Nations. The three 'broad and deep' transitions are needed to address this huge societal problem are the energy transition, current use of space, and the total greenhouse emissions of the food system. How can disciplines become overarching in breaking loose big societal problems of climate change, biodiversity loss, soil and water contamination, social unrest, pandemics and inequality? These challenges can be examined from perspectives of science, humanities and social science. Many disciplinary scholars in all three domains are increasingly studying the Anthropocene. An overarching Anthropocene theory, especially over the three domains is non-existent, although we do observe many researchers crossing boundaries usually within domains. Towards an Anthropocene theory is an interesting exercise in this paper with a call for transformation that needs incremental steps, and which needs to be acknowledged by all academic, governmental, corporate and societal actors.

ID: 90756

Exploring Historical Biocultural Diversity in Urban Landscapes as a Baseline for Rebuilding Habitat Connectivity

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KEYWORDS: **Biocultural diversity, degradation, land transformation, place identity, keystone landscape elements**

Many cities that historically played pivotal roles have transformed into rapidly growing urban areas since the 1950s. Istanbul, former capital of the Byzantine and Ottoman Empires, exemplifies this transformation, accumulating and transforming cultures, ideas, and ecologies over centuries. However, like many cities, Istanbul faces challenges such as ecosystem degradation and the alienation of residents from its rich cultural and natural landscapes. This study examines the current and past landscape of Ortakoy, a historic neighborhood in Istanbul along the Bosphorus



with a diverse topography. Despite undergoing significant gentrification, Ortakoy has partly preserved its multicultural identity from the Ottoman period, with wooden houses and architectural landmarks amidst greenery. This transformation reflects the broader trend of rapid land use changes in Istanbul, leading to the degradation of its biocultural aspects. To analyze Ortakoy historical landscape, the study used land use data from 1927 insurance maps by Jacques Pervititch, which provide detailed information about the blue and green infrastructure in Ortakoy. Additionally, historical travel narratives were filtered to extract observations and perceptions regarding Ortakoy natural diversity. Comparative analysis of the current and past landscape structure of Ortakoy reveals that rebuilding connectivity within the district and its surroundings requires enhancing both the quantity and quality of green spaces. Consequently, strategies and objectives were developed through a thorough examination of the landscape transformation over the last century. This would not only help in understanding processes of change but also provide insights into keystone landscape elements (e.g., ancient trees, streams) and green areas crucial for restoring, adapting, and fostering biocultural diversity. Furthermore, it would help reconstruct the narrative of landscape character, informing younger generations and policymakers about the significance of landscape identity and place attachment. Lastly, it would assist in selecting elements to rebuild habitat connectivity, which could enhance the resilience of cities against climate change.

ID: 90014

Designing the Historical Ecology of Beekeeping in the Central Rift Valley of Kenya

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KEYWORDS: historical ecology; archaeology of beekeeping; beescape; African archaeology; landscape change

Despite of its high economic and cultural importance, pollination services to some of the most important cash crops, and broader ecosystem services that enhance forest biodiversity and soil stabilization, beekeeping and beekeeper communities in sub-Saharan Africa have often been overlooked in development and conservationist literature for their roles in shaping their inhabited landscapes and ecosystems over *longue durée*. Simultaneously, despite of its well-attested antiquity, apiculture has been generally overlooked in archaeology. Current methods that traced the origin of beekeeping to early agriculturalist Near East, relying on either the remains of apicultural structures or lipid analysis of beeswax, become infeasible when encountered with sub-Saharan African apiculture where hives and receptacles were mainly made from perishable materials and where beeswax was not widely collected until recently.

Following earlier proposition of the concept of 'beescape' as biocultural heritage to embrace the meshed processes of multispecies intra-actions/co-becomings that reified ecosystem, landscape, and material memories, this paper proposes historical



historical ecology-minded, multidisciplinary approaches to investigate the living beescapes of eastern Africa, by coalescing oral historical, participatory mapped, GIS-based, remote-sensed, palaeoecological and archaeological materials. Through a comparative studies of how long-term beekeeping had mediated the landscape modification in the lowland Lobo Plain in south Baringo county and the highland Kapcherop Forest in the Cherangani hills on the conjecture of Elgeyo-Marakwet, West Pokot, and Trans-Nzoia counties of Kenya, this study hopes to point directions for further historical ecological studies of African apicultures.

This study also examines how learning from the ecological and landscape past of beekeeping in Kenya may inspire future policy-making concerning food security, biodiversity, forest conservation, and climate change reactions in both the local and global scales.



LAC 2024

LANDSCAPES
OF EQUALITY:
DECENTRALIZATION,
COMPLEXITY
AND RESISTANCE
IN THE POLITICAL
CONSTRUCTION OF
SPACE

SESSION 18



LANDSCAPES OF EQUALITY: DECENTRALIZATION, COMPLEXITY AND RESISTANCE IN THE POLITICAL CONSTRUCTION OF SPACE

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Analyses of the political organization of human societies are far from being a modern novelty, even if “modern” is understood as a reference to Modern Age’s immediate origin of our cultural universe. A case could be certainly made for the pursue of equality, a definite rendering of what elsewhere might be pervasively conceived as “justice”; and perhaps, it could also be made for an essentialization of social relations, somehow linked to the liberal shaping of the individual. Though paradoxical at first, the dichotomic construction of otherness during the expansion of European groups clarifies this matter. While direct experience of our own social environment bolsters the perception of individual actors, entangled in an intricate network of personal and factional interests, the awareness of such a political arena is far more deficient when dealing with alien cultures. The same could be said about the vivid certainty of inequalities within Modern societies; leading in turn to an almost mythical, indistinguishable devising of “primitive equality”. Not for nothing, it has been written that the very idea of Prehistory resulted from this colonial encounter. And the fact is that, during the following centuries, different trends of evolutionism developed more or less bulky sequences of social typologies in order to explain an alleged progression from simple to complex and from egalitarian to hierarchical, where the underlying concern could perhaps be better expressed as the imaginary measurement of the distance from –naturalized– “others” to –cultured– “ourselves”

All this explains to a great extent why escaping from traditional categories –like band, chieftaincy, or the State itself– is so difficult even now, after several decades of convincingly challenging them. On the contrary, pointing out the limitations of evolutionary models has not brought forth new analytical consensus, systemically aware of the complexities of human practice. But what can Archaeology, and specifically Landscape Archeology, contribute to this debate? Firstly, the study of human cultures, societies and histories through materiality stands as a strong reminder that, being part of the same species, our endless diversity needs a ground of shared reflection, rather than current vogue narrativism. Secondly, if inhabiting



a space implies its cognitive appropriation, unravelling the structuring-structured logics therein fossilized could open a window into other versions of imagining reality, and hence ordering politics. In such sense, this session aims to focus particularly on egalitarianism; not only because so-called “egalitarian societies” represent the bulk of human experience, but because, despite that, their practical logics have tended to remain concealed under a sort of black box. How non-coercive social equilibriums are reached and preserved?

How does the principle of equality interface with those personal and factional interests, with the will of dominance in its different forms and intensities, or with the dynamics of hierarchization that –not necessarily translated into political relations– cross-cut all human social universes? What exactly means to be equals?, or, do we irretrievably cease to be so with the advent of the State? By which means can Archaeology trace such tensions and social settings in spatiality? Case-studies from all chronologies and areas will be welcomed in order to deepen these and other issues related with the “landscapes of equality” from a comparative perspective.



ID: 90177

Landscapes of Freedom: How Oppressed African American Communities in 19th Century Pennsylvania, USA, Deployed Landscape to Undermine Slavery and Promote Self Sufficiency

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KEYWORDS: **LiDAR, Charcoal, Resistance, African American, Underground Railroad**

Prior to the American Civil War (A.D. 1861-1865) and subsequent Emancipation, enslaved African Americans frequently escaped bondage in southern states and made the perilous journey to freedom in northern states or Canada. They were aided by a network of people and communities who saw enslavement as immoral and unjustifiable. Frequently known as the Underground Railroad, this system has often been portrayed as a network of “agents” and “conductors” many of whom were white. Less attention has been paid to the role of African American individuals and communities and to the role of the landscape in between these nodes. In this paper, I present recent research that focuses on Six Penny Creek, a small rural Black community in southeastern Pennsylvania, a “free” state. The Mason Dixon line (the border between Pennsylvania and the slave state of Maryland) lies only 35 mi to the south. The landscape was key to their participation in the Underground Railroad. Six Penny Creek is located between large tracts of charcoal land that was used to produce charcoal to fuel three nearby iron furnaces. Landscape archaeology, particularly through LiDAR and field survey, has demonstrated that this landscape was deployed to transport people escaping slavery, hide those people, provide them with temporary or permanent residence. Additionally the community accessed important resources distributed across the landscape and vital to the success of their self-sufficient community, including building materials, water, and hunted and gathered food. This paper presents the techniques and models used to reconstruct the landscape to better understand the ways that communities resisting economic, legal, social and cultural oppression deployed that landscape to ensure the vitality of their community and aid (possibly) hundreds of people seeking freedom from enslavement.

ID: 91037

A Water Management System in Iran Questions of Infrastructural Ownership and Conflicts

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KEYWORDS: **Irrigation, Iran, Documentary Archaeology**

In this paper I would like to discuss the water management system of the agricultural plain of Varamin in Iran, just southeast of Tehran. This plain has



throughout the centuries supplied the region of Reyy and Tehran with significant agricultural production which was only possible through an intricate network of qanat irrigation structures.

I want to focus on the ownership of these irrigation structures, how they are dispersed throughout the landscape, who owns them, who benefits from them, and what types of conflicts arose between the owners and the users. The owners were usually landlords or state nobility, the users the peasant-farmers producing wealth for these owners.

Through analysing the landscape based on aerial photography and insights from documentary evidence I will discuss the conflicts arising from struggle - both beneficial and detrimental - about these irrigation structures.

ID: 89858

Structured spaces, structuring egalitarianism, and the first villager landscapes of Southern Andes: The case of Tafí tradition (Northwest Argentina)

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KEYWORDS: Political Anthropology, Theories of practice, Social complexity, Identity, Prehispanic South America

Located into the Eastern Andean foothills, between the yunga rainforest of Tucumán and the pre-puna dry valleys, Tafí was the epicentre of one of the most renowned cultural traditions of Argentina's archaeological record. As early as in the 1890s travelers and naturalists noticed the presence of thousands of circular stone-structures scattered all over this valley and its environs, from 1800 to 3000 masl; and thanks to the development of modern archaeological techniques, since 1960, most of them could be dated in the so-called Formative Period, with an occupation range of roughly a millennium between 300 BC-AD 800. In a first instance, the co-occurrence of new subsistence strategies based on agriculture and livestock, an unprecedented demographic growth, and the detection of a small ceremonial center, led to interpret "Tafí tradition" as an emerging chiefdom, immerse in a process of increasing hierarchization. However, in view of the fact that no other evidence of social fracture was found and, above all, the specific importance it gave to a house pattern characterized by a heavy building effort and the spatial segregation from the outside, further analyses emphasized instead household autonomy and egalitarianism. The ComplexEquals project –which will be presented in this communication– seeks to unravel such apparently paradoxical scenario by means of a new multiscalar approach. Grounded in an updated, practice-driven theoretical framework, it combines excavations at domestic, productive and ritual



spaces with the construction of extensive settlement models through very high resolution UAV topography and satellite imagery. The underlying question to answer is perhaps not as obvious as it seems: What if “egalitarian societies” are equally, or even more complex than “complex societies”?

ID: 90374

Committing to heath: living in Northern Europe’s ancestral commons

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KEYWORDS: **Commons, heathlands, ancestors, barrows, landscape infrastructures**

The North European heathlands have radically transformed over the last two centuries, such that they are now on the brink of almost total disappearance. Unlike many other types of landscape, this is due to the lack of human interference and commitment. In this paper, we cast an eye back on the deep-time emergence of a commitment between humans and heathlands, and how that relationship extended far beyond its economic and botanical forms.

During the third millennium BC, new forms of human-provoked and maintained Calluna heathlands began to spread, connecting the sandy regions across northern Europe. These nascent open stretches of pasture required novel forms of maintenance, involving grazing and burning, to interrupt and prevent a transition to shrubland and forest. These repetitive practices and seasonal rhythms afforded new social opportunities as well as a sense of a shared past and (ancestral) affiliation. We refer to this emergent link between human-animal practices, landscapes, and their modification (e.g. funerary barrows) as ‘ancestral commons’. We explore a rich series of ethnographic evidence of other cases where economic practices and monuments at the same time link communities of living and dead. Focusing then on the second millennium BC, we argue for a specific pasture/barrows/mobility connection in the heathland regions of Northern Europe, with a shared anthropogenic landscape horizon connecting to an ever-present ancestral past.

ID: 90775

Do we make the road or do the road makes us? A revision of the Acobamba-Ulcumayo road section, Junin, Peru

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KEYWORDS: **Acobamba-Ulcumayo road, Qhapaq Ñan, use-disuse, Junin Highlands**

This research comes from my interest to identify the changes and continuities in



the use and disuse of pre-Hispanic roads and how those are still being used or have been transformed in time. The work focuses on the Acobamba-Ulcumayo road section that is part of the Qhapaq Ñan or Inca road, which goes from the Highlands to the Amazon forest brow of Peru. Located in the district of Ulcumayo, province, and region of Junin, the Acobamba-Ulcumayo road section was used by the local and foreign population during the Inca period on the Late Horizon (1476 - 1532 AD). Main uses may have been communicating between surrounding settlements and having direct access to an area full of natural resources (the Amazon forest brow) that also allows them access to the Amazon forest. Therefore, this research will explore the following questions 1. Whether or not the use of this section of the road is still being used, 2. What were the reasons for its disuse? and 3. Was this road section only understood as a way of communicating settlements or are there any other ways to understand roads? Through the revision of archaeological and historical data about the Acobamba-Ulcumayo road section's use and gathering information through interviews with the local communities, this research aims to identify the political and economic reasons that have changed the use – and disuse – of the road.

ID: 89379

Duel of Landscapes. Centrifugal vs Centripetal nomadic landscapes. Visions from the Horn of Africa

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KEYWORDS: Nomads. Pastoralists. Centrifugal vs Centripetal. Horn of Africa. Political landscapes.

Many will agree that different human dynamics are materialized in a diverse variety of landscapes. For instance, a landscape built up by sedentary people it would be defined by the presence of more-less disperse villages, wells, enclosures, fields for cultivation, patches of deforested areas for pasture, etc. The classic roman organization of ager, saltus and silva. This kind of model is reflected in a worldview in which the village is shaped as a centre follow up by consecutive layers. Closer to core implies more sense of belonging, attachment and political control. But, what about people without a single centre? What about nomadic pastoralists? What kind of landscape(s) they produced and engaged? Studying nomadic pastoral landscapes in the Horn of Africa could be challenging due to their mobility and the scarce nature of the material culture generated by herders. The most outstanding indicator of their presence of nomads is the ubiquity of funerary monuments in the landscape. Furthermore, in this landscape there are little to no centres to which they firmly grip. Moreover, nomadic polities are a fluid metonym of their mobility. The present paper uses archaeological data of the Incipit in Somaliland and Djibouti during the past five years with support of the Palarq foundation. By using data gathered on the field as well as collected by remote sensing; we, firstly,



aimed to present how cairns and Islamic tombs acted as gathering places for the nomadic herders. Second to understand the landscapes in the Horn as metonyms of the political organization of nomadic and how it changed through time. In that sense, we propose the existence of two different landscape models one centrifugal and other centripetal, embodying of two opposite models of social organization before and after Islamization, reflecting the complex and fluid political dynamics materialized in the nomadic landscapes.

ID: 90560

Reasserting equality: social strategies for the formation and replication of a decentralized landscape in castro societies

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KEYWORDS: **Iron Age, Castros, Segmentarity, Landscape Archaeology, Political Anthropology**

Archaeological research reveals that the Iron Age societies of the northwest of the Iberian Peninsula shared a decentralized and non-hierarchical territorial pattern. Castro societies are formed by the replication of small autonomous communities, fortified and individualized in the landscape. In this communication we analyse the social mechanisms that guarantee the reproduction of an atomized order that we define as segmentary. We also reflect on the genetic processes that shape the territorial scheme of the castros, and the historical changes in Bronze Age societies that lead to the consolidation of a new political landscape.



LAC 2024

DESERT
AND FLUVIAL
LANDSCAPES.
LIGHTS AND
CHALLENGES
OF LANDSCAPE
ARCHAEOLOGY
PROJECTS IN
THE THEBAN
AREA (EGYPT)

SESSION 19



DESERT AND FLUVIAL LANDSCAPES. LIGHTS AND CHALLENGES OF LANDSCAPE ARCHAEOLOGY PROJECTS IN THE THEBAN AREA (EGYPT)

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The aim of this session is to gather the numerous archaeological projects focused on landscape archaeology and working with geospatial data currently working in the Theban area. The research interests of these projects have focused on the displacement of the Nile, the location of - partially lost - settlements, and the understanding of the emergence and development of necropolis. Thanks to technological and methodological innovations in recent years and the existence of numerous interdisciplinary teams, studies on palaeolandscape are therefore undergoing a major breakthrough.

Studies on the Theban spatial dimension promote a multidisciplinary approach to the archaeological site in order to examine its historical reality from a holistic perspective, expecting to overcome the specificity that characterises many of the analyses of this area – mainly focused on isolated tombs or sites without paying much attention to their surroundings. This comprehensive approach allows us to understand the changes of the landscape –natural or anthropogenic - over the last millennia. In this regard, the Theban area is of great historical and environmental significance, as it is a land of contrasts between the desert area and the fertile river valley. Thebes is highly influenced by the dynamic nature of the Nile concerning the exploitation of the natural space, the organisation of the territory, and the placement of archaeological sites. Likewise, the climatic changes that occurred in the Theban area had a dramatic impact on the communities that inhabited this area over the millennia. The existence of multidisciplinary projects with specialists in geology-geomorphology, geoarchaeology, palynology, etc., allows us to understand the changes in the landscape and climate during the development of the Egyptian civilization and beyond.

In the last decades, new studies concerning the funerary landscape are being carried out throughout the entire Egyptian territory. Innovations in emerging technologies such as remote sensing or machine learning techniques enable us to complement landscape studies based on archaeomorphology. However, the study of landscape in Egypt has its own challenges and limitations, such as the absence of high-resolution geospatial data compared to other geographical



areas. It is for this reason that this session aims to bring together the efforts of the archaeological projects focused on landscape archaeology and geospatial data in order to complement the information of those teams working in the Theban area.

The main target will be to share raw data with the aim of creating a UTM unified topographic network to be used by all the missions working in the area. This proposal will grant us a great opportunity to establish perfect synergy between the different international missions and institutions working in the Theban area.



ID: 89873

The ETSAQ project in Luxor (Egypt): Study of the territory of Sheikh Abd el-Qurna, an analysis based on Landscape Archaeology

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KEYWORDS: **Project ETSAQ, Sheikh Abd el-Qurna, Theban necropolis, Landscape Archaeology, 18th Dynasty**

The main target of the ETSAQ project is to reconstruct the landscape of Sheikh Abd el-Qurna during the 18th Dynasty in an area that includes 50 tombs. The study of this territory has been motivated by the idea that the location of a tomb was not subject to chance, but important criteria had to be present during the selection process of the locations where the tombs were going to be built. In order to do so, an analysis of the distribution of the territory and the creation of a GIS database are mandatory. To accomplish these two objectives a series of tasks has to be completed such as a prosopographic study of the owners of the tombs; a geological-geomorphological study of Sheikh Abd el-Qurna; and a topographic survey to create the digital cartography. Once the GIS database is created, several tools will be applied to run visibility studies, reconstruction of ancient paths and spatial statistics between the tombs in the research area, and the main funerary monuments of the Theban necropolis.

Thanks to the Landscape Archaeology approach, the ETSAQ project hopes to contribute to the reconstruction of the palaeo-landscape of Sheikh Abd el-Qurna and the Theban necropolis. Therefore, a more rigorous image of the whole necropolis in terms of organisation and placement of the tombs is expected to be achieved, highlighting the sacred aspect of the necropolis and its urbanism.

ID: 90779

Unveiling dependency networks and sacred spaces through landscape analysis in the Theban necropolis

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KEYWORDS: **West Bank, necropoles, sacred space, networks, visibility, orientation**

This paper focuses on the history of the landscape for the various necropoles of the First Intermediate Period and the early Middle Kingdom at Thebes, a study that has been progressively developing over the last few years under the auspices of the Middle Kingdom Theban Project (MKTP). Based on a compilation of different



types of data –textual sources, historical cartography, geospatial information, varied satellite imagery, archaeological remains– the MKTP team has developed different analyses and studies of the palaeolandscape, using high-resolution digital elevation models as a basis (such as visibility and mobility analyses).

Thus, an analysis of the relationships of interdependence, subordination, and control of physical and religious space in these periods is proposed from the perspective of a diachronic study of landscape. Perceptions on the modern landscape and the lack of evidence (and further studies) for the earliest West Bank necropolises seem to have caused a misrepresentation of the distribution and dependencies of the ancient areas, which need to be reassessed. The major changes experienced by the city of Thebes in its earliest history as capital of the country had an impact on the location, development, and transfer of the main necropolises, which comes associated to the transformations of the riverine and desert landscape.

It seems that the inception of the cult to Amun, a phenomenon that came to occur by the time of Intef II, and the transfer of the “royal” necropolis to the area of Deir el-Bahari played an important role in the modification of previous patterns of location, orientation, and space dependencies, which will be discussed in this paper.

ID: 90789

Desert rocks: archaeological lithic record as an indicator of the landscape diachronic use in the Hatasun wadi (Luxor, Upper Egypt)

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KEYWORDS: **lithic record; Theban necropolis; Middle Stone Age; Middle Kingdom; Wadi Hatasun**

The Wadi Hatasun runs through the area of the Theban necropolis known as South Asasif. Its first recorded use until nowadays dates to the Middle Kingdom as a funerary space and continued along the entire Egyptian history. However, archaeological evidence transcends the sacred use of the space and reveals the existence of a series of other activities carried out in this environment. These ancient works are reflected in the presence of an immense surface lithic record forming an archaeological palimpsest of territorial dimensions. It can be explained by the abundance of siliceous limestones and flints outcropping in and being released from the surroundings of the wadi, but also and fundamentally through the recurrent utilisation of this landscape as a provisioning and knapping area by different populations throughout the millennia. In this vein, we present here the preliminary results of the newborn research line linked to the *dos cero nueve* Project, and dedicated to the study of the archaeological lithic record of the wadi. We have used the widely available surface record, but also found in-place workshops of limestone and flint. Our data point to the fact that the most recent leverage of these rocks in the wadi must be posterior to the Middle Kingdom, and that the



most ancient one dates back to the Middle Stone Age. They are an indicator of the complex nature of the diachronic life occurred in the Hatasun record, to which a new layer is now added with the identified lithic assemblages. It also underscores the need to take it into account to fully interpret the human presence in the Theban necropolis.

ID: 91051

A fluvial landscape inside the Theban necropolis: The Wadi Hatasun and TT 209

DANIEL M. MÉNDEZ RODRÍGUEZ-ULL, MARÍA GONZÁLEZ RODRÍGUEZ-ULL

KEYWORDS: **Flood, Late Period, rainfall, West Bank**

The Wadi Hatasun articulates the natural and cultural landscape in the area known as South Asasif in the Theban Necropolis. TT 209, a large tomb of the Twenty-Fifth Dynasty is located at the lower part of its northern slope.

The biography of this tomb is directly related to the wadi in which it is located and the flash floods that flowed through it, as well as the run-off from its slope. The water from both sources dramatically reduced the survival of its superstructure and condemned the underground chambers to a regime of periodic flooding that reduced its space and conditioned its useful life.

In order to understand the interaction between the tomb and the hydrology of the wadi, as well as the impact of the anthropic action on the landscape of the area, the members of the *dos cero nueve* Project excavated a trench across the channel that reached the bedrock and extended to the top of the northern slope, adjacent to the western wall of TT 209. In this section it was possible to document the hydrological history of the wadi channel, from the first sediments of a period prior to the Egyptian civilization, through the works in its headwaters since the Middle Kingdom, the accumulations of debris produced by the construction of tombs in the Late Period, to the landslides caused by rainfall and human activity at later dates.

ID: 91052

“With the Street Between Them”. An Approach to the Street System of the Theban Necropolis in the Late Period

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KEYWORDS: **communication routes, demotic papyri, khoakhite, Luxor, ptolemaic papyri**



The existence of a communication network made up by roads and streets must have been a practical necessity for the organisation and use of large cemeteries such as that of Thebes. The necropolis was the setting for a wide range of activities related to the construction and renovation of tombs, burials and regular funerary services for the deceased. These tasks required a network of routes that allowed and facilitated the movement of people and goods through the area. However, data on the actual existence of streets and their possible layout are scarce, and the hypotheses of itineraries based on natural and present-day paths, the location of the great funerary temples and associated tombs and the relationships between the latter, do not have, so far, archaeological confirmation and, even less, corroboration of their layout. This communication paper analyses the evidence for streets in the Theban necropolis in the Late Period papyri, especially the records of various khaokhite families whose contracts specify the tombs where they officiated and their boundaries. The latter include references to pathways mentioned under different denominations. It also examines the rare archaeological evidence for streets located in the South Asasif and in Dra Abu el-Naga.

ID: 90794

Remote sensing studies in the Theban Valley: towards a comprehensive study of the Nilotic paleolandscape

JESÚS MARTÍNEZ FERNÁNDEZ - URV, ICAC, UAH

KEYWORDS: **Thebes, remote sensing, Nile, InSAR, paleolandscape**

Archaeological research in the Theban region of Egypt represents a fascinating - yet challenging - endeavour in studying the paleolandscape. This contribution focuses on the significant difficulties faced by researchers working in this field, with particular emphasis on the scarcity of publicly available raw geospatial data. One major obstacle is the limited availability of comprehensive and up-to-date geospatial datasets and high-resolution imagery for the Theban area.

Landscape research combining remote sensing techniques with the use of remote servers is underway within the Middle Kingdom Theban Project (MKTP). One of the aims of this approach is the detection of palaeotracés in relation to the riverine landscape along the Nile, which will allow us to better understand the evolution of the river and its relationship with human settlements throughout Egypt history. Furthermore, GIS analyses are complemented with the incorporation of Synthetic Aperture Radar (SAR) satellite data and Interferometric SAR (InSAR) techniques. These methodologies play a pivotal role in generating high-resolution digital elevation models, not only within the Theban region but extending across the Nile Valley. This contribution critically evaluates the advantages and disadvantages of SAR and InSAR in comparison to other approaches, providing a comprehensive view of their suitability for analyzing paleolandscape features, but also for assessing geological processes that may pose potential threats to archaeological heritage.



ID: 89948

Landscape archaeology, cultural memory and significant geography in the West Bank, Luxor: the C2 Project

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KEYWORDS: **landscape, archaeology, Thebes, cache, mummies**

The C2 Project has been working since 2017 in the Valley of the Cache of the Royal Mummies, Luxor, West Bank. The project has aimed since its inception to analyse the landscape surrounding the tomb of TT 320, known as the Royal Cache, where the royal mummies preserved in the National Museum of Egyptian Civilization in Cairo were discovered in 1881. The aim of the project was to provide contextual information related to an archaeological find of such remarkable characteristics, and to provide an explanatory discourse that would reduce the notable amount of anomalies that the current model of interpretation presented, the idea that it was a secret hiding place to protect the royal bodies from robberies. The methodology used has prioritised the analysis of the continent of the area over the contents of the tomb, and the results obtained are providing a significant historical and cultural context that provides a new vision of the role played by this area of the Theban necropolis during a long period of its history.

ID: 90310

DEM Generation in the Theban Area: Results and Methodological Reflections

KATHERINE EMOGENE ROSE- Ludwig Maximilian University Munich

KEYWORDS: **Landscape modeling, DEM, spatial analysis, mortuary landscapes, survey strategies**

This paper presents the results of creating a DEM of the larger Theban area, conducted by the Middle Kingdom Theban Project GIS team. The ground survey was conducted primarily in the Theban area on the West bank and centered around the collection of geospatial data in the area of the MKTP concession with a focus on Deir el-Bahari, the broader Asasif area including South Asasif, Deir el-Medina, Dra Abu el-Naga, the modern village of El-Tarif, and the surrounding modern agricultural fields near the Nile. This research compares methods for generating an accurate DEM through stereo satellite imagery and reflects on strategies for the creation of a robust, high-quality network of ground control points (GCPs). For example, overcollection of GCPs can help account for potential issues with georeferencing using certain points; large errors or locations that cannot be confirmed in satellite



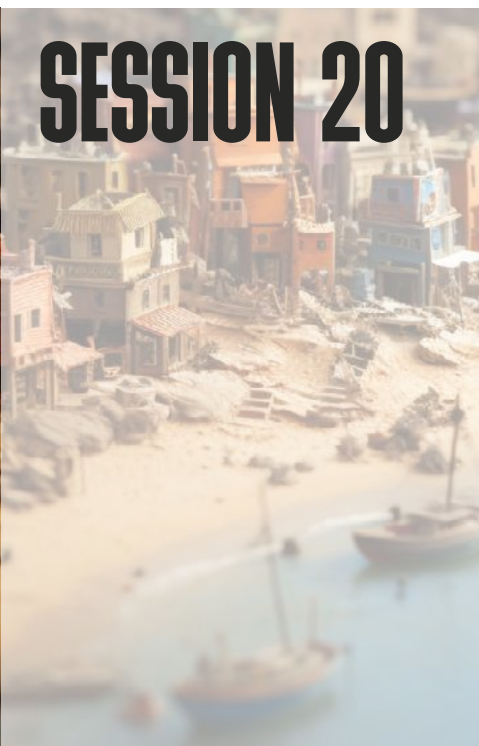
imagery. While using more GCPs during the processing phase does not ensure a more accurate DEM, having a robust and diverse data set of GCPs to choose and test from certainly does. Furthermore, experiments with specific patterns of GCP dispersal are presented and analyzed to test best practices of DEM generation. Lastly, this paper considers the broader scholarly implications of DEM generation to research. This model serves as a highly accurate digital representation of the landscape of the broader Theban region and is crucial to aid further landscape analysis in the region. It provides an opportunity to understand terrain changes and patterns better and can serve as the basis for additional spatial analyses.



LAC 2024

IDEOLOGY,
PRODUCTION
AND SOCIAL
CHANGE. FORMS
OF TERRITORIAL
ORGANIZATION
DURING THE 3RD
TO 1ST CENTURIES
BCE

SESSION 20



IDEOLOGY, PRODUCTION AND SOCIAL CHANGE. FORMS OF TERRITORIAL ORGANIZATION DURING THE 3RD TO 1ST CENTURIES BCE

SESSION ORGANIZERS

MARÍA ISABEL MORENO PADILLA
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Spanish National Research Council (IH-CSIC)

Iron Age polities underwent significant changes as their territories became involved in conflicts on a Mediterranean scale from the 3rd century BCE onwards. Complex organizational systems had developed in much of the Western Mediterranean territories until that time. Archaeology has been acknowledging these political entities in a landscape where settlement hierarchies were predominant, structured around walled settlements (oppida). In the southern and Mediterranean territories of the Iberian Peninsula, these Iron Age political entities spearheaded processes of urbanization and population concentration with diverse ranges and degrees of inequality. Like other Mediterranean landscapes, these political entities were dominated by the oppidum, but significantly varied from one place to another in terms of extension, settlement hierarchy, rural strategies and land occupation.

The trajectories of these Iron Age polities experienced significant changes in the 3rd century BCE. In some territories, the emergence of major centers or new forms of cohesion and legitimization seemed to be linked with new forms of dominance/rule that surpassed the previous regional space. However, the onset of major Mediterranean conflicts (Punic Wars, Roman conquest) disrupted these regional developments. Research spanning from the mid-3rd century to the 1st century BCE has emphasized the variability of trajectories and territorial strategies before, during, and after these conflicts.

This session examines the changes, continuities, disruptions and the heterogeneity of this period's societies from a threefold perspective: the Mediterranean scale in which they are embedded, the regional scale in which they are incorporated, and the local scale in which they are defined. Our objective is to analyze the new power strategies associated with the new political territories and the processes of social change, which entailed the dismantling of Iron Age organizational forms and the configuration of others during the Roman Republican era. Simultaneously, it pursues a more precise investigation into the dynamics and common elements proper of this period. In this context, we aim to debate the creation of new strategies and power relations in various

Western Mediterranean contexts during this period. Contributions are welcomed that analyse:



- Forms of territorial organization from a diachronic perspective.
- Ideology, materiality, and social practice.
- Resilience, emulation, hybridization, reinterpretation, and social change.
- Socioeconomic structures. Social relations of production and forms of exploitation.
- New definitions of the concept of Romanization: local identity vs. Roman identity.

In summary, this session aims to contribute to the debate on social complexity processes and urbanization across different territories of the Western Mediterranean during the final centuries of the first millennium BCE.



ID: 90132

¿Bellum iustum?. War as a transforming factor in the Upper Guadalquivir territory

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KEYWORDS: Conflict archeology, roman conquest, Second Punic War, territorial transformations, Archaeology of the Iberian Culture

In recent decades, the progress of archaeological studies at different sites in the Upper Guadalquivir, currently the Jaén province, has allowed us to recognise the mechanisms used by Rome during the conquest process and therefore the consequences that these had for local society throughout the 2nd-1st centuries B.C.E.

This paper analyses fundamental aspects of this process based on the territorial transformations resulting from the Second Punic War. For the analyses databases and maps have been developed using the different variables that can characterise or determine the evolution of the different settlements, such as: whether the settlement has a strategic position or a geographical relevance, whether it controls fords, whether it has a key function in the communications network or it is relevant within a new communications system, the rank or size of the oppidum, the role that each of the oppida could play within the conflict, i.e. whether they supported Rome or Carthage...). So all these variables have been treated within a geographic information system that allows us to identify patterns and draw new interpretations about what were the determining factors that led Rome to adopt one mechanism or another, as well as the possible role played by the Iberian communities.

For the first moments of conquest (where the effects of the Second Punic War are reflected) archaeological research has identified several transformations in many Iberian sites in the Upper Guadalquivir, a significant number of which continue their occupation under the way of the oppidum, other sites are abandoned, attacked or violently destroyed (under the perspective of the Roman *ius belli*). We will highlight the sites of Iliturgi and Puente Tablas, which are the subject of in-depth archaeological research and where the phenomenon of discontinuity or rupture can be identified.



ID: 90293

New models of exploitation of a territory of the Upper Guadalquivir after the Second Punic War: The Ossigitania

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KEYWORDS: **Upper Guadalquivir, Fortified enclosure, Ossigitania, II-I centuries BC**

The territory of Ossigitania is located in the south of the Iberian Peninsula (Pliny III,9), where the Guadalquivir River entered the Baetica province. The discrepancies regarding the spatial references on its capital (Ossigi) keep open a historiographic debate whose spatial framework is located in the eastern countryside of the current province of Jaen (Andalusia). In this territory, the archaeological analysis work carried out by the University of Jaen since the beginning of the 80s of the 20th century recognized a nuclearized population model in oppida during the Iberian period, with spatial differences in the locational pattern of the urban centers of the eastern and western countryside, which will undergo important changes from the end of the 3rd century BC as a consequence of the Second Punic War.

The development of a superficial archaeological documentation strategy in the theoretical territory of Ossigitania, which is based on the design of selective surveys based on remote sensing work managed through a Geographic Information System, is allowing the identification of a set of small fortified sites, with chronologies, which, with exceptions, range between the mid-2nd century BC and the high imperial period. Generally located on small hills with a high prominence over their surroundings, they are located in areas of low agricultural productivity but next to strategic geological resources such as ferric oxides, gypsum or salt mines.

This communication presents the initial study of a set of these enclosures based on an interdisciplinary strategy of minimally invasive analysis, the results of which show similarities and differences in terms of their locations, construction techniques or type of ceramic registration, which allows us to argue the synchrony of a group of them and propose their possible connection with some of the historical communication routes in the eastern countryside of the current province of Jaen.

ID: 90299

Mapping the memory. Conflict, material culture, and territorial organization between the 3rd century BC and the 1st century AD in the Upper Guadalquivir

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KEYWORDS: **Iberian territories, conflict, posconflict, material culture, ideology**



For two decades, the University Research Institute for Iberian Archaeology at the University of Jaén has been developing a research line focuses on the study of war scenarios related to the Second Punic War. The spatial scope of this line is associated with the western Mediterranean and, specifically, the Upper Guadalquivir, a territory of enormous importance during the course of that conflict. The time frame is defined as between the mid-3rd century BC, with the emergence of Romans and Carthaginians in the geopolitics of the Iberian Peninsula, and the 1st century AD, with the definitive implantation of the Roman way of life, allows understanding the Late Iberian period ant the Roman conquest process in this territorial area.

Within the project “Materialidad, Identidad y Memoria en la iconografía iberica del Alto Guadalquivir: estrategias post-Segunda Guerra Púnica”, this proposal analyzes the consequences of the conflict from a broad perspective, both territorial and social and identity related. Through the analysis of two specific case studies: Iliturgi (Mengíbar, Jaén) and Castulo (Linares, Jaén), we aim to incorporate a different type of social interpretation in Post-Conflict Archaeology. To do this, we focus our attention on the mechanisms involved in socialization and identity reconfiguration that take place after the conflict, incorporating the importance of community and memory in the analysis of this period. From a multiscale perspective, ranging from territory to object, our aim is to define the map of Late Iberia ideology and identities. We propose to contrast these two territories with well-differentiated post-conflict developments: the consequences of the siege of the oppidum of Iliturgi, and the territorial reconfiguration of Castulo. The new territorial organizations resulting from the conflict will have an immediate reflection in materiality and iconography, showing various performativities and narratives aimed at responding to the geopolitical demands of the period.

ID: 87869

On the Local Roots of Roman Territorial Construction: A Proposal from the Territorium Dianensis

IGNASI GRAU MIRA- Universitat d'Alacant, *JOAN NEGRE*- Institut Català d'Arqueologia Clàssica, *PERE ROSELLÓ*- Universitat d'Alacant

KEYWORDS: Iberian and Roman periods, settlement patterns, cost-distance spatial statistics, neighbourhood dependence, density analysis

The foundation of cities throughout the Roman imperial period also meant the transformation of the ways their respective territories were organised and administered. Moreover, the economic, cultural and religious changes in the urban centres were linked to the modifications of the territorial and landscape structures. In that sense, the objective of this study is to review the transformation of the Roman imperial territorial organisation from the perspective of Landscape Archaeology and Human Geography, taking into account the case study of the ancient city and territorium of Dianium (current Dénia, Alacant), in the central eastern coast of the Iberian Peninsula.



Traditional views of this process have focused on the changes that would have materialised during the early imperial period, from the Principate onwards. However, our hypothesis proposes the relevant role of the local territorial organisation, dated in the 1st century BCE, in the genesis of the basic administrative structure observed in Roman imperial times.

This paper relies on different analytical and quantitative approaches to evaluate this influence, an approach that proved to be theoretically robust and methodologically useful in previous works (Negre et al., 2018). First, by defining possible territorial settings via hydrological watershed analysis and the archaeomorphological study of geographical traces. Second, surveying the spatial structure of settlement through a modified version of Ripley, K function which embeds the spatial pattern under study into a frame of reference based on its cost or social distance matrix. And, lastly, by evaluating the influence of the main urban centres on the dynamics of attraction or repulsion over peasant settlements, measuring density variability within cost-distance buffers and chi-square testing the results against the model for normal distribution.

ID: 90773

The Configuration of an Ibero-Roman Landscape in Layetania (Barcelona) (3rd century BC – 1st century BC)

JUAN FRANCISCO ÁLVAREZ TORTOSA- Universidad de Alicante

KEYWORDS: **Roman Archaeology, Layetania, Hispania Citerior, landscape, Barcelona**

The impact of the Second Punic War on the Iberian Peninsula and the subsequent conquest process of these territories by Rome represented a noticeable change in both the power and socio-economic structures of the indigenous peoples. These are complex and heterogeneous processes framed within Romanization, in which both situations of abrupt rupture and convergence and alliance can be identified, leading to the configuration of the varied and complex Ibero-Roman reality. All of these processes left a profound mark on the landscape.

The landscape's analysis of ancient Layetania (coastal area of present-day Barcelona) constitutes a case study of particular interest to observe the changes in structuring that took place between the end of the 3rd century BC and the administrative reorganization of Augustus, at the end of the 1st century BC.

The progressive dismantling of the network of oppida and their gradual replacement by new structuring centers of various kinds - urban and otherwise - set the guidelines that led to the reorganization of the countryside and its economic and productive reconfiguration, where its traditional surplus cereal orientation would give way to the establishment of a viticulture aimed at maritime trade that blossomed at the end of the 1st century B.C.

We present a diachronic analysis of Layetania from the decades prior to the outbreak of the Second Punic War to the implementation of Augustus territorial reform, in which we will provide elements about this interesting period of transformations that led to the configuration of an Ibero-Roman landscape.



ID: 89329

Territorial organisation in Late Iron Age Gaul: Changing dynamics and nested identities

MANUEL FERNANDEZ-GOTZ- University of Edinburgh

KEYWORDS: **Gaul, Late Iron Age, Territorial organisation, Oppida, Sanctuaries**

This paper will explore the dynamics of territorial organisation in non-Mediterranean Gaul (Gallia Comata) from the 3rd to the 1st centuries BC. During this period, we witness the development of centralisation processes that led to the emergence of large settlements, both in the form of open agglomerations and fortified oppida. Written sources describe various nested levels of identity and socio-political networks, which are partly traceable in the archaeological record. Based on examples from central-eastern Gaul, this paper will particularly focus on two aspects: the relative impact of endogenous and exogenous factors on the Late Iron Age urbanisation process, and the role of sanctuaries as places of aggregation in times of socio-political change.

ID: 90265

The control and integration of the Cerretani under the Roman rule (s. II-I BC). Changes and continuities of the settlement patterns

ORIOL OLESTI VILA- Universitat Autònoma de Barcelona

KEYWORDS: **Cerretani, Romanization, Roman Army, Pyrenees**

Since 2007 our archaeological research in the Cerdanya region (Oriental Pyrenees) has identified the Cerretanian-Iron Age settlement patterns. Their sites, as El Castellot de Bolvir, El Tossal de Baltarga (Bellver), Serrat del Castellar and St. Feliu de Llo, present a modest surface (about 0,6-0,5 ha), and the description as oppida is based on their defensive system, their organised urbanism (well documented in the El Castellot de Bolvir-site), and the presence of different economic activities, including metallurgy. Of course, their surface and number of inhabitants is far from the definition of an urban centre, but we have to consider the geographical and historical context, and the deep change that this kind of settlement involved in relation to the modest huts of the first Iron Age period (7th-6th century BC). From the middle of the 2nd c. BC, these oppida were controlled by the Roman army, starting a complex process of integration that we could track until their abandonment at the end of the 1st c. BC. The paper will analyze the economic and social changes documented in this process, using the territorial and archaeological information but also the epigraphical and numismatic data.



ID: 88251

Ups and downs. Diachronic survey of the social changes in Carpetania through landscape analysis between the fourth and the first centuries BC

PABLO SÁNCHEZ DE ORO-Universidad Autónoma de Madrid

KEYWORDS: **Late Iron Age, Social Change, Landscape, Settlement Pattern**

Landscape is the scenario where human societies represent their plays. Characterising it, and, moreover, its changes, it is possible to attach the latter to the social processes which were occurring. This is specially clearly in the case study proposed in this abstract. The Carpetania (mainly the middle Tagus valley) suffered from several changes during the Late Iron Age (i.e. fourth century BC-first century BC).

The transition into the fourth century BC was characterised by a turmoil episode, being one of the results the apparition of a new type of settlement occupying strategical positions in high lands. At the same time, some plain settlements moved into higher grounds, which can be related to a weather variation, and specifically, to a change in the hydrographic regime.

A new chapter was inaugurated from the last years of the third century onwards. The extension of troubles and wars (e.g. Second Punic War, Lusitanian War, Sertorian War), totally modified again the landscape and the settlement pattern. Manifold of these former places were abandoned, when not violently destroyed. New big settlements were created, probably through the unification of migrating population searching for a safer place where resist the uncertain ambient.

Finally, once the Roman domination of this area was totally consolidated, the landscape was once more altered. The main hubs were positioned in plain areas close to the communication routes, becoming nodes of the bigger Roman network. Through a survey of this transition, it is possible to understand the social and cultural modifications which shaped the dynamic Late Iron Age in Carpetania. We think this is a suitable case study for illustrating the inherent relationship between landscape and societies, and how we cannot understand one without the other.

ID: 89472

Territorial organization of the Southern Meseta between the 3rd and the 1st centuries BC: local responses and global processes

SUSANA GONZÁLEZ REYERO- Instituto de Historia (Consejo Superior de Investigaciones Científicas)

KEYWORDS: **Territorial organization, economic exploitation, ideology, Central Iberia, I millenium BC**



The southeast of the Southern Meseta was articulated during the Iron Age into political entities of regional nature. Complex organizational systems had developed in this territory, in the central area of the Iberian Peninsula. Settlement hierarchies were predominant, structured around walled settlements (*oppida*), but significantly varied in terms of extension, settlement hierarchy, rural strategies and land occupation.

Research has emphasized the significant changes these territories underwent from the mid-3rd century onwards. The variability of trajectories has been highlighted, depending on the strategies followed in each territory and the agreements between Rome and these various local entities. But we have difficulties in distinguishing the specificities of each territory between the s. III and II BC.

This intervention aims to identify these changes in the eastern part of the Southern Meseta. I will examine the territorial organization, economic exploitation and redistribution of imports, as well as possible changes in the ideological sphere to get closer to identifying the potential creation of new strategies and forms of power, whether or not involving the dismantling of existing ones. I will try to relate the results to the larger scale transformations that were taking place in the southeastern quadrant of the Iberian Peninsula, a key territory in the global processes of the Second Punic War and the subsequent implementation of Roman rule.

ID: 90507

Castro societies during the Late Republican Iron Age: identities, relations of production and social change

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KEYWORDS: **Iron Age, Roman army, romanization, egalitarianism, Roman conquest**

The Iron Age communities of the Iberian Peninsula northwest were subjected to a profound process of transformation from the end of the 2nd c. BC onwards as a result of the first incursions of Rome beyond the Duero River and the systematic presence of Phoenician sailors from Gades in the Atlantic coasts. From this moment on, a series of transformations in the social and territorial structure take place, being particularly intense in the southern area, more exposed to contact with Rome. Despite the current opinions, this later record does not respond to the expected internal development of pre-Roman social formations (egalitarian and segmentarian), but nor does it accommodate to the conventional idea of the so-called Romanization. From spatial analysis, we propose to address mainly to two of the points proposed by the session's organizers: "Socioeconomic structures. Social relations of production and forms of exploitation" and "New definitions of the concept of Romanization: local identity vs. Roman identity".



LAC 2024

CRISIS?
WHAT CRISIS?
NEW
PERSPECTIVES
ON THE CRISIS
OF THE LATE
ROMAN EMPIRE

SESSION 21



CRISIS? WHAT CRISIS? NEW PERSPECTIVES ON THE CRISIS OF THE LATE ROMAN EMPIRE

SESSION ORGANIZERS

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The third century CE is widely recognised to be a turning point in the history of the Roman empire, defined by a superposition of different factors —e.g., political instability, social conflicts, natural disasters— that, altogether, led to deep transformations in the local landscapes. In particular, the increasing paleoenvironmental evidence for climatic imbalances, such as hydrological imbalances or temperature anomalies, in different parts of the Mediterranean in this period has enhanced a sharp debate on the role of climate change in this “third-century crisis”, especially as regards the reorganisation of the rural districts of many ciuitates. However, the links between climate change, environmental risk increase, and human responses remain barely explored. Different archaeological records can be used to achieve this purpose: settlement patterns, agrarian landscapes, paleoenvironmental and archaeosedimentary records, etc.

Hence, this session aims at building an interdisciplinary and multi-scalar perspective on climate-led environmental changes and human responses to them, during the 2nd to 6th century across the Mediterranean world. Three main axes of discussion are proposed to this purpose. The first axis regards the study of climatic imbalances around the third century CE, and their contextualisation within the larger climate history of the Mediterranean. A correct understanding of the nature and intensity of these changes is crucial for the assessment of their effective impact on the socio-spatial layout of the Roman societies, and provides a valuable context for the human responses recorded in the archaeological sites and their surrounding landscapes. The second axis regards the archaeological study of climate-induced environmental changes —e.g., floods, drought, erosion— and the human responses to them, resulting in either adaptation or failure. A strong accent is set on the characterisation of landscape transformations, such as anthropized riverine or coastal plain areas, irrigated or terraced field systems, or specific pedological developments, where the imprints of both environmental change and human activity can be traced. Interdisciplinary local studies are thus welcomed, especially if contextualised in wider regional perspectives permitting comparisons within and between different Mediterranean regions.



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The third axis encompasses methodological reflections on how to integrate the material traces of historic human-environment interactions in order to build significant archaeological information. This includes, though not exclusively, research approaches based on extensive field survey, geoarchaeological and bioarchaeological methods, Geographic Information Systems, or urban archaeology.

Hence, this session will offer new perspectives on the crisis of the Late Roman Empire by assessing the role played by climate-induced environmental transformations, and the manifold responses opposed by local societies across different Mediterranean regions, resulting in different developments over the following centuries. Both a theoretical and a methodological reflection are proposed, so as to build a shared analytical framework between different regions

10-14 JUNE. ALCALÁ UNIVERSITY. SPAIN

HUMAN CHALLENGES IN A CONTEXT OF CHANGING LANDSCAPES



ID: 90747

When dams flooded out of sediment: sedimentary silting of the Roman Mues dam (Navarre, Spain)

ENEKO IRIARTE- University of Burgos, *JOSU NARBARTE*- University of there Basque Country

KEYWORDS: **Roman dam, silting, flood, hydrological imbalance**

The study of the archaeo-sedimentary sequence deposited in the basin of the Roman dam of Mues (Navarre) provides interesting information about the prevailing paleoenvironment before and after its construction.

In a first phase, between the 1st century BC and the 2nd-3rd century AD, sediments and sedimentary processes typical of natural river environments are observed; A natural fluvial dynamic predominates with channel and floodplain sediments deposited in an area with a tendency to flood and form fluvial lagoons due to the narrowing of the valley of the Odrón River in the Congosto de Mues.

Later, between the 2nd-3rd century and the 4th century, this natural character is altered. Massive clays are deposited that indicate the continued existence of a sheet of water and the absence of energetic tractive flows and, therefore, of coarse-grained sediments, which would indicate the presence of the Roman Mues dam and its water reservoir. Episodes of the contribution of archaeological material to the dam basin are also observed, which suggests construction/maintenance tasks in the vicinity.

Finally, around the 3rd-4th century, the dam was amortized, through the silting up of the basin and the later incision and cannibalization of its own sediments by the Odrón River. The silting of the Mues dam coincides with the silting of other Roman dams in the middle Ebro valley and the flooding and amortization of agricultural landscapes. It could therefore be inferred the occurrence, throughout the 3th century, of hydrological imbalances that contributed to the dismantling of the water supply and agricultural production that must have had a notable impact on Roman society.

ID: 90287

Crisis? Decrease? Post-boom?! Climate, floods, and erosion in Roman Imperial Pergamon (western Türkiye) from the 2nd to the 4th century C.E.

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KEYWORDS: sustainability, geoarchaeology, monumental architecture, abandonment, late antiquity

The Late Roman Empire (3rd-4th centuries CE) witnessed a deep transformation of the rural landscape, with many villae being deserted while others were refurbished and enlarged. This hierarchisation has been interpreted as the result of a land reorganisation leading to the concentration of land property in the hands of a restricted rural aristocracy. However, recent investigations have also stressed the relevance of climatic imbalances in this period, which may have resulted in increased rainfall and subsequent torrential floods in some parts of the Western Mediterranean. However, the precise relation between environmental constraints, human response and landscape transformation in this period remains a matter of debate.

In this communication, we present the example of the Resa archaeological site (Navarre), in the middle Ebro valley. The site has a long occupational sequence spanning from, at least, the Iron Age to the Late Middle Ages. During the Early Roman Empire (1st-2nd CE), a villa complex was built in the area, which was at the time included in the suburbs of the city of Calagurris. This villa was abandoned during the 3rd CE and covered with a thick deposit of clay and sand. The geoarchaeological characterisation of this sedimentary archive has revealed the concurrence of fluvial and colluvial depositions during the Late Roman Empire, which can be interpreted as the result of increased torrential flooding and consequent human response -i.e., settlement desertion and, possibly, replacement.

The example of Resa offers a valuable evidence to re-assess villae desertion and landscape transformation in the middle Ebro valley. Indeed, many early Roman settlements (especially on floodplains) were abandoned in this period, and covered with thick sedimentary deposits that traditionally have not been regarded as positive archaeological evidence. A regional overview offers a nuanced view on this process.

ID: 91027

Which relation between agriculture, settlement, and climate in central-northern Portugal during the Late Roman Empire

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KEYWORDS: Archaeobotany, Agriculture, Western Iberia, Adaptation

Late Antiquity is thought to have been a period of climate reversal and many authors consider this to have played a relevant role in social, economic and political



upheavals throughout the Roman Empire. Still, it is not clear how global this phenomenon was as regional variations likely occurred. In fact, the Empire was a geographically, climatically, and culturally heterogeneous space and regional studies are necessary to fully understand the scale of the changes and uncover eventual adaptive strategies.

In this presentation, we will address the archaeobotanical record contextualised archaeologically in order to detect possible changes in agricultural choices and environmental conditions in what is now northern and central Portugal. This will be interpreted in the light of dispersed rural settlement trends and commercial circuits in the study area, and combined with other archaeological data to infer if climate fluctuations had a significant impact on agriculture and territorial strategies and if so, how they fit with data from other areas of the Empire.

ID: 89963

Consequences of and responses to hydrosedimentary crisis during Roman period in the upper Rhône valley: case study of the Vernai villa (Isère, France)

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KEYWORDS: wetland, hydrosedimentary crisis, geoarchaeology, hydraulic system, Gallo-Roman period

Since the 90s, the upper Rhône valley has been the subject of extensive studies on river systems' evolution, focusing on the Rhône River and tributaries. On a regional scale, they highlighted a major multi-century crisis in Rhone hydrosystems during the High Empire (1st - 3rd centuries), characterized by river aggradation, high-energy flows, torrential events and floods. Its origins are twofold: climatic and anthropogenic forcing.

The consequences of this crisis on human occupations have been observed on several occasions in this area, but we propose here a case study of the villa of Le Vernai to show on a local scale how this crisis manifests itself with the variations observed, but also to present the consequences on the site occupation and the anthropic responses to it.

The villa of Le Vernai (Isère, France) is located on a small alluvial hill in a glacial basin, incorporating two marshes and crossed by a tributary of the Rhône (the Girondan). This strategic location, at the crossroads of major ancient traffic routes, meant that the occupants had to adapt their environment to cope with the omnipresent problems of humidity (development of the river, vast hierarchical drainage and irrigation systems in the marshes, adapted buildings).

It is studied using a multidisciplinary, multiscale and systemic approach that includes geoarchaeological studies. These studies, carried out on the river, marshes and their ditches, have allowed us to reconstruct the hydro-sedimentary dynamics



evolution during the Gallo-Roman period, highlighting two periods of hydro-sedimentary crisis in the 1st and 3rd centuries, framed by a period of stability in the 2nd. The consequences of these crises, visible in the marshes, the river and on the site, led to a series of responses by the occupants: reorganization of the ditch systems and dredging, reorganization of the habitat, development of the river channeling for example.

ID: 90590

Changing mountains. Late Roman settlement, water management and land-use dynamics reconstructed through the geoarchaeological analysis of the archaeosedimentary archives of Artzi (Navarre, Western Pyrenees)

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KEYWORDS: **Mountain, Western Pyrenees, landscape, water management, Late Empire**

The Artzi archaeological site is located in a mid-mountain environment in the western Pyrenees, more specifically in a transition zone between the high mountains and the plains linked to the tributaries of the Ebro River. Due to its strategic position, it became a place of passage and control of the territory in which it has been possible to record a long-lasting occupation of the area, which, despite certain changes, began in the Roman period and continued until the middle of the 20th century. Along these lines, the geoarchaeological and sedimentological studies carried out with the aim of understanding the changes in the landscape around what was a road station in Roman times have made it possible to confirm the activation of a regular stream or successive torrential episodes during the 3rd century AD. The causes of this type of phenomena may be multiple, some linked to climate change such as the increase in rainfall, but also anthropic, such as the lack of infrastructures for the management of water resources or the systematic deforestation related to the metallurgical activities recorded at the site from the second half of this century onwards. Therefore, the example recorded at Artzi shows a good example of adaptation and resilience in the face of apparently adverse conditions dating from the 3rd and 4th centuries AD.



ID: 88056

The Roma colony of Ilici (Elx, Alacant). Centuriation and resilience

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KEYWORDS: **Ilici, Centuriatio, geo-archaeology, hidraulic events.**

The colony of Ilici (Elx, Elche) was founded about the second half of 1st c. BC, and his territory was distributed following the “centuriatio” system. This centuriatio is still very well preserved in the current landscape. This paper analyzes the process of construction and maintaining of this centuriated landscape through the geo-archaeological methodologies, identifying the long term history of this system. Far from an unchnaged landscape, the study shows the different phases of development of this system, some of them connected to some hidraulic evenements, connected to the historic and climatic patterns.

ID: 90465

New perspectives on Ager Tarraconensis: the Late Antique rural landscape

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KEYWORDS: **landscape studies, Late Antiquity, villae, hinterland, rural settlements.**

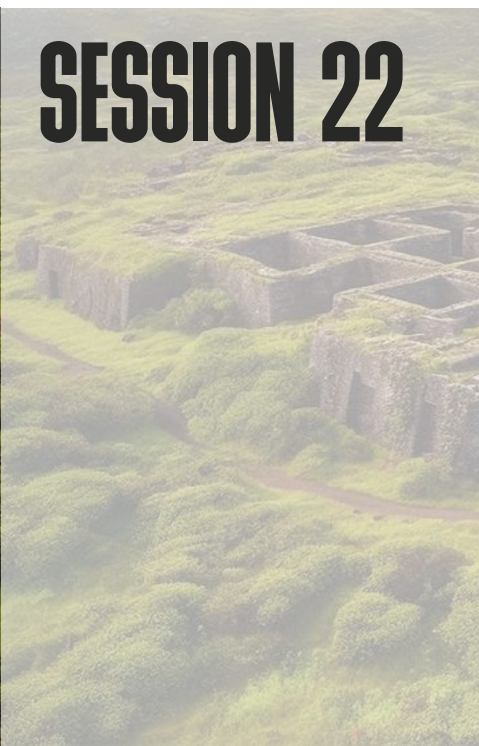
In the last few years, the study of Late Antiquity has become more interdisciplinary. A detailed approach to the fields of study has largely been dictated by the heterogeneity of the period. In this sense, the structure and use of the Roman landscape was fundamentally determined by Late Roman rural settlements. Agricultural locations on the fertile plains, as in the case of the villae, have been the subject of many studies. In order to study the dynamics of this period, interdisciplinary archaeology can provide new data. This paper presents the case of Vilardida (Alt Camp, Tarragona). This is a Roman villa that was abandoned in the 3rd and 4th centuries. A better understanding of this site and the area in which it is located has been achieved through the sedimentological study. For this purpose, we will use the rural landscape of Tarraco, the provincial capital of Hispania, as a case study.



LAC 2024

MEMORYSCAPES:
MONUMENTS,
MATERIALITY,
AND THE
MEMORIALISATION
OF THE
LANDSCAPE

SESSION 22





MEMORYSCAPES: MONUMENTS, MATERIALITY, AND THE MEMORIALISATION OF THE LANDSCAPE

SESSION ORGANIZERS

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The relationship between memory, monuments, and landscape is complex— one that is shaped and interpreted depending on notions such as culture, discipline, and ontology. In the field of landscape archaeology, they are intrinsically connected in the development of ‘memoryscapes’. Which we define as monumentalized landscapes that are significantly shaped by memory and serve to remind people of past occupation; the range of which can be abstract on one end, simply serving as a vague reminder of the past, and concrete on the other, i.e. relating to specific people, events, stories. In this context, monuments and materials become embodied memories and connect people to the past both spatially and temporally through the *longue durée*. In this way landscapes are shaped by memory and memorialised through monuments and materiality. The past is also upheld, and memory formed by the physical presence of monuments (ie. materiality) and their longevity within a landscape.

Landscapes are constantly reused, as are monuments and material culture, thus landscapes are by nature endowed with memory. Via the latter, landscapes shape identity, cultural change and inspire alteration and re-use as well as active and passive resistance. For these reasons, memoryscapes have a fundamental role in archaeology and the understanding of past and present societies. In this session, we aim to revisit the role of memoryscapes in archaeology in light of new developments within the field.

We also seek to examine the role of agency, in terms of both landscape and materiality and how this impacts and influences human interactions, both on a macro and micro scale. Importantly, while monuments imply longevity, intentional destruction is also a factor at play as it directly influences memory and how it is shaped. As monuments are built to last, when a monument is intentionally destroyed, altered, or re-use, this can be considered as a form of intentional memory creation as different cultures seek to re-frame their relationships to both landscapes and material objects through such direct actions.

Some of the questions we seek to address are as follows:

1. How does the creation and destruction of material culture influence and impact memory?
2. How does materiality itself act as an agent in relation to memoryscapes?
3. What are the impacts, both past and present, of monumentalized landscapes within archaeology itself and in terms of broader human culture?
4. How do landscapes and monuments shape a cultures ‘sense of place’?



ID: 89409

“Entheotopos”: Towards the structural elements of sacred landscape

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KEYWORDS: **landscape, cognitive archaeology, eye-tracking, Egypt, cultural memory**

In recent years, landscape archaeology has gained increasing traction within Egyptological research, particularly concerning necropolises and funerary traditions. However, this application has often relied on theoretical and methodological frameworks that have been previously explored in other historical contexts. Concurrently, advancements in cognitive studies, particularly in neuroscience, have revolutionized our understanding of the interaction between the brain and culture. This paradigm shift challenges the notion of cognition confined solely within the human brain, recognizing external factors such as landscape and culture as integral influences on cognitive processes.

In this context, this paper integrates cutting-edge technological and theoretical approaches from neuroscience with established archaeological and textual methodologies to examine the influence of landscape on the funerary aspects of ancient Egypt. Through the application of eye-tracking techniques in experimental neuro-archaeology studies, and fractal geometry in tombs' distribution patterns, this research considers the physical features of the Egyptian landscape, anthropic evidence within it, and the phenomenological experiences of ancient society.

By combining theoretical and experimental approaches related to landscape archaeology, neuroscience, and fractal geometry in Egyptian funerary spaces it has been possible to reveal a series of key landscape elements that could determine the origins of these religious processes. These findings (summarized in the concept *Entheotopos*) could potentially explain the religious experience as being originated and shaped by landscapes, the natural processes within them and the phenomenological experience of the societies that inhabit them; with potential applicability to a broader cultural and chronological context, such as the Eastern Mediterranean. A structuralist approach to the religious phenomenon and its relationship with landscape as a trigger for extended cognition and memory in ancient societies.

ID: 90472

“Don't forget us!”. From warscape to memoryscape: the heritage of the First World War in Italy

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KEYWORDS: **Warscape, Memoryscape, First World War, Conflict Archaeology**

Still today, walking through the places where the First World War was fought in Italy, numerous “scars” witness the travails that our grandparents and great grandparents suffered. Trenches, shell holes, tunnels and other military buildings identify places of life and death of a whole generation, which began to produce the memory of the war, of the fallen and of itself, already during the conflict. Several monuments and epigraphs have been created to remember fallen comrades, the construction of roads, but also the deployment of military units in specific locations. In the aftermath of the conflict, the legacy of the First World War was soon absorbed by Fascism, that shaped the former warscape into a glorified memornscape. In this period, monumental ossuaries and shrines were built to collect the spoils of the fallen coming from the smaller cemeteries scattered in the territory, thus becoming the most important landmarks related to the memory. Since the direct witnesses of the war were disappearing – from the 60s to the 2000s – other monuments and plaques were built to memorialize events, places, military units, soldiers. Furthermore, in the last 30 years, parts of the frontline were re-excavated, cemeteries were restored and trails were chart to visit the war sites. This paper aims to investigate how landscape and memornscape has been modified in time and in which ways each generation deals with the First World War legacy. To do that, archaeological data are taken into account to reconstruct diachronically the warscape. Therefore, the acquired information was compared with the monumentalization of the landscape in the different periods. Lastly, the role of the different social actors involved in the transmission of memory was examined in order to assess the risks behind non-archaeological activities that daily affect the memornscape related to the First World War.

ID: 90737

Enduring Landscapes of the Passage Tomb Tradition in Western Europe: A Comparative Study of Newgrange, Maeshowe, and Gavrinis

JULIA GUSTAFSON - University of Cambridge

KEYWORDS: **monuments, neolithic, landscapes of memory, memory, passage tombs**

Traditionally, archaeology has focused on classification, material culture, and interpretation with an emphasis on when, in this case, prehistoric monuments were actually constructed. But it is important to understand that once a prehistoric monument has been built in a landscape, it forever changes the way in which humans who encounter these landscapes perceive and interact with them. The use and reuse of Neolithic passage tombs throughout time demonstrates how people attached meaning to difference places and how this meaning shifted and changed over time as society transformed. These places of monumental construction become ‘landscapes of memory.’ The aim of this study is to understand the use/reuse, construction/reconstruction, and interpretation/reinterpretation of three Neolithic passage tombs in Western Europe (Newgrange, Maeshowe, and Gavrinis)



and their immediate surrounding landscape as well as the various ways in which people who have experienced these monuments have interacted with them. Multiple methods were used throughout this study to accomplish this overall aim including a review of previous archaeological excavation, a historical and modern GIS map analysis, a review of historical literature, folklore, and toponym, and a focused examination of modern use of the three sites. Findings from this study indicate that all three monuments were used and incorporated into the existing world views of the various and extensive people groups that have shared the landscape with them over time. Once built, the monuments themselves become part of the landscape—compelling all those who share space with them to seek to understand their presence in a way which make sense to them.

ID: 93191

Materializing memories of a lost landscape: Lower Nubian monuments in the Sudan National Museum and their preservation amid war

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KEYWORDS: **memory, monuments, Egypt, Nubia, Sudan**

In the 1960s, the UNESCO-led campaign to save the monuments of Nubia prior to the flooding of the area caused by the Aswan High Dam rescued a significant part of the materiality of Lower Nubian heritage from complete destruction. Massive Egyptian temples in north Sudan were dismantled and reassembled in the newly designed Sudan National Museum in Khartoum. Despite this great achievement, however, much has been lost, including the original context of such monuments, in which meaningful relationships were established between them and surrounding communities. The tomb of Djehutyhotep/Paitsy, a Nubian chief working for Egyptian colonizers, was the first monument to be removed from Sudanese Nubia. Now in Khartoum, the tomb is once again at risk of destruction due to war. This paper summarizes the results of a field season interrupted by war in April 2023 and discusses how the season's incomplete results may assist us in preserving the remains of the tomb amid war, while simultaneously allowing communities to reconnect with heritage from a distance.

ID: 92886

Sardinian Landscapes of Memory: a view from the Giara di Siddi

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KEYWORDS: **monuments, landscape, Sardinia, nuraghe, landscapes of memory**

Monuments endure through time, they act in their own way as agents, and they shape the world of the people around them. They are tied to place- carrying the memory of those who built them into the present and future. The 'landscapes of memory' that emerge in areas with monuments develop a culture of their own. This phenomenon has been almost universally documented in Europe but much remains to be understood regarding why people, often separated both spatially and temporally, attach meaning in such varied ways.

As an island in the Mediterranean, with clear geographical boundaries, Sardinia presents a unique case study with which to investigate these questions. During the Nuragic Bronze Age (1800-1100 BC), Sardinia experienced a boom in monumental construction, predominantly in the form of the eponymous nuraghi. Estimates of up to 10,000 at the peak of development, with the remains of around 7,000 still present in the landscape today. Due to this abundance and the sheer scale required for an island wide approach, this study highlights one geographical area as a focal point.

The primary area of study is the Marmilla region, one of the densest areas of Bronze Age settlement in Sardinia. Within this region, we focus on the town of Siddi and its plateau, the Giara di Siddi, home to 17 Nuragic monuments. Of these 17, one nuraghe in particular, Sa Conca sa Cresia, has been the site of intense research by the Pran'e Siddi Project for the past decade. In order to determine the level of human activity around this monument, we led an intensive survey of the area around this nuraghe. The survey has only been partially completed but preliminary results have been remarkable- demonstrating interaction with the landscape around the nuraghe through almost every time period.

ID: 90724

Five Millennia of Large Stones for the Dead. The Megalithic Phenomenon as Diachronic Feature in Funerary Architecture at La Peña de los Enamorados, Antequera, Spain

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KEYWORDS: **Megaliths, Diachronic occupation, Intensive Surveying, Funerary Architecture, Southern Iberia**



La Peña de los Enamorados (Antequera, province of Málaga), is a limestone promontory rising 886 m.a.s.l. Included in the UNESCO World Heritage List as part of the Antequera Dolmens Site since July 2016. La Peña stands out both as a remarkable landmark and as a multi-period archaeological complex. First due to its strategic position, located right at the intersection of the two main communication routes in Andalucía, and secondly for its unique shape, which resembles a human face looking towards the sky. Its archaeological significance was highlighted fifteen years ago by its connection visual and conceptual with the Menga Dolmen, the central piece of the Antequera Dolmens Site, which is oriented exactly towards the “chin” of the human face, locally known as Tajo Colorado (‘Red Gash’). A rocky shelter with schematic rock art known as the Matacabras, located there was in use before the construction of the great dolmen. Previous studies of La Peña have largely focused on its northern sector, because of its association with Menga. For this reason, in 2024, we organised a large survey campaign to synthesise the archaeological diachrony that La Peña de los Enamorados as a whole and to create a high-resolution archaeological cartography of it. In this paper we present a specific aspect of this recent diachronic study: the remarkable persistence of the use of large stone blocks in funerary architecture over a span of 5000 years, from the Late Neolithic to Late Antiquity. From the recently excavated Piedras Blancas Late Neolithic structures, to La Angostura necropolis, dating to Late Antiquity large stones are a common thread connecting societies spanning five thousand years, which suggests the powerful effect that Neolithic monumentality left in the memory of the people who inhabited the region.

ID: 90392

The Falstad Forest – the memorialisation of a killing site from the Second World War in Norway

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KEYWORDS: **World War II, memoryscape, execution site, monument, war graves**

The Falstad Forest in Central Norway is a memorial site for over 200 people murdered by the Nazis during the Second World War. Several monuments in the area mark burial sites for prisoners from the nearby SS-prison camp Falstad. Established as a national memorial site just after the War, it conveys stories and memories from the Nazi occupation. The post-war ‘refunctionalisation’ of the killing site into a memorial site is materially demonstrated by the first monument from 1947. Several other monuments have been erected through the decades, representing the memory politics of different periods, thereby creating a stratified memoryscape.

Made in concrete, the monuments have solidified memories for visitors to experience, carrying certain values and messages. Through their materiality however, they are also agents influencing the way people experience the site. Interacting with the forest environment, they create a noticeable atmosphere producing a distinct sense of place.



As well as being a tangible and visible landscape with physical markers above ground, the memoryscape at Falstad also has a hidden, but nonetheless material reality underground. As only 88 of the assumed 200 executed prisoners are found, potentially over 100 people are still buried there. The notion of hidden graves creates an additional layer of meaning.

To “excavate” the stratigraphy of this memoryscape may help identify how the killing site, concealed by trees and marshland, was transformed into an official memorial site by material means. An investigation of the different monuments can also reveal changes in the memory culture. Finally, it might reveal different dimensions of identity. The site is important locally, nationally, as well as containing multinational memories because the majority of those killed were not Norwegians but Soviet and Yugoslav prisoners of war.

ID: 90393

Mounds of Azerbaijan: Three Millennia of Evolving Burial Landscapes

STEFANIA FIORI - Kiel University

KEYWORDS: **Kurgans, Mounds, Azerbaijan, Remote sensing, Funerary landscapes**

The phenomenon of constructing kurgans in the Southern Caucasus spans from the 4th millennium BC to the 1st millennium BC, revealing an evolving funerary typology with distinctive characteristics in shape, dimensions, and construction techniques. An enduring ideology, reflected in the monumentalization of the landscape, remains a consistent element across this temporal range. In specific regions, the repeated construction of kurgans over time underscores the lasting connection of communities to ancestral resting places, emphasizing a profound link between these communities and their funerary customs across generations. One such case is located in Central-Western Azerbaijan, where the strategic placement of burial mounds on the white limestone slopes contributes to shaping this landscape as an enduring site of memory.

By addressing this case study, the paper focuses on the phenomenon of moundscape formation. The methodology involved creating a georeferenced database that consolidates data from remote sensing analyses, excavation reports, surveys, and published works to investigate the temporal evolution of the archaeological landscape. Utilizing recent satellite imagery from Google Earth Pro and declassified imagery from the 1960s and 1970s (Hexagon, CORONA, and Gambit), the study conducted a meticulous analysis, enhancing the potential to detect kurgans, even those potentially destroyed over the past six decades. Through an in-depth analysis of natural landscape features and the archaeological record, the study aims to delve deeper into this continuity of use by unravelling the intricate relationship between these kurgans and their immediate landscape.



ID: 90601

Intervisibility studies applied to the Prehistoric funerary landscape of Menorca (Balearic Islands, Spain)

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KEYWORDS: **rock-cut tombs, intervisibility, Menorca, funerary, Protohistory**

From the 9th century BCE onward, Menorca experiences significant transformations in funerary practices marked by the emergence of artificial caves or rock-cut tombs. These tombs, vertically positioned on cliffs, ravines, or rocky outcrops, evolve over centuries, incorporating architectural elements like pillars, pilasters, niches, and various entrance types. The structural complexity observed in the latter half of the 1st millennium BCE reflects the culmination of these architectural developments. Despite lacking discernible patterns or directional orientation, these tombs share distinctive features such as monumental facades adorned with stepped bands and external entry courtyards, though not universally present. This session proposes a scholarly exploration of Menorca evolving funerary landscape, focusing on the architectural nuances and spatial characteristics defining these artificial caves.

The paper conducts a study on the intervisibility between rock-cut tombs in Menorca& 1st millennium BCE necropolises. Its objective is to determine whether certain caves within assemblages exhibit greater visual pre-eminence over others or the rock-cut tombs in the ensemble. The analysis considers external appearances, specifically facades, as another variable. The study aims to identify visually dominant rock-cut tomb types, exploring their internal characteristics (morphology and architectural elements) and external features like facades or courtyards.

By integrating studies of intervisibility with chrono-typological classifications, the paper contributes to a better understanding of the life sequence of these necropolises. It approaches them as persistent places of memory, questioning whether the reuse of the same funerary territory over time reflects the prehistoric communities; intention to symbolically mark or consecrate the space.

ID: 8277

Vandalism of the Spanish Civil War archaeological remains and heritage: the case of the Iron Belt (Basque Country)

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KEYWORDS: **vandalism, war heritage, graffiti, digital humanities, Spanish Civil War**

War heritage helps us to understand the different narratives surrounding a traumatic historical event. For example, the Republican fortified line known as





the Iron Belt reflects the memory/forgetting dynamics of the Spanish Civil War memorialization in the Basque Country. Due to its wartime importance, the Iron Belt was the first war site to receive heritage status in the region. This status has not spared it from suffering different types of vandalism (from partial destruction to the proliferation of graffiti) over the years, which has, in fact, recently intensified. This paper explores the vandalism around the Iron Belt and its surrounding heritage through a selection of three sectors. We have used an interdisciplinary method based on the creation of a geospatial database of the Iron Belt's heritage elements. This information has later been analysed by means of geographic information systems (GIS) and data visualisation (R Studio).

Results show that this phenomenon is transversal and that in some cases it has become a chronic problem. Moreover, in those sites where vandalism actions have a clear intention for vindication, as in the case of political graffiti, they are directly related to their socio-cultural context. Beyond the intention of these (re)actions that claim an alternative political model, we wonder if they also seek to promote a *damnatio memoriae* process or if any of these interventions may even be protected in the future.

ID: 90766

Representation of Memory through Commemoration in early historic site of Kanaganahalli, India (c. 1st century BCE-3rd century CE)

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KEYWORDS: **Mahā-Stūpa, Jātaka, commemorative, Sātavahāna, Aśoka**

In the Indian subcontinent, one can trace landscapes, traditions, and socio-cultural behavioral patterns attached to historical memories. The paper deals with a Buddhist site in Kanaganahalli (c.1st century BCE-3rd Century CE) along the Bhima River in Northern Karnataka. The reading of the site evokes historicity through representations of memory and embodied materialities of Buddhist cultural traditions. The landscape provides multiple linkages through fluvial and land routes to the structural site of Mahā-Stūpa. The Mahā-Stūpa, with enshrined narrative panels, label descriptions depicting stories from several Jātaka tales, and the enormous limestone sculptural representations of Sātavahāna political rulers raise imperative interpretations on issues of memory. The paper will deal with the plausible interpretations behind the need for material portrayal of Aśoka with his queens and reverence to the Buddha by the rulers of the period alongside their representations. The commemorative practices and implications will be discussed by critically analyzing the excavated landscape and site formation. Viewing, remembering, and embodying political legitimacy through the remembrance of the past ruler was intricately associated with the landscape and its early socio-political tradition. The paper will also discuss another grand political event that entered into the narrative of culture-specific ways of commemoration. A sculptural



art with an inscription from Kanaganahalli shows the act of giving Ujjayini or Ujjain by the Sātavahāna king in a generous manner that transits a viewer to the material-discursive representation. Thus, through the imposing structural monument on the site and its materialities, the landscape of Kanaganahalli could be interpreted as a memoryscape connecting the early historical past to our times even today.

ID: 90650

Names of the Namib: land use and community-building in extreme arid environments

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KEYWORDS: **namib, arid, low-density, transhumance, names**

Have humans ever truly; the Namib region of south-west Africa?

It is an environment of extreme temperatures, little natural shelter, high aridity and low resource availability. Namibia was declared an independent state in 1990, after passing through sporadic German, South African and British occupation since the 1800s. It was one of the last regions in Africa to be claimed by colonists, likely due to the high risk and low reward of trying to live and profit there. This paper focuses on the Orange River and surrounds, separating modern South Africa from Namibia, as both a boundary and perennial water source.

The Namib biome cannot easily support settled forms of living. Few crops will grow in the sandy soil, and the sparse vegetation and lack of fresh water cannot support intensive or long-term use. Seasonal transhumance over hundreds of kilometres, foraging and in the last 2000 years mobile livestock-keeping, is still practiced in the present and is the most successful way to live in this environment. This results in an ephemeral archaeological record, deflated surface scatters with little stratigraphic context, but which represents human activity and survival for ~25 000 years.

Here, places with names are often places with water, the rarest and most important resource. I will show how toponymy can be used to reconstruct social movement, resource management and community-building in stochastic environments, supporting limited archaeological and documentary evidence.

Is naming a place, claiming that place? I argue that ideas of resource ownership and control are not inherent in transhumant contexts, and that land use is at best collaborative and at worst co-existent until population increases in the 1850s driven by colonial expansion stretched limited resources and destabilised the landscape, leading to social and ecological degradation and the complex regional present.



ID: 87877

UNESCO Global Geoparks-UGGp as Geological and Archaeological Culture Heritage Memoriscapes

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KEYWORDS: Archaeological culture, geological heritage, materiality, memoriscapes, UNESCO Global Geoparks

Memoriscapes and cultural heritage weave a narrative that transcends time, offering a tangible connection between the past, present, and future. Rooted in the concept of materiality, these constructs stand as testaments to human history, shaping the memorialization of landscapes in profound ways. In particular, such connections go beyond singular monuments, encompassing entire landscapes that unfold as immersive narratives of cultural, historical, and natural significance. These dynamic spaces, often shaped by both human and environmental forces, become living expressions of memory. The natural features of these landscapes, such as rocks, vegetation, and water bodies, intertwine with human interventions to create multifaceted memoriscapes that tell stories of resilience, adaptation, and evolution. The materiality of archaeological culture, in the context of memoriscapes and monuments, refers to the physicality of the objects, structures, and landscapes that serve as repositories of collective memory and societal values. From ancient ruins to sculpture landscapes, the materiality of these elements serves as a bridge across temporal boundaries, allowing individuals to experience the echoes of bygone eras. UNESCO Global Geoparks (UGGp) serve as extraordinary repositories of geological and archaeological heritage, encapsulating the rich Earth history, stand as living libraries and living laboratories, open for exploration. Such materiality manifests in the diverse geological formations showcase a geological mosaic, from towering cliffs to ancient fossils, revealing the intricate dance between Earth processes and the eons that have shaped its surface. Simultaneously, UGGps house memoriscapes embodying the tangible cultural remnants of human societies that once thrived within these geological wonders. Indeed, the memorialization of the landscape in UGGps transcends traditional notions of monuments, as the entire territory becomes a monument. This holistic approach to memorialization fosters a profound connection between visitors and the landscape, fostering a sense of stewardship for our planet heritage.



LAC 2024

WHAT IS NEXT?
METHODOLOGICAL
SOLUTIONS FOR
THE STUDY OF
ARCHAEOLOGICAL
LANDSCAPES:
COMPARATIVE
PERSPECTIVES.

SESSION 23



WHAT IS NEXT? METHODOLOGICAL SOLUTIONS FOR THE STUDY OF ARCHAEOLOGICAL LANDSCAPES: COMPARATIVE PERSPECTIVES.

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The landscape is a dynamic whole, a palimpsest of activities, uses, perceptions, appropriations and meanings that human societies make of and give to the environment in which they live.

Therefore, landscape is a dynamic cumulative whole, which on the one hand generates traces in the morphology of the landscape, making it possible to identify and characterise archaeological sites and, on the other, hinders their identification, masking past traces. In this struggle of opposites, archaeologists face different challenges in the location and study of these archaeological sites, regardless of the chronology to which they belong or the area in which they are located. The construction of infrastructures, the reforestation of ancient wooded areas, the terracing of hillsides to create agricultural terraces, the massive planting of dry crops such as olives or vines, the environmental and ecological conditions, different vegetation cover... are some examples of natural features and anthropic modifications of the landscape that have affected the preserved material traces of past societies.



This session is based on the collaboration between different organisations and institutions, distributed in different areas of the Iberian Peninsula with different landscape characteristics but similar problems when dealing with the archaeological study of these landscapes. The aim is to establish debate and contributions that are not only interdisciplinary but also intergenerational, with different theoretical and methodological perspectives that can be applied in their research projects by people who are beginning their research careers and others who have long experience.

The aim of this session is to offer a space in which the problems of the study of archaeological landscapes and the different methodological solutions applied are presented. In this way, the main contribution of this session is to share concerns and challenges that may arise from the study of these landscapes, generating dialogue and collaborative relationships to offer possible solutions and thus improve the study of past human societies



ID:89387

Archaeoastronomy from the air. Digital tools in the study of Roman landscapes and skylscapes

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KEYWORDS: **archaeoastronomy, cultural astronomy, centuriations, Roman landscapes**

The centuriations were public lands delimited and divided in regular lots, that were applied by the Roman state in the conquest of new territories. But they were also a kind of conceptual appropriation of the landscape, that gradually transformed the nature according to a religious background and particular conceptions of the space which, according to classical sources and previous works, they may have incorporated the sky. Roman archaeoastronomy started decades ago, during which the methods to approach this issue have incorporated progressively new emerging techniques used in landscape studies, while developing others especially useful in this field. In particular, some of those have been applied in the research of the orientation of Roman cities and centuriations in various regions of the Empire, both in the East and West, when fieldwork was not possible or as a complementary source of data to those acquired in situ.

In this presentation we outline a methodological study and its implementation in a case study. First, we will show a work for estimating the accuracy of various digital tools widely used in archaeoastronomy, based on a large sample of Roman towns data obtained in situ in the Iberian Peninsula. Secondly, the results of applying these techniques to Roman towns and centurions in Italy will be presented. The aim is to determine whether ancient surveyors followed purely practical guidelines for the layout of the territory, if they also incorporated topographic and symbolic rules, including the sky in different configurations, in these vast programmes of land reorganisation and the reasons at each case.

ID: 89193

Identifying the “intruder”: Geomorphometric proposal for the identification of Iron Age defensive enclosures through GIS and remote sensing

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KEYWORDS: **Landscape Archaeology, Iron Age hillforts, agrarian terraces, GIS, remote sensing**



The landscape is a palimpsest of anthropic and biological activities, uses, meanings, perceptions, appropriations, change and permanence. These factors, in a more or less evident way, leave their mark on the landscape, on its morphology. In the book *The Dark Abyss of Time: Archaeology and Memory*, Laurent Olivier presents the idea that the past is not a fossil, but that it determines (and is determined by) the present. It is an active and constantly changing element. Walter Benjamin, in *On the Concept of History*, identifies this potential with the term *Jetztzeit*.

In nowadays landscapes, past and more recent elements can be identified layered on each other as a result of both discontinuous and continuous processes of deposition. This temporal superimposition affects not only archaeological records, but also our interpretation of them in the present. Some technological tools such as remote sensing or photo-interpretation are useful to observe these layers, but do not allow us to approach the complexity of their formation, sometimes leading to misinterpretations.

A characteristic feature of Mediterranean landscapes are agricultural terraces. These terraces sometimes make it difficult to locate archaeological sites. Their morphology, adapted to the relief, produces a visual deception in the interpretation of remote sensing data. This paper presents a methodological proposal based on volumetric comparisons between agricultural terraces and the remains of defensive elements of Iron Age sites. For this purpose, use is made of open-access data: LiDAR and DEMs, as well as different applications of visualisation tools for the identification, and collection of information that will serve as a basis for carrying out quantitative analyses. The aim is to recognize geomorphometric features of each of these elements to observe the different scale of each of these architectures, which has interesting implications for understanding their origin, nature and meaning.

ID:90076

“Lights and shadows” of the method: the challenges of metal detecting in the analysis of the Second Punic War conflict

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KEYWORDS: **Conflict archeology, methodology, metal detector, Second Punic War, Archaeology of the Iberian Culture**

Is there a foolproof methodology for detecting the archaeological trace of a conflict? Ancient conflict scenes are very particular archaeological contexts: they are the result of a short lapse of time, they do not usually have ordinary stratigraphies,



they do not usually have preserved structures, their dimensions can be very large and therefore the costs of investigating them very high... In short, locating them is quite complex. An absolutely necessary but not infallible methodology is surface archaeological micro-surveying with metal detectors together with GPS georeferencing. Its effectiveness has been tested in different scenes and sites that have allowed us to know the archaeological visibility of this type of events such as battlefields (Baecula) and sieges or assaults (Iliturgi and Puente Tablas).

However, applying this methodology is sometimes a challenge, and this paper reviews the different challenges and dilemmas faced by our research dedicated to identifying and characterising the archaeological contexts of the Second Punic War in the Upper Guadalquivir. The analytical possibilities of this technique are conditioned by the biases derived from the different immediate and long-term post-depositional processes (ranging from recovering weapons and elements that can be reused after the battle, to contemporary illegal plundering). Another obstacle is the current geological and anthropogenic alterations (erosion processes, olive plantations, infrastructures construction, etc.). Moreover, another problem is the contamination of the landscape (recent metallic remains such as wires, nails, food cans, etc.), which slows down the application of this methodology in a disproportionate way, involving a notable investment in work and time. These difficulties sometimes affect the quality of the study, however, we already know that the materiality of these archaeological contexts is mainly metallic, so we could consider it the most appropriate technique, although sometimes we have to decipher a real palimpsest.

ID: 90527

Post-medieval terraced landscapes. Methodologies, approaches and results from researches in the Ligurian Apennines

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KEYWORDS: **rural archaeology, terraced landscape, multidisciplinary approach**

Ligurian Apennines are widely characterized by terraced landscapes that have been studied by the Laboratory of Environmental Archaeology and History, in relation to the environmental resources management practices (in particular, historical farming and transhumance system).

This paper aims to present results from our ongoing research on eastern Ligurian terraced slopes, often associated with complex irrigation systems, particularly widespread since the 17th century. In the selected case studies, Castagnello (Borzonasca) and Viganego (Bargagli), historical cartography testifies terraces, at least, since the first half of the 18th century.

The research investigates terraces as archaeological artifacts, to reconstruct the empirical knowledge (how it has been constructed and transmitted at local scale)



related to their construction, use, and abandonment; we also aim to understand terraces life cycle in the framework of the wider local environmental resources management practices and system. The analysis started from the identification of different materials and building techniques, in relation to the different uses of terraces, to reflect on the craftsmen choice of materials, their methods of sourcing, and the knowledge related to the construction techniques. These data were collected through a combination of different approaches, methodologies, and sources that involved rural and landscape archaeology, oral tradition, geoarchaeological and ecological investigations, and archival documentation. We will discuss about potentialities and limitations of this multidisciplinary approach, and the possibility of applying this historical research to develop more effective strategies for environmental resources management, preservation, and safeguarding of upland landscapes and memories.

The data are the outcome of a PhD project funded by the Italian Agency for the Territorial Cohesion which, carrying out the National Strategy for Inland Areas, helps sustainable development and fights the demographic decline of rural areas; the study also benefits from the collaboration with Antigone.

ID: 90768

Transhumance and the formation of landscapes: livestock mobility in Devon (UK)

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KEYWORDS: landscape archaeology, computational archaeology, transhumance, mobility modelling, field systems

The long and close connection between nature and people have led to the development of the cultural landscapes that we experience and study today. According to the World Heritage Convention, these have been shaped by successive social, economic, and cultural forces, both internal and external, together with the possibilities and/or limitations posed by their natural environment. One such element playing a central role in many landscape narratives is pastoralism, which is regarded as one of the main causes of landscape transformation in numerous areas. Several studies also suggest that pastoral mobility has a critical importance for the conservation of vulnerable ecosystems, while shaping the distinctive character of innumerable rural areas. Thus, unravelling which elements and dynamics contributed to the long-term formation of such landscapes requires an interdisciplinary suite of approaches, incorporating archaeological and historical sources, old cartography, spatial modelling and analysis, and dating methods.

This paper will introduce the results of the research carried out in southern Devon (UK). Located in the south-west of England, one of Devon's key features is Dartmoor, an extensive moorland upland area which, for centuries, has provided summer pasture for cattle from the Devon lowlands. This upland area is also renowned thanks





to the long and generally straight Bronze Age field boundaries known as reaves. While the prehistoric and medieval archaeological features have been studied, the long-term impact of past pastoral practices, particularly transhumance, on this landscape has not been fully addressed. To do so, our research has simulated potential transhumance mobility patterns and employed a suite of quantitative methods for the analysis of archaeological and historical features, both in the uplands and the lowlands, to provide a meaningful interpretation of the spatio-temporal correlations between pastoral practices and the historical configuration of the territory.

ID:89999

Systematic surveys and contextual analysis of evidence in the Sibaritide area (Northern Calabria)

GIUSEPPE VALENTINI - Sapienza University of Rome

KEYWORDS: **Sibaritide, Landscape, survey, GIS, environment**

The Sibaritide region, located in the north-western part of Calabria, is renowned for its rich archaeological density, which attests to the presence of ancient civilizations and significant settlements, highlighting their historical and cultural importance in antiquity and the richness of their archaeological heritage.

This research proposes an in-depth study of the settlement dynamics of the Sibaritide through surface surveys and contextual analysis of archaeological presences. It focused on the area around Cerchiara di Calabria (CS), using a systematic-random sampling methodology of 10%. The objective was to identify and map archaeological evidence, comparing settlement dynamics over time and considering the surrounding environment.

For data analysis, the QGIS software was used, while LiDAR data was employed to examine natural morphologies and terracing traces related to the identified areas. Overall, the study identified and mapped 43 archaeological dispersion areas, spanning from the protohistoric period to the post-classical era. These results can be considered satisfactory as they provide important information on settlement dynamics and human presence in the studied region.

In summary, the study utilizes a combination of research methodologies and analytical tools to obtain significant information on the population and occupation of the territory in a part of the Sibaritide, contributing to the understanding of the history and archaeology of the region.



ID:90723

How to integrate datasets from different landscape-archaeological approaches? Studying the hinterland of Regina Turdulorum (Casas de Reina, Badajoz, Spain)

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KEYWORDS: archaeological methods, palynology, survey archaeology, data integration, urban-rural-relationship

How to integrate datasets from different landscape-archaeological approaches? Studying the hinterland of Regina Turdulorum (Casas de Reina, Badajoz, Spain) In the framework of the MiReg Project (Miróbriga – Regina Turdulorum: Town and Country in the Roman Far West) the Universities of Vienna and Marburg together with the Università degli Studi Modena – Reggio Emilia analyze the suburban areas and the wider hinterlands of two smaller towns in the Roman provinces of Baetica and Lusitania. Especially in the case of Regina Turdulorum a wide array of methodological approaches including systematic onsite and offsite surveys, geophysical research (geomagnetics, electrical resistivity, GPR) and targeted excavations as well as zooarchaeological and palynological analysis has been applied.

From this methodological variety, one focus of the project has become the question how to find the best way of combining these different methods of archaeological research and how to integrate the data provided in order to reconstruct landscape developments and urban-rural relationships in a historical perspective. The lecture will firstly give an overview about the methodological challenges and opportunities we met during MiReg and will secondly present some results, highlighting the human impact on the natural environment.

ID:89968

Hillforts, war and pines. A methodological proposal based on Civil War orthophotos to characterize Iron Age settlements

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KEYWORDS: Iron Age, Remote Sensing, Spanish Civil War, Orthophoto, Basque Country,

Understanding the spatial dimension that the ideology and worldview of a community acquire involves approaching it in a more comprehensive manner.





However, characterising this social landscape entails grasping the various issues, both natural and anthropic, that influence each terrain. In the specific case of the Iron Age in the eastern Cantabrian region, the two primary concerns are the timber industry and significant demographic pressure. All of this has resulted in a highly biased comprehension of this chronology. Consequently, encountering spatial information gaps, unverified sites, or a limited number of excavated locations is common.

Nevertheless, these issues are neither static nor perpetual, and they can be traced both in time and space. In the case of the eastern Cantabrian region, we are aware that the systematic and standardised introduction of pine plantations took place between the 1940s and 1950s. Concurrently, the intense migrations of the mid-20th century, from the Spanish state to the Basque Country, enable us to date this acceleration in the alteration of these landscapes. Therefore, characterising the Iron Age in this territory may involve compiling a corpus of spatial data predating these dates for intensive remote sensing.

Hence, orthophotos from American flights (1945-1946/1956-1957) are crucial in this respect. Nevertheless, they are not the sole source, as during the Civil War, both Nationalist and Italian aviation captured images of various points within Republican defenses. We know that some of these defenses reused structures from Iron Age sites, rendering them a fundamental source of data.

For all these reasons, this presentation will outline a remote sensing methodology based on orthophotos captured by Nationalist forces during the Civil War, with the aim of characterising Iron Age settlements.

ID:90651

Different ways to study past landscapes: spatial analysis, historic modelling and reconstructions

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KEYWORDS: Spatial analysis, Historic modelling, GIS, ancient landscapes, reproducibility

To delve into the study of historical landscapes, a comprehensive approach is required, encompassing literary, archaeological, and geographical sources. The integration of these diverse sources is commonly facilitated by Geographic Information Systems (GIS), which not only serve as work base but also possess the capability for analysis and modelling. The discourse surrounding this integration often centres on technical aspects and tools, which significantly shape the methodological progress. However, the mind-set and perspective of each past society play a pivotal role in shaping and influencing the landscape, thereby determining its transformation or resilience.

This contribution engages in a discussion on the utilization of GIS to construct historical models, essentially starting from historical inquiries. This approach involves recognizing existing or missing elements within the geography and



subjecting them to analysis using tools that enable correlation and modelling. While the examples primarily focus on the Roman mentality, which exhibits a considerable degree of uniformity across regions, the principles under scrutiny are applicable to other cultures and chronological contexts. The discourse revolves around the application of models related to land use, visibility, mobility, topography reconstruction, and predictive analysis.

The primary objective of this intervention is to display, through several case studies, the potential inherent in these methods and the requisite process. This is crucial not only for extracting pertinent data for research purposes but, more importantly, for ensuring reproducibility by fellow researchers. This emphasis on reproducibility is a key consideration when studying ancient landscapes, preventing the existence of isolated pockets of knowledge and methodologies that demand substantial technical expertise for replication by others.

ID: 89726

“Trust me, that’s another hillfort“: The applicability of remote sensing to investigate fortified sites in challenging landscapes for archaeological prospection

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KEYWORDS: remote sensing, landscape archaeology, hillforts, Iron Age, UAVs in archaeology

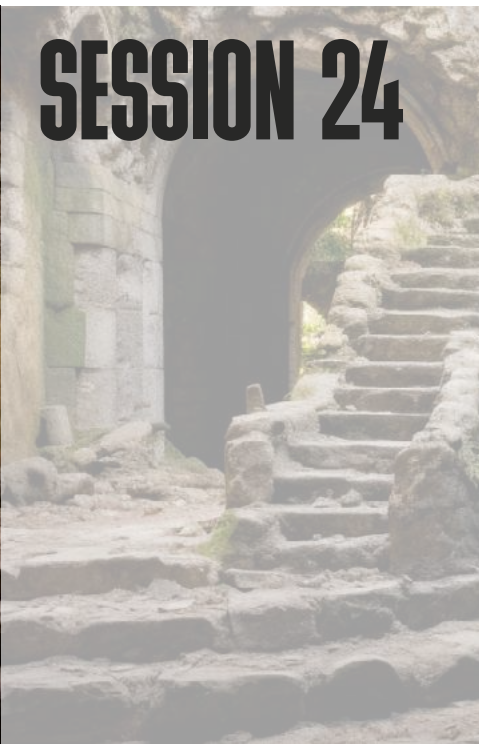
The applicability of remote sensing techniques for the archaeological study of ancient landscapes is strongly determined by geographical conditions and recent land uses in the study area. These factors sometimes challenge our ability to investigate –and even identify– certain types of archaeological sites. Indeed, the material characteristics of the archaeological traits also condition the analytical possibilities of remote sensing techniques in archaeological research. This paper reviews the challenges faced in our ongoing research aimed to identify, characterize and contextualise the archaeological context of hill-top fortified sites in the Cantabrian coast (Northern Spain). We evaluate the effectiveness of the different methods and datasets used to overcome the limitations derived from recent anthropogenic alterations (such as eucalyptus and pine tree plantations, infrastructure construction, urban growth, and mining activities), and the local geological conditions in an area with challenging geology dominated by limestone formations. The integration of several datasets available open access (cartography, aerial imagery and airborne-LiDAR), the acquisition of new data with archaeological purposes (UAV-LiDAR and UAV-photogrammetric restitutions), and the consideration of local oral memories and place names allow us to improve our knowledge on the fortified settlement patterns of Iron Age communities inhabiting the central area of the Cantabrian region and to optimize the results of archaeological ground-truthing in our project.



LAC 2024

LOST IN THE
LANDSCAPE.
ABANDONED
TOWNS BETWEEN
LATE ANTIQUITY
AND THE MIDDLE
AGES IN THE
MEDITERRANEAN
AREA

SESSION 24



LOST IN THE LANDSCAPE. ABANDONED TOWNS BETWEEN LATE ANTIQUITY AND THE MIDDLE AGES IN THE MEDITERRANEAN AREA

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The abandonment of cities or failed urban centres is a phenomenon observed at different junctures and historical moments. In recent decades, archaeological research has made considerable progress in our knowledge of the classical city and of the signs of fragility and unsustainability that affected numerous urban centres in the Roman Mediterranean arc, leading to their abandonment or their transformation into rural environments, many of which did not survive into Late Antiquity. We also have a better understanding of the transformations and new urban architectural models that affected urban centres during the first centuries of Christianity, which reached episcopal rank and which in a large number of examples show a historical continuity up to the contemporary period. This session proposes an exhaustive analysis of several examples of cities that experienced decline or abandonment, as well as the evolution of their dependent territories, in the Mediterranean area during the period between Late Antiquity and the Middle Ages. This phenomenon has been less explored in comparison with the earlier classical period. Certainly, researchers are constantly wondering why similar cities experienced divergent trajectories. Why did some fall into decline, while others survived or even improved their situation during these centuries? Why are different situations observed within a few kilometres? The primary objective is to shed light on the significance of these processes of urban abandonment, decline or displacement, which in many cases involved the relocation of settlements over relatively short distances. To this end, the possible social, political and geographical factors that contributed to the reconfiguration and restructuring of these territories will be examined. It is important to note that the underlying causes of this phenomenon are not easily discernible; however, an attempt will be made to identify the actors that played a preponderant role in the lack of continuity of these cities up to the present day. In addition, the impact on the immediate surroundings of these cities will be investigated, examining whether the evolution of that territory was also affected by these changes. In that sense, our analysis will try to determine whether a divergent urban evolution also influenced the development of its surrounding areas, especially with regard to rural habitat types and their levels of survival, discontinuity and mutation.



ID: 89415

Urban and rural contexts as landscape entities: an analysis of the peninsular centre from an integrative perspective (5th-7th century)

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KEYWORDS: **Cities, Early Middle Ages, Late antiquity, Suburbia, Territoria.**

Given the paucity of data available on the socio-economic reality of the rural environment in the late Antiquity and early Middle Ages, this study presents the conformation of the suburbs and the territories of some of the main cities of the Central Plateau of the Iberian Peninsula. The archaeological record linked to these spaces allows an approach to their characterisation as elements inherent to the urban centres, which would also form part of a larger framework: a landscape with its own identity. The interpretation of this archaeological documentation represents an approach to a landscape in transformation, which will lay the foundations for what will later become the landscape of the Middle Ages. Through the analysis of archaeological, environmental and textual data, an identification of these socio-cultural realities is carried out, guaranteed by the combination of different procedures and scientific perspectives typical of Landscape Archaeology. This possibility of study is essential when it comes to issuing an interpretation of the society of the centre of the peninsula after the rupture brought about by the end of the Roman Empire.

ID: 90427

Fall and Rise. The Endurance and Decline of Tarragona after the Islamic Conquest of the Iberian Peninsula

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KEYWORDS: **Tarragona, Tortosa, shifting cities, al-Andalus, urban unsustainability**

This proposal analyses a case study that has had significant repercussions in the Mediterranean debate on the decline or desertion of certain urban centres during Late Antiquity and the Early Middle Ages. In this sense, the example of Tarragona during the 7th and 8th centuries provides insight into the factors that resulted in the transfer of institutional, political, and administrative power from this former Visigothic provincial capital to the region primary centre from the 9th century onwards, Tortosa. Historiography has traditionally portrayed Tarragona



as a declining urban centre, practically uninhabited after the Islamic conquest of the Iberian Peninsula. Recently, however, archaeological studies of the city have proliferated, and the results strongly suggest otherwise. For this reason, this work will examine the role of Tarragona in two different chronological scenarios: the final stages of the Visigothic kingdom and the formative moments of al-Andalus under Umayyad rule. The ultimate aim is to analyse the administrative, political and economic changes that took place in the city between those two moments, using a holistic approach that incorporates all the available historical records. In the end, the fall of the ancient Roman capital led to the rise of a nearby urban centre, Tortosa, which played a leading role in the fate of Islam new frontier against the Christian territories from the 9th century onwards. As seemed to be the norm in al-Andalus, power was transferred to an existing, fully consolidated centre rather than founding a new city. Hence, archaeological, written, and architectural sources are combined to attain maximum economic, socio-political and cultural information, while historical explanation remains as the sole form of meaningful progress in historiographical discussion.

ID: 90641

Finding Banzos. Preliminary results on the research of an abandoned village in the northern Sardinia

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KEYWORDS: landscape archaeology, sardinia, survey, remote sensing, abandoned villages

The first involved extensive bibliographic and cartographic research that led to the delimitation of the survey area through the toponymy shown in nineteenth-century cadastral maps.

In the second phase, an intensive survey was conducted covering an area of about 70 he. While on the field, all material finds were positioned using a mobile GIS platform (Merging Maps), considering the diagnostic and particularly significant items. Meanwhile, drone coverage of the entire area was performed to obtain a detailed base map.

After the survey, two different settlements were identified, based on the location and type of materials: a Late Antiquity settlement and a medieval fortified area.

The presence of a Late Antique-Early Medieval settlement phase was conceivable but was never documented before. It was also possible to associate the second area with the Malaspina's fortified village cited in medieval documents.

The data collected throughout this first campaign greatly enriches the previous knowledge of the area, however, it is still extremely relevant to investigate the neighbouring areas further since this first survey did not observe any evidence or structures that can be associated with certainty with the presence of the village of Bangios.



ID: 90742

Lost landscapes or invisible landscapes in the Iberian Peninsula? Tarazona and its territory during the Late Antiquity and Early Middle Ages

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KEYWORDS: **Tarazona, rural world, middle Ebro valley, Late Antiquity, High Middle Ages**

In this study, we investigate the history and archaeology of Tarazona, a city located in northwestern Spain, in the middle Ebro valley, which historically formed part of the Roman province of Tarraconensis. Although its importance was minor compared to other cities such as Caesaraugusta and Tarraco, Tarazona survived the Late Antiquity and the High Middle Ages, becoming an episcopal see. Although documentary and numismatic sources indicate its existence and apparent dominion over a part of the central Ebro valley, the archaeological remains available from this period are limited, revealing mainly a certain topographical Christianisation. In this paper, we seek to systematise the scarce and heterogeneous information on this small episcopal see and to explore its immediate territory. Prior to our research, this period was characterised by a generalised scarcity of data, limited mainly to a few sites from the Late Imperial period. However, through archaeological prospection, we have documented a network of small settlements, although they are mainly characterised by their invisibility. In the 9th century, with the arrival of Islamic power, there will be a change of polarity in favour of Tudela, which from that time onwards will rule this area of the middle Ebro valley. This study contributes to filling a gap in the historical and archaeological knowledge of Tarazona and its surroundings, providing a new perspective on its development and territorial organisation in less documented periods.



LAC 2024

HISTORICAL
RESPONSES TO
ENVIRONMENTAL
CHANGE:
RETHINKING
RIVERINE-COASTAL
LANDSCAPE
ARCHAEOLOGY
THROUGH
INTERDISCIPLINARY
APPROACHES

SESSION 25





HISTORICAL RESPONSES TO ENVIRONMENTAL CHANGE: RETHINKING RIVERINE-COASTAL LANDSCAPE ARCHAEOLOGY THROUGH INTERDISCIPLINARY APPROACHES

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This session intends to bring together scholars, researchers and working archaeologists to publicise and discuss landscape archaeology topics and research that affect the broad vision of space-site interaction adapted to coastal, intertidal and riverine contexts from novel methodological or theoretical approaches. Examining questions about the human past drives researchers to the most challenging questions when covering landscape interaction. More specifically, entanglement between human and the environment have been evidenced by 'Anthropocene' episodes directly affecting population mobility, migration and structural changes, particularly in coastal, intertidal, and riverine areas. This relationship generated a learning process in the decision-making of settlements and abandonment of areas triggered occasionally by environmental causes and subsequent forms of resilience or adaptation (social, economic and political consequences). With this session, we aim to delve into whether and how historical responses at the micro-scale (site level) might interrelate with the variations observed on a broader, regional scale in a dynamic riverine-coastal environment without presupposing determinism. The study of coasts, intertidal areas and management of river basins has received considerable attention in the last decade, primarily due to the increasing availability of non-invasive technology required to access archaeological sites in spaces that occupy vast unexplored extensions. This context has enabled the discipline to blossom, primarily through geoarchaeological and remote sensing methodologies. Following this, the proposed session sees the study of landscape archaeology, including inter and multidisciplinary research, as crucial to understanding game-changing historical responses to climate change, periods of crisis or flourishing, and strategies of adaptation to challenging environments.



ID: 89926

Ecological Vulnerability and Human Responses in a GIS-based model of Surame, lower catchment of the Sokoto-Rima basin, Nigeria

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KEYWORDS: **Vulnerability, Human-Environment, Responses, interactions, Sokoto-Rima.**

Paleo-ecological research based on plant and animal macro-remains, and ethnoarchaeology permits accurate qualitative reconstruction of responses to human-environment interactions in the archaeological site of Surame and contemporary Sokoto, 45 kilometres apart. The Sokoto-Rima basin is located between Latitude 110 and 160 north and Longitude 40 and 80 east. The lower catchment of the basin is composed of thick sedimentary deposits, and a flat topography where greater part of rainfall is loss to evaporation. The area is dissected by the Sokoto and Rima rivers whose floodplains on the sedimentaries are up to 8 km wide and includes past settlement locations from riverside to valley margins that are mounded, walled, or open. A proto urban or 'pre-Surame' settlement phase corresponding to cal. AD 1455 indicates diversification of agriculture and utilization of *Spermacoce* sp., pearl millet, Fonio and other wild millet species, sorghum, and *Poacea* sp., fruits of baobab and cotton. By cal. AD 1503, *Poacea* species were completely absent, as fruits of baobab and utilization of cotton increased. Involucre base numbers were high suggesting that grain was stored as full panicles, against a precarious climate. The faunal spectrum includes most exclusively domesticates such as cattle (*Bos taurus/indicus*), Caprines (sheep: *Ovis aries* and goat: *Capra hircus*). Large wild mammals were completely absent due to high human activities, including man-made bush fire, cultivation, collection of firewood, wood and wild plant products, and extensive pastoralism. Between cal. AD 1913, 1942 and 1971, responses to marked rainfall minima shows patrilineal homestead organized production and food consumption. Patterns of intercropping, the selection of drought-resistant strains, and the use of crop combinations also varied with yearly environmental fluctuations. This study combined social and ecological factors together into a common temporal and spatial framework to produce vulnerability maps and to inform areas facing novel ecological disturbance.



ID: 90699

An integrated remote sensing approach to palaeogeographic and landscape changes around the ancient Greek colony of Abdera in coastal Thrace (Northern Greece)

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KEYWORDS: Palaeogeography, Landscape change, Geomorphology, Multi-temporal imagery, Digital Elevation Models.

By combining DEM-derived products, multi-temporal satellite imagery, different cartographic sources and orthophotography, we detected and mapped more than 1000 km of former coastal and alluvial landforms, overcoming the spatio-temporal and resolution limits of single-method studies. The mapping of these geomorphological features was cross-checked with an archaeological site database of the whole area and historical data about modern towns. These data allowed us to elaborate a reconstruction of the geomorphological dynamics and palaeogeographic evolution of the area since the Antiquity. Our results indicate that the Eastern part of the Nestos delta was formed mainly from the Hellenistic period onwards, and reached a similar shape to nowadays in the Late Antiquity. However, most of the large palaeochannels clearly visible in aerial imagery are significantly younger, and likely correspond to short-lived avulsions during the last centuries. The Kosynthos plain also prograded significantly eastwards since the Antiquity. This dynamic accelerated in Byzantine and Ottoman ages, and even more in the 20th c., causing the silting and a marked size reduction of the lakes Lafra and Vistonida. Conversely, other wetlands and lagoons in the coast of Porto Lagos that are not connected to major river systems seem rather stable during the last millennia, with only very minor coastline progradation and silting. Forthcoming geoarchaeological, geomorphological and palaeoenvironmental research will give us more precise insights about the dynamics and drivers of socio-environmental interaction, landscape change and social adaptation in this area of Aegean Thrace over the *longue durée*.



ID: 90701

Developing interdisciplinary and integrated landscape archaeology approaches in the Aegean: current state and perspectives of archaeological, geoarchaeological and palaeoenvironmental research around Abdera (Thrace, Greece)

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KEYWORDS: Geoarchaeology, Survey, Landscape Archaeology, Socio-environmental interaction, Aegean.

Coastal Mediterranean landscapes are the result of a complex interaction between humans and their environments since Antiquity and before. This has been in the focus of scientific research of the last decades, that has resulted in plentiful, but sometimes groundless and questionable, socio-environmental narratives. In order to overcome simplistic interpretations, the multi-faceted dialectic between History and environmental change needs to be appraised through integrated and interdisciplinary landscape archaeology approaches, that often lead to reconsidering the traditional interpretations. Within the framework of interdisciplinary landscape archaeology projects focused on Greco-roman landscapes of the Mediterranean and especially in the ancient Aegean (APAX, TransLands, TranScapes i.a.), we developed a comprehensive and comparative approach including multi-scale and multi-methods surveys, archaeomorphology, excavation, remote sensing, and multi-proxy geoarchaeological and palaeoenvironmental studies. Up to now, results from intensive survey and geoarchaeological works around the ancient Abdera, a Greek colony in Aegean Thrace, have yielded abundant new data that changed our perspective of the history of the city. Results of the survey carried since 2015 have shown an intensive and complex occupation of the area north of the city walls, characterized by multiple clusters of funerary mounds, and also farmsteads and other rural settlements. Geoarchaeological research developed since 2020 (and still ongoing) has allowed to reconstruct sea-level and paleogeographic changes since the prehistory, and to discuss their interaction with the city. We



have expanded our research to the hinterland of the colony, and current works encompass remote sensing, geomorphological, paleogeographic, archaeological and archaeomorphological studies of all the coastal plain between the Nestos delta and the lake Vistonis. Further and broader research perspectives include the comparison of Abderitan landscapes with those of its Ionian Metropolis, and of far-west colonies in the fringes of the Mediterranean world.

ID: 89714

Life-threatening choices. Investigating the human-environment relationship of ne romania's late bronze age

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KEYWORDS: habitation practices, flood hazard, ashmounds, Late Bronze Age, NE Romania

During the Late Bronze Age (ca. 1600-1100 BC), the territory of nowadays eastern Romania was occupied by the communities belonging to Noua culture, known for various aspects, but especially due to the presence of the so-called ashmounds/ash-heaps/cinder mounds/zolniki (quasi-circular grey spots visible on the soil surface with diameters between 15 and 45 m and maximum 50 cm elevations, resembling small mounds) within their settlements. This characteristic has allowed researchers to include the societies in question in the Noua-Sabatinovka-Coslogeni cultural complex that occupied large territories of the present-day South-East Europe. While many aspects regarding these human groups are still sparking debates among specialists, one broadly acknowledged fact is their preference for settling near confluence areas, riverbanks or floodplains.

The main objective of the present study was to enhance the existing knowledge regarding the behavior of the Noua communities from the Jijia River catchment (NE Romania), a territory of approximately 5.750 sq.km, where 363 settlements have been documented. The data currently available suggests that the human groups in question performed pendular migrations, so that it is possible that the number of sites known so far does not illustrate a similar number of communities. Nevertheless, while most of the sites are located near one or more secondary hydrographic arteries, an important number have been identified near the main course of Jijia River, the most important watercourse of the case study, thus proving an interesting perception regarding flood hazard. In this context, our approach implied performing various spatial analyzes using high-resolution Digital Elevation Models derived from LiDAR datasets, as well as remote sensing techniques (aerial photography, photogrammetry and geophysical measurements) in order to better understand the human-environment relationship, with special emphasis on the factors that influenced their selections of settling territories.



ID: 89980

Human adaptation to environmental change: a case study from the central Netherlands showing a multi-proxy geo-archaeological record of 10.000 years of riverine-coastal landscape development

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KEYWORDS: Geo-archaeological assessment, Holocene, wetlands, adaptation, environmental change

The region contains a well preserved buried late Pleistocene aeolian landscape, covered by several meters of Holocene wetland sediments. The archaeological value of the late Pleistocene landscape is rather well known and tens of Mesolithic hunter-gatherer sites have been discovered here during the last 20 years.

However, the prehistoric to historic archaeological value of the Holocene deposits in the area is still largely unknown. Therefore, a large scale geo-archaeological assessment of the Holocene sediments has been carried out. This assessment consisted of an integrated multi-disciplinary approach aimed at landscape and palaeogeographic reconstructions of mid- to late Holocene wetland (coastal and riverine) environments. Using a combination of lithological descriptions of sediments, soil-micromorphology, radiocarbon dating, botanical analyses, diatom analyses and micropalaeontological analyses, we were able to reconstruct Holocene sedimentary environments and landscapes and - in combination with existing archaeological data - to assess their archaeological value.

The research has resulted in new insights in the archaeological value, usability and habitability of Holocene wetland environments in this part of the Netherlands. It has also revealed new research themes, scientific information and datasets on mid-to late Holocene landscape development of the region. Moreover, with the research we have clear indications that men made continuous adaptations to the changing landscape and that human presence in the area was more or less continuous for a period of over 7000 years.

ID: 89466

Legal security for human-river interaction in the framework of changing riparian landscapes: the river islands

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KEYWORDS: river islands, Digesta, Corpus Agrimensorum Romanorum, flood, alluvium





Regarding this, it must be taken into consideration that the legal system that regulated environments was a key for a better control, management and supervision, as happened in the Roman world. In addition, and not infrequently, the situation was affected by the capacity and need of adaptation, or if preferred, of resilience, to contexts derived from changes produced in the landscape (particularly the coastal one), so that the resulting new reality could be adequately managed. And this is especially the case after episodes of floods and alluviums that could generate phenomena such as the appearance of river islands, either in the river course itself or at its mouth.

From this point of view, it is essentially the analysis of the jurisprudence preserved in the Digesta of Justinian and likewise of the news collected in other sources of information, such as those referring to the treaties of surveyors included in the Corpus Agrimensorum Romanorum. These are compilations made in Late Antiquity, in an evident example of the validity and relevance of the measures that were mainly established during the Principate, but also it shows the necessary regulation of this type of issues.

In any case, it is complex to apply this general information to specific areas, particularly given the lack of other news in documentary sources about this phenomena, just as it happens in Baetica.

ID: 90230

The AQVIVERGIA project and its advances in the historical study of river basins: Hasta Regia - Lacus Ligustinus and Urci - Lower Andarax

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KEYWORDS: river basin; society-environment interaction; Baetica province; past experiences; non-invasive research.

We present the advances in the AQVIVERGIA Research Project since 2021. This project focuses on the analysis of the historical society-environment interaction in the river basins, to know how past societies related to these natural spaces, and how they practiced their use and management. Methodologically, in addition to the traditional techniques of historical studies, based on the exegesis of primary and secondary sources, the application of non-invasive and digital documentation and research tools and techniques is used. The main objective defined is the integrated vision of the watershed as an essential geographical unit of reference and as a spatial concept, and the analysis of the perception of these terms for ancient societies. For this purpose, two of the case studies developed in the project are presented: Hasta Regia and the lacus Ligustinus, and Urci and the lower basin of the Andarax river. This is based on the paleoenvironmental study, including the changes in the coastline. Regarding the mouth of the Guadalquivir, the works of Dr. Menanteau and Dr. Arteaga on the lacus Ligustinus are fundamental; these are



the starting point to analyze the geomorphological evolution in relation to Hasta Regia (Mesas de Asta, Jerez de la Frontera, Cádiz) after the last studies carried out within the AQVIVERGIA project. In relation to the mouth of the Andarax river, its paleoestuary was analyzed by Dr. Hoffman team. In spite of this, the Roman period is the one that has presented less attention for the historiography until the beginning of this decade. For this reason, the study of Urçi (El Chuche, Benahadux, Almería), for which several non-invasive prospecting campaigns have been developed, as well as the analysis of its relationship with some of its most emblematic sites, such as Portus Magnus (Almería) and the officina purpuraria of Torregarcía, acquires a particular interest.

ID: 89241

Ports of the East, ports of the West: Comparative approaches to Roman ports, mobility and connectivity in the Mediterranean

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KEYWORDS: **roman landscapes; GIS; spatial analysis; archaeology of ports; Mediterranean Sea**

Over the last decades, research focussing on the study of ancient ports is experiencing a remarkable expansion that is enhancing our understanding of their organisation and daily functioning. However, whilst these studies are developing numerous (and diverse) lines of research, ranging from the study of port appearance and urban planning to the creation and transformation of port systems, further emphasis should also be placed on their study at wider geographical scales to foster better understandings of the impact their creation, development and (also) abandonment had in transforming territories and regional systems in Antiquity. It is in this context that “Beyond ports: Movement and Connectivity in the Roman Mediterranean” (financed by The Swedish Research Council) develops, focussing on exploring the connections between ports and their regional contexts as means for a better understanding of the role of ports in the integration of regions within the Roman Empire. Relying on an integrated approach that combines geoarchaeological and archaeological data within a GIS-environment, this paper will present the preliminary results of a comparative analysis of the provinces of Asia (western coast of Turkey) and Baetica (southern coast of Spain) during the Roman Empire, seeking to draw similarities and differences between the strategies developed by local communities to enhance and expand their connections with others. In doing so, this contribution seeks to highlight the potential of integrated, comparative approaches to explore (firstly) the bidirectional relations between human communities and their landscapes and (secondly) the diversity of these responses across the ancient Mediterranean.



ID: 89847

The Testerep project: using archaeological, historical, and geological data to reconstruct 5000 years of human-environment interaction

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KEYWORDS: **environmental reconstruction, coastal dynamics, human-environment interaction**

The Belgian coastal area has been subject to many changes over the past 5000 years. Currently dominated by a hard linear sea dike, the area previously consisted of a dynamic system of tidal gullies, mud flats, and marshes. In the central part of the coast, a tidal gully running parallel to the sea once separated an elongated strip of land from the mainland. The emergence, reclamation, and eventual partial demise of this (pen)insula named Testerep has left many traces in the present landscape. The project focuses on investigating these traces to reconstruct the evolution of this former (pen)insula and its environment, and to understand the natural and anthropogenic drivers of change in this landscape. The project is carried out by a consortium of researchers, including marine geologists, archaeologists, and coastal engineers.

The reconstruction and modelling efforts carried out for this project are shaped by and provide a framework in which to (re)consider individual sites. Studying the evolution of specific sites allows us to learn about the way coastal communities interacted with their coastal environment. Roman and Medieval settlements developed in the area, taking advantage of the opportunities provided by proximity to the sea. Despite a strong Roman presence on a nearby sandy outcrop, and apparent investments in localised coastal defence, Roman sites nearer the coastline appear to have been overtaken by the sea relatively fast. Detailed study and OSL-dating of a roman dike provides new insights into the late roman coastal presence. High and Late Medieval coastal communities settle in the coastal plain, taking advantage of natural defensive opportunities and creating them when not available. The apparent longer lasting success of these settlements is due in part to historically attested investments in coastal defence, which are now also increasingly evidenced by new remote sensing data.

ID: 90808

3D Modelling of a fluvial Paleochannel associated with Prehistoric sites in Mato Miranda, Golegã – Portugal

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KEYWORDS: **Paleochannel, 3D Modelling, Paleolithic, Landscape, Prehistoric sites**

The work carried out in Mato Miranda (Golegã) is presented, in the context of depositional architecture indicating the geometry of a river paleochannel in the Lower Tagus, with several prehistoric sites identified in its surroundings. The aim was to broaden archaeological knowledge, define areas with archaeological potential, and propose measures to protect and enhance their archaeological heritage. The study focused on areas with Pleistocene river terraces, revealing the presence of lithic materials (Early Prehistory, mostly Middle Paleolithic) and ceramics (Recent Prehistory). Golegã is part of the Portuguese Middle Tagus river basin, and its entire relief is the result of the evolution of the river. In Portuguese territory, the drainage area is made up of schists, granites, gneiss, quartz, quartzites, sands, sites, clays, limestones, and marls, covering ages from the Ordovician to the Holocene. The county has predominantly Quaternary formations, characterized by the occurrence of staircases with extensive terraces and Pleistocene colluvium, reflecting climatic-eustatic control in a context of tectonic uplift. Sites and outcrops where stratigraphy can be observed were identified. 3D modeling has contributed to a better understanding of the landscape and the archaeological sites already identified. Because it is an important tool for archaeology and improves the documentation, preservation, analysis, and communication of archaeological sites, it contributes to the advancement of archaeological knowledge and the involvement of the public with history and cultural heritage. This study is important because, through the reconstruction of spatial and geomorphological contexts and their relationships between different archaeological elements, patterns can be observed that will be used for more advanced spatial analysis and in the planning of future excavations, as they help to define research strategies and identify areas of interest and to better understand the human occupations of that area throughout the ages.

ID: 90722

MidHolocene coastal Landscapes and Neolithic evolution of the Oman by a multi-scalar and multi-proxy study of in-site and off-site archives

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KEYWORDS: Neolithic, paleogeography, multi-proxy analysis, Oman, coastal landscapes evolution

NeoArabia is an interdisciplinary and multi-scalar project, dealing with the long term of the Arabian Neolithic (6200-2800 BC) by a latitudinal transect of ~1000 km, from the UAE to the Dhofar region, Oman. Focused on environments/landscapes reconstructions and the mobility of coastal human communities, it intends to test the societal resilience, using socio-environmental scenarios. We present an integrated approach incorporating evidence from Neolithic settlements and their surrounding environments (lagoons, mangroves, estuaries), to wider regional contexts (deltas activity, marine SST and upwelling activity, monsoonal air masses). Neolithic Eastern Arabia coast offers an exclusive exploratory research opportunity to reconstruct past landscapes and environments in a region which has been greatly transformed over the last 5,000 years by aridification process, mainly under orbital control. Since the Early Holocene humid optimum, the region has undergone a polyphased evolution, that we propose to reconstruct for two micro-regions (Ruwais, Sharbithat) by a combined in-site and off-site approach of coastal sedimentary archives. Applications combining drone images and structure from Motion photogrammetric approach (high resolution DEM), geomorphological, sedimentological, geophysical, bio-geo-archaeological analyses have proven powerful and effective to examine landscape morphologies and soil archives and to decipher the evolution of early coastal landscapes under climatic, eustatic and socio-ecological processes. We test the potentials and frontiers of multi-proxy integrated methods and multi-scalar analysis (from site to micro-regional scales) to propose landscape evolution scenarios from 6.0 to 2.0 kyr BC. Our study shows coastal landscape mobility and changes in vegetation cover on a secular scale under the combined action of sea level changes, Arabian-Indian monsoon activity, alluvial and eolian dynamics. It also shows changes in economic strategies on the shell middens at the same time, as a response to the constraints of palaeogeographic, marine and coastal biomasses (with progressive disappearance of mangroves), and also probably cultural changes.



LAC 2024

"THREE-
DIMENSIONAL
LANDSCAPES"
CURRENT
APPLICATIONS
ON SURVEY,
ANALYSIS, AND
VISUALIZATION OF
ARCHAEOLOGICAL
LANDSCAPES

SESSION 26



"THREE-DIMENSIONAL LANDSCAPES". CURRENT APPLICATIONS ON SURVEY, ANALYSIS, AND VISUALIZATION OF ARCHAEOLOGICAL LANDSCAPES

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In the last decade, remote sensing and 3D processing techniques have undergone significant theoretical and technical advancements. The quality and quantity of data obtained through various 3D techniques have marked a substantial leap forward, and Archaeology is no longer a mere bystander. As a result, their application has become increasingly common, particularly in Landscape Archaeology, where various techniques are employed to survey and analyze the landscape in three-dimensional ways.

In this regard, methodologies such as airborne photogrammetry on Unmanned Aerial Systems (UAS) platforms or airborne LiDAR, among others, have gained significant relevance in the field. Additionally, new frontiers are emerging, such as the application of Artificial Intelligence, which will play a pivotal role in the near future. The adoption of these innovative methodologies has brought about a methodological revolution, with profound theoretical implications on how we study the landscape evolution.

This session aims to be a space for presentation and debate of the state-of-the-art 3D methodologies for survey, analysis and visualization of the landscape. The primary objective is to engage in discussions about methodologies, application challenges, new theoretical perspectives, and the future directions. Thus, papers on methodological and theoretical issues on 3D applications for the study of the Landscape will be welcomed, including case studies of methodological relevance. The outcome of this session will be an up-to-date overview of a field constantly undergoing significant methodological updates within Landscape Archaeology, thereby fostering discussions of considerable value for the exploration of current applied methodologies and the advancement of theoretical debates.



ID: 90725

A test for the integration of Micro-topographic reconstructions and Machine Learning-based image analysis for the characterization of archaeological surface record

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KEYWORDS: Archaeological Survey, Remote Sensing, Machine Learning, funerary monuments, Abdera

During last years, archaeologists involved in surface surveys have found themselves dealing with accelerate developments that have affected its traditional sources and instruments: access to global geolocation and on-site digital recording are nowadays a standard practice in survey programs; EO sources have multiplied as more missions are set up, the old ones consolidated or declassified. In parallel, programs of digitisation and georeferentiation of collections of historical materials provide unprecedented access to archival material; UAS-mounted sensors have opened the testing of higher resolution imagery for targeting all sorts of archaeological features (from potsherds to little mounds or crop-marks); Computational-based analyses, among them machine learning, are opening new avenues for quantitative approaches, and make possible to question newly available big datasets. Archaeologists have been “surfing” this technological and data wave, experimenting with the different techniques and sources, initially independently, but multidisciplinary integration is starting to emerge as one of the main challenges.

Here we will present a workflow designed to respond to the question if the combination of automatised methods can provide clues to interpret the archaeological surface record beyond location. We take as a case study the levelled funerary tumuli spread through the hinterland of the Ancient Greek city of Abdera. In that scenario, we have used a multi-scale and multi-source approach to integrate 1) the Micro-topography of the area; 2) the automatic detection of pottery fragments in high-resolution imagery including its formal characteristics; and 3) experimenting with soil classification to provide some taphonomical and contextual clues. The results of this completely non-invasive workflow have been compared to the results of the pedestrian survey developed in the area. This will provide the ground to discuss the applicability of automatised survey methods, potentialities and limitations encountered until now and how these could be conceptualised within the context of archaeological surface survey.



ID: 89576

The bullet, the enclosure and the camera. Using new technologies for the study of the Spanish Civil War landscapes in northern Madrid

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KEYWORDS: Spanish Civil War, conflict landscape, 3D technologies, NNTT, heritage diffusion

Near object photogrammetry and drone photogrammetry have been widely used by archaeologists in all kinds of contexts since more than a decade now. Albeit very convenient to keep the record of all the phases of the excavation and to register objects, their use can be much further extended in terms of site and landscape understanding as well as diffusion of knowledge to the not specialized public. The present talk verses about the integration of 3Ds, drone flights and historical aerial images within a set of data from a series of archaeological excavations and surveys on the fields of battle of the Spanish Civil War (1936-1939) in the mountains of northern Madrid. The progressive ensemble of data, specially photogrammetries, from successive campaigns during the last 4 years have permitted us to work in three-layer scope. The first, is the reconstruction of the fighting positions and an attack performed by the Republican Army towards the nationalists' positions in Cuesta de la Casa; the combination of 3Ds from the fortified positions, survey materials and archive documents have allowed us the generation of an interpretative drawing. Second, aerial historical images and remote sensing enabled us to understand the landscape in a diachronic way and the changes from a productive herding landscape to a destructive one during the conflict. Third and last; the uploading of the 3D models in Sketchfab allows our work to endure and gain further diffusion by a wider public. All these three scopes are, finally, gathered by the same effort in understanding and highlighting the conflict landscapes of the Spanish Civil war by several tools, in which new technologies play a key role.

ID: 90109

Fly Away. Multiscale digitisation and spatial analysis of the medieval castro of Doña Palla (Asturias)

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KEYWORDS: **SfM photogrammetry, UAVs, multiscale, digitisation, spatial análisis**

Together with SfM photogrammetry, the use of UAVs is an increasingly common reality in archaeology. It could be said that the combination and standardisation of this type of workflows configures a new way of understanding archaeology, much more remote, extensive and, why not, rigorous.

Throughout this paper we will try to analyse the main benefits, possibilities and also problems of using, in a systematic way, a multiscale three-dimensional documentation in an extremely complex site such as the medieval castro of Dona Palla, Pravia (Asturias).

On a macro-spatial scale, semi-automated drone data becomes an ideal basis for the study and understanding of the surrounding landscape. On the other hand, meso- and micro-spatial information obtained from individual structures or even stratigraphic units by means of pedestrian photogrammetry or iPad devices complete an increasingly complex, but practically essential, three-dimensional puzzle for the archaeologist. However, what are the real possibilities of working with this type of 3D resources in archaeology?

ID: 90110

Rediscovering Los Millares. 3D digitisation and spatial analysis with LiDAR of a Chalcolithic settlement in the south of the Iberian Peninsula

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KEYWORDS: **calcolithic, photogrammetry, digitisation, LiDAR, UAVs**

The site of Los Millares, Santa Fe de Mondújar, Almería (Spain), became known at the end of the 19th century thanks to the excavations carried out by Luis Siret. This huge settlement from 3200 cal bc occupies about 5 ha and is defended by 4 concentric lines of walls.

Although the excavation activities carried out until 1991 provided a wealth of valuable information about this settlement, excavations have recently been reactivated. The main objective has been to improve our understanding of the functioning of Millares, in particular of some of the most important buildings, as well as of its immediate surroundings.

For this purpose, it has been employed SfM photogrammetry using UAVs, as well as aerial LiDAR (Light Detection and Ranging) for meso-spatial analysis and remote sensing of possible hidden structures. In our case, in parallel to the archaeological intervention, a total of 400 ha have been covered by UAV, combining both LiDAR flights and photogrammetry. In this way, precision flights at very low altitude were combined with the execution of programmed flight missions at higher altitudes, but much more extensive. Using LiDAR flight as a basis, visibility basin analyses of the 13 forts have been carried out using the Visibility Analysis plugin of QGIS, verifying their potential as elements of landscape control.



ID:88063

Let's make the invisible visible. LiDAR investigations and archaeological data from fortified sites attributed to the Bronze Age in Eastern Romania

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KEYWORDS: **LiDAR, Bronze Age, fortifications, archaeological investigations, Romania**

The recent archaeological researches was carried out in the sub-mountainous area in the Eastern part of Romania allowed for the identification of several fortified sites situated in areas covered by woodland. Even if some details linked to the presence of the defensive structures can't be observed on the ground level, a detailed topographical image is absolutely necessary in order to comprehend the complexity of these fortifications in relation to the surrounding landscape. Based on their spatial layout, it can be noticed that those sites protected/controlled a geographical clearly defined territory, rich in salt resources.

Within a research project called "ForTum", recently implemented by the Neamț National Museum Complex and the National Institute for Earth Physics Romania, several fortifications were scanned from above with the help of an UAV LiDAR sensor system, therefore highlighting relevant information and details about the topography of the scanned sites.

The archaeological research carried out on those fortifications indicated that some structures date back to the Early Bronze Age (4-3rd millennium BC), while others were erected in the Middle Bronze Age (2nd millennium BC), a fact which was also confirmed by the data resulted from the absolute dating methods.

The importance of the non-invasive investigations recently effectuated in the sub-mountainous area from the Eastern part of Romania, lies in the fact that these represent the first LiDAR scans of these Bronze Age fortifications and conclusive images about their topography were obtained. Therefore, a series of observations can be made about the social energies involved in the establishment of these defensive systems.

ID: 89996

Landscape Archaeology in Morocco

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KEYWORDS: **landscape archaeology, Morocco, hydraulic modeling, palaeoclimate, marine resources**



The Atlas Mountains in Northwest Africa (Morocco) form a natural barrier and watershed. The differences in precipitation between the area north of the Atlas (European precipitation levels) and south of the Atlas (desert climate) are extreme. These differences led to different ways of life in pre-modern times: agriculture and animal husbandry in regions with abundant rainfall and alluvial plains, and predominantly nomadic lifestyles in regions with little rain and dry soils. Hydraulic modeling based on digital elevation models is crucial for better understanding these different landscapes. This allows habitats to be quantified and ultimately qualified based on the size of catchment areas, precipitation levels, or index values. Additionally, historical reports, using Morocco as a case study, can provide valuable insights into ancient landscapes and landscape changes since antiquity.

Various methods are suitable for hydraulic modeling. For large datasets and spatial analyses, modeling using the open-source software GRASS GIS is particularly useful, allowing for the modeling of complex river systems. Here, a brief overview of the software methodology will demonstrate its capabilities and limitations.

By integrating the vertical and horizontal distribution of ancient sites, it is possible to reconstruct the ancient coastline. The Phoenician-Punic coastline from the Wadi Moulouya to the Wadi Draa will be modeled as a case study.

There is also the question of whether modern climate data can or should be used for studying ancient spaces. Paleoclimate reconstructions using mathematical models are possible and will also be demonstrated using the case study of Morocco. Additionally, the sea has played an important role in the location of ancient settlements. Rich fish stocks have always been valuable for producing trade goods such as Garum. In this context, satellite images of the sea are significant. The potential for utilizing the Copernicus Marine Service platform will be explored.

ID: 90689

MED.LAS (MEDiterranean Lidar Archaeological Survey): Unveiling Archaeological Landscapes: Integrating Drone and Lidar Technology in Forested and Mountainous Areas of the Mediterranean

GIUSEPPE PROSPERO CIRIGLIANO - IMT Lucca

KEYWORDS: **LIDAR, Mediterranean, Survey, Deeplearning, Archaeology**

This paper presents the results of an ongoing doctoral project titled MED.LAS (MEDiterranean Lidar Archaeological Survey). This research aims to identify a methodology and workflow applicable in forested and mountainous contexts in Mediterranean areas for archaeological purposes. The approach employed combines multiple remote sensing methods by utilising aerial drones in conjunction with terrestrial surveys. The study area is a hill chain characterised by dense vegetation typical of the Mediterranean scrub, which is composed of both high and low trees



and is located in the southern part of Tuscany (Italy), within the territory of the ancient city of Roselle (Grosseto). Here, a Lidar acquisition was conducted over an area of 550 hectares, with an average of ca 750 points/m² by the Emptyscapes project team during the winter season of 2021. The area, which shows an abundance of archaeological evidence from various historical periods, allowed for a diachronic approach to identifying archaeological features in the landscape. Specifically, the combination of aerial drones and Lidar sensors enabled us to obtain high-resolution and large-quantity data, requiring significant management efforts facilitated by collaboration among various professionals with expertise in different fields, such as archaeologists, computer scientists, and geomatics. The challenges associated with large datasets and semantic segmentation of point clouds have been addressed through the application of deep learning by enabling the development of an efficient workflow. This has yielded encouraging results that add crucial elements to the reconstruction of the historical narrative of the reconstruction of the historical narrative of the ancient landscape of Roselle/Tuscany.

ID: 89357

A multi-scale approach to the documentation of landscape through new technologies. The case of the Alpujarra (Almería and Granada, Spain)

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KEYWORDS: **medieval, Lidar, structure from motion, Spain, multi-scale**

New techniques for the three-dimensional documentation of the landscape have been an important theoretical and methodological innovation in Landscape Archaeology. In this paper we present the methodology used for the multi-scale documentation of the medieval landscape of the Alpujarra, combining different technologies, especially LiDAR and Structure from Motion photogrammetry.

The Alpujarra is the region situated on the southern face of the Sierra Nevada, located in the current provinces of Granada and Almería, in the southeast of the Iberian Peninsula. The high altitude of these mountains, up to 3,000 m, has conditioned the landscape and the way of life in the area up to the present day. During the al-Andalus period (Middle Ages), an intense rural settlement developed here, which included villages, cultivation terraces, irrigation networks and fortifications.

To understand the elements of this landscape and their evolution, especially the role played by the fortifications, a highly accurate multi-scale documentation was carried out. For this purpose, aerial LiDAR at the macro-spatial level was combined with aerial UAS-based Structure from Motion photogrammetric documentation at the micro-spatial level of the fortifications and their immediate surroundings.

The resulting documentation, of high quality and reliability, has served as support for subsequent spatial and material remains analyses. The versatility of these technologies and their combination opens up new paths for a multi-scale approach to the study of landscape and historical heritage.



ID: 90750

Perception, Interpretation and Projection: Funerary Architecture as a node between Geographic Landscape and Solar Cycle. Geometry and balance in a dual system

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KEYWORDS: **Funerary Architecture, Tomb, Landscape, Geometry, Solar Cycle**

This text aims to carry out systematic studies of the necropolises of Ancient Egypt to achieve a comprehensive understanding of the complete funerary landscape. The research intends to integrate disciplines for the collection of data generated by the excavations in a spatial language. To achieve this objective, the Landscape is considered a key resource, conceptualized as a continuum where material remains, forms and functions hatch to offer numerous readings where meanings from the past are condensed into the present. Consequently, the composition of the funerary space at all scales emerges as crucial for a spatio-temporal analysis, where the solar cycle and its geometry are transferable resources to apply into different locations in the Nile Valley.

Funerary architecture in Ancient Egypt, despite its differences, is conceived as a common project derived from the funerary ritual overlapped with the territory. It is suggested that the meaning of death and the tomb project arise from a shared geo-mentality translated into spatial language, where lighting becomes crucial to provide the space with a sacred character. Geometry serves as a link between implicit and explicit order, materializing the principles of Maat through the design of the numerous funerary complexes. Each of these is directly related to territorial conditions, geo-graphy and geo-metry, where solar projection influences all dimensions of the landscape. The fusion of architecture and environment resulted in an exceptional landscape as an essential means of expression and communication in a culture guided by a powerful symbolic imaginary, where the sun is the epicenter. Through the observation of the natural cycle traced and organized by the sun, the Egyptians developed a conceptual interpretation that transcended the landscape and space to the political-social and religious sphere, giving rise to the systematization of time and the civil calendar, currently active.

ID: 89673

New Methods of Archaeological Documentation: Advancements in 3D Techniques at Cucuteni – Cetatuie (NE – Romania)

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KEYWORDS: 3d documentation, public archaeology, lidar, photogrammetry, chalcolithic

The Chalcolithic culture of Cucuteni is renowned for its exceptional painted ceramics, showcasing remarkable artistic expertise. Equally notable are the remains of residential structures uncovered in archaeological excavations. Many of these constructions bear evidence of significant fire damage, leading to the vitrification of clay walls and floors. Despite this destruction, valuable insights into daily life and ancient spirituality are preserved within these remnants. However, accurately documenting these layers of destruction presents considerable challenges.

Fortunately, advancements in 3D documentation techniques have transformed the recording process, allowing for faster and more objective preservation of archaeological data. Our methodology begins with comprehensive 3D scanning of the site surroundings (UAV photogrammetry and LiDAR scanning) and non-invasive prospecting, providing essential context. We then meticulously document the layers of destruction within the archaeological trench, creating detailed 3D models (obtained through photogrammetry and mobile devices equipped with LiDAR sensors).

For our investigation, we chose to study a dwelling within the Cucuteni settlement of Cetățuia in northeastern Romania. This structure exhibits extensively burnt walls, collapsed over a suspended floor, which overlays a ground floor containing various artifacts such as loom weights and ceramic vessels. Without the assistance of photogrammetry, recording these materials in their original positions would have been challenging and time-consuming. The 3D models generated not only facilitate academic research but also serve as valuable educational and public engagement tools. Through a freely accessible online platform (ArcGIS Pro based), we integrate all collected data, including photographs, archaeological surveys (both invasive and non-invasive), and illustrations, employing a Public Archaeology approach to enhance accessibility and understanding of the site.

ID: 89904

The Application of LiDAR based 3D models as an aid to the interpretation of Hillforts - a case study

SIMON MADDISON - Institute of Archaeology, University College London

KEYWORDS: LiDAR, Visualization, 3D, Hillfort, Interpretation

LiDAR is revolutionising the recognition and interpretation of earthworks of all kinds and is particularly interesting for archaeological sites and features. A fundamentally important aspect in this is the removal of vegetation, exposing otherwise unrecognisable sites within woodland, for example.

Recently published techniques for processing LiDAR to generate different visualizations, such as the RVT tool, are a very powerful aid to human recognition and interpretation of archaeological features. Typically, this is used to generate a two-dimensional, orthostatic view.



The Digital Terrain Model (DTM) produced from LiDAR can be used to generate 3D models of the terrain, enabling different viewpoints to be seen. As trees and vegetation are stripped out, views can be generated that are not accessible in current reality. By draping different visualizations over this DTM, the 3D model can be enhanced beyond simple hill-shaded views.

This paper discusses this approach with particular application to a specific Hillfort in Wales, UK. The site lies on a riverine peninsula and has impressive ramparts to the south-west, more modest ramparts otherwise and an isolated rampart by the river whose function was not clear. It lies entirely within woodland. 3D modelling enabled the overall site to be viewed in different ways and makes clear that the Hillfort was designed to create a very strong visual impression when being approached both by land from the south-west, and by water up the river.

The tools for this method are readily available. LiDAR is also very rapidly becoming widely available from publicly accessible sources and can now be processed with modest effort. This paper presents a straightforward methodology and argues that it should become a standard technique in the study and analysis of Hillforts and other similar archaeological sites.



LAC 2024

NO-MAN'S
LAND? DEBATING
BORDERS,
BOUNDARIES,
AND FRONTIERS
AS AREAS OF
INTERACTION,
CONNECTION,
AND EXCHANGE
IN WESTERN
EUROPE
FROM THE
CHALCOLITHIC
TO THE IRON
AGE

SESSION 27



NO-MAN'S LAND? DEBATING BORDERS, BOUNDARIES, AND FRONTIERS AS AREAS OF INTERACTION, CONNECTION, AND EXCHANGE IN WESTERN EUROPE FROM THE CHALCOLITHIC TO THE IRON AGE

SESSION ORGANIZERS

PABLO SÁNCHEZ DE ORO

University Autónoma of Madrid

ANDRÉ TEXUGO

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What are borders, boundaries, frontiers, and other types of limits? Did they exist in the past? In that case, is it possible to identify them? And, furthermore, what was the role of these spaces?

These are some of the questions we would like to introduce in our session. From this point, our aim is to create a platform for the discussion of this phenomena in Western Europe from the Chalcolithic to the Iron Age. We have chosen this geographical area and this long chronology because they clearly allow to reflect about the evolution of borders—and its multiple synonyms—. Here, several changes occurred in the landscape and in the way the different communities interacted with it, especially in the issues linked to the organisation and the division of the space. These variations took place in a way which presents significant chronological and geographical contrasts, being, in that sense, the chosen framework a perfect setting for debate.

Moreover, we would like to delve into the polysemy of these spaces and its multiple and differential perceptions and meanings. But also in a practical sense, we pretend that the different participants will present distinct methodologies and case studies about the identification, the research, and the characterization of threshold points. So, we encourage the presentation of works about new methodologies, discussion about terminology and change, comparative studies, et cetera.



ID: 88712

Borders and territoriality in Nuragic Sardinia: the case of Trexenta

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KEYWORDS: **Bronze Age, Nuragic, Sardinia, borders, territoriality**

The Bronze Age Nuragic settlement patterns in Sardinia show a significant degree of diversity in different parts of the island, including clusters of nuraghi with buffer zones around them (Sedilo; Bonzani 1992), occupation focused on edges of highland plateaus (the plateau of Gesturi; Lilliu 1984) and more dispersed settlement (regions of Gallura and Sarrabus; Puggioni 2009, Namirski 2020). Relatively good state of preservation of Nuragic settlement networks allows to study the Bronze Age territorial organization in Sardinia (especially in the Middle and Recent Bronze Age), investigate relationships between settlement and ritual sites, as well as to detect probable borders between various territorial units. One of such cases is the area around the towns of Gesico and Mandas (Trexenta region, central Sardinia), where a large cluster of nuraghi with clearly distinguishable boundaries around its edges survived. A series of landscape surveys carried out by the author resulted in detailed recording of the Nuragic settlement network in that area. The aim of the presentation is to discuss the issue of borders and territorial organization in Nuragic Sardinia with particular focus on the Gesico-Mandas area, including comparison to different areas of the island and references to later prehistoric settlement in other Mediterranean islands.

ID: 89330

Fluctuating frontiers in the Late Iron Age northern British borderlands

MANUEL FERNANDEZ-GOTZ- University of Edinburgh

KEYWORDS: **Borderlands, Northern Britain, Late Iron Age, Roman Frontiers**

In northern Britain, the first centuries AD constituted a period of encounters between Late Iron Age populations and the Roman Empire. The territories extending from present-day northern England to southern Scotland became contested borderlands, in which the frontier line fluctuated over time and communities engaged in episodes of conflict, collaboration, and exchange. This paper will explore concepts of boundaries based on this northern British case study, which presented both physically demarcated frontier lines (Hadrian's Wall, Antonine Wall) and other, less visible spatial demarcations. The role of the inner and outer hinterlands with indigenous settlements and Roman military installations will also



be discussed. Finally, I will apply theoretical concepts from frontier studies in other disciplines and later historical analogies to better understand the northern British evidence, and how movement across boundaries was dynamic despite the erection of physical demarcations.

ID: 89543

Unravelling limits between Past and Present in Carpetania

PABLO SÁNCHEZ DE ORO - Universidad Autónoma de Madrid

KEYWORDS: **Boundaries, limits, frontiers, Late Iron Age, Carpetania**

One of the main research foci for Late Iron Age contexts is the one related to the extension of ethnical territories. In Carpetania (i.e. Late Iron Age Central Iberian Peninsula) this is clear. Here, following the Roman conquest, some frontiers were established. These have been maintained during all the Antiquity. As soon as the Renaissance, scholars started to get interest in this specific topic. Thus, they surveyed the possible extension of the Carpetanian territory, in a tendency which has been followed until present days.

In the past 40 years, external limits have been drawn following natural barriers (e.g. mountain ranges, rivers, changing landscapes, et cetera). However, it is of great interest the resemblance of the resulting territory with today provinces. A further step was taken by J. de Torres Rodríguez, who, in his PhD Thesis, stated that Carpetania was “a land without limits”. Next question is related with inner limits. Do they exist in Carpetania? Can we survey them? What differences do they present with the outer limits?

Our purpose is to review previous works and reflect about if it is possible to identify limits —both outer and inner— for this territory. For this aim we will use the classical sources, as well as possible territorial markers as highlighted settlements, architectural models, and archaeological materials.

ID: 89905

The use of spatial clustering techniques to identify ancient socio-political territories: a case study of British hillforts

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KEYWORDS: **clustering, hillforts, territory, spatial analysis, percolation analysis**

The ‘Atlas of Hillforts in Britain and Ireland’ (<https://hillforts.arch.ox.ac.uk/>) is a comprehensive database of over 3000 hillfort sites, primarily associated with the Iron Age. This rich source of data has been used to investigate the spatial distribution of hillforts in Britain and Ireland, using modern Spatial Analysis methods and Geographical Information System (GIS) tools.



Initial analysis focused on identifying groupings of hillforts, using a technique recently established in geography called Percolation Analysis. This is based on the Euclidean distance between sites. The analysis has produced some very interesting results showing clusters of hillforts that have distinct regional characteristics in different parts of Britain, and quite different ones for Ireland. These suggest possible ancient territories and how they might have interacted, with specific sites playing a connecting role. Using the sites' enclosed area as a proxy for importance has additionally identified possible territorial and hierarchical relationships between hillforts, within clusters.

The Percolation Analysis technique is briefly summarised, prior to presenting and discussing the cluster patterns that this has generated and the nature of their regional variations.

Some specific clusters in Britain have been selected for detailed discussion and are explored for possible territorial explanations and these are presented as individual case studies.

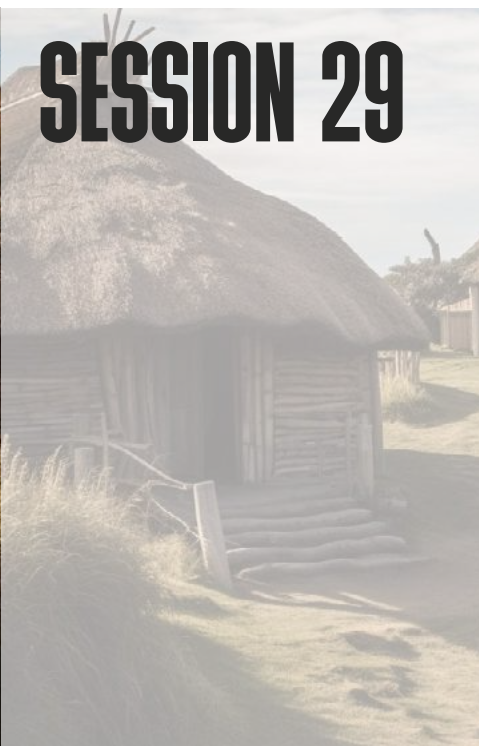
In conclusion there is considerable scope to apply this research approach further to develop understanding of possible socio-political territories during the Iron Age and other periods, based both on hillforts and other classes of archaeological site.



LAC 2024

AN EVOLVING
LANDSCAPE. AN
ANALYSIS OF
THE IBERIAN
RELATIONSHIP
BETWEEN
BUILT SPACE
AND MATERIAL
CULTURE (4TH-
11TH CENTURIES)

SESSION 29



AN EVOLVING LANDSCAPE. AN ANALYSIS OF THE IBERIAN RELATIONSHIP BETWEEN BUILT SPACE AND MATERIAL CULTURE (4TH - 11TH CENTURIES)

SESSION ORGANISERS

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This session presents an analysis of the Iberian relationship between built space and material culture from the 4th to the 11th centuries. The Iberian Peninsula witnessed significant cultural and political changes during this period, including the fall of the Western Roman Empire, the arrival of Germanic peoples, and the Islamic conquest. These transformative events had a profound impact on the region's built environment and material culture, leading to a dynamic and evolving landscape.

The session examines the interplay between landscape, built space and material culture, exploring how changes in one sphere influenced the other. It seeks to understand the ways in which landscape, settlements, and the culture materials evolved over time. Additionally, it investigates the social and cultural factors that shaped these changes, such as political power dynamics, religious beliefs, and economic factors.

To conduct this analysis, a multidisciplinary approach is employed, incorporating archaeological, architectural, and historical evidence. The session draws upon a wide range of sources, including excavations, architectural surveys, textual sources, and digital humanities. By examining this comprehensive dataset, the study aims to provide a nuanced understanding of the Iberian Peninsula's built and material culture during this period.

Additionally, the session aims to highlight the multifaceted nature of the relationship between built space and material culture. It recognizes that the construction of different types of settlements and landscapes was not only influenced by external cultural groups, but also shaped by internal political and social contexts. By analyzing these aspects within their broader historical and cultural contexts, the session hopes to provide a more comprehensive understanding of the Iberian Peninsula's past.



Furthermore, the session will contribute to the broader scholarship on Iberian history and archaeology by shedding light on a crucial period of transformation and cultural exchange. This period, spanning, witnessed significant changes in social, political, and cultural dynamics. Through an examination of built space and material culture, the session will offer valuable insights for archaeologists studying this region and time period.

In conclusion, this session will emphasize the importance of studying built space and material culture in Iberia during the 4th to 11th centuries. By analyzing the diverse influences, shifting contexts, and resulting microspatial powers, the session aims to deepen our understanding of the region's past.



ID: 90313

From villa to village: early medieval settlement patterns and domestic architecture in central and northwestern Iberia

CARLOS TEJERIZO- University of Salamanca

KEYWORDS: **Household archaeology; domestic architecture; settlement patterns; rural world; Iberian Peninsula**

The post-roman period in Western Europe has become the chronological centre of many historiographical debates. From those who highlight this period as the end of the Roman age, framed by Barbaric invasions and political turmoil, to those who consider it a rough patch within a long Late Antiquity. As always in the history of humanity, reality lies in a place in-between in which a dialectic between changes and continuities, seen through the prism of regional scale, becomes the common place for historical interpretation. All said, I may argue that in this balance, the post-roman period falls into the weighing pan of the change in most parts of Western Europe, and that this structural change can be seen in the archaeological record. This is the case of central and northwestern Iberia, where both the evolving landscapes and the material culture suggest the presence of deep changes. In this contribution, I will approach this characterization of the post-Roman transformation century as a moment of rupture and change from the point of view of three different sets of material record: the settlement pattern, household archaeology and the domestic architecture and pottery production and consumption. Using a comparative methodology and some key archaeological sites, I will reflect on how post-roman rural societies adapted and coped with the structural changes occurring at the macro-scale, pinpointing the changes in the structuration of the household which marks the beginning of a new world.

ID: 90088

Domestic space and the scale of the everyday. An analysis from a gender perspective

CELTIA RODRÍGUEZ-GONZÁLEZ- Centro de Investigación Interuniversitario das Paisaxes Atlánticas Culturais (CISPAC)

KEYWORDS: **Gender archaeology, Household Archaeology, daily life, Early Medieval Ages, Galicia**

One of the prominent challenges in the analysis of the period from the decline of the Empire to the Early Middle Ages lies in the absence of contemporary research on the domestic sphere in the northwest region. This lack of studies is justified by the paucity of archaeological data, a limitation that persisted until relatively recently. However, recent research has compiled an extensive body of archaeological



evidence, making it possible to observe in detail the everyday dimension of these settlements. This evidence reveals a dynamic domestic environment subject to change, immersed in post-Roman dynamics that indicate transformations in daily life. The aim of this proposal is to conduct an archaeological analysis of this space, highlighting the interconnection of everyday practices and the generation of social dynamics within it. For this we use the theory and methodology of gender archaeology and household archaeology, to try to see the daily life rural experience of societies in the early medieval past in various settlement of northwest of Spain.

ID: 90736

Landscapes on the move: Emerging Perspectives in the Study of Early Medieval People and Space

JULIO ESCALONA MONGE- Instituto de Historia - Consejo Superior de Investigaciones Científicas

KEYWORDS: **Early medieval landscape archaeology, Social theory, Social Complexity**

The contributions to this session represent a rich palette of approaches to the overarching theme of the relationship between early medieval societies and the spaces they recognise as their own. Over the past two decades, archaeological research has intensified in both Spain and Portugal, resulting in a rapidly growing body of fresh data that have the potential of challenging the established paradigms derived from the written sources. At the same time, scholars dealing with texts are also incorporating archaeology to their thinking. At this point, a window of opportunity is opening for superseding the traditional mutual incomprehension between both fields. I will contend that the only way we can do that is by reinforcing high-level social theory, at a level of abstraction that can work for both without submitting one to another. Such a theoretical scenario will need to accommodate three essential components: (a) Diversity as a structural dimension of the Early Middle Ages; (b) A sense of spatial, temporal and structural scale and scale change; (c) A redefinition of all dimensions under scrutiny (cultural, linguistic, political, economic, technological, environmental, etc.) in terms of social processes.

ID: 90284

Niches construction and the evolution of Late Roman settlement in the Lower Guadalquivir basin (SW Spain)

LUIS-GETHSEMANÍ PÉREZ-AGUILAR- University of Granada

KEYWORDS: **Niche construction theory, Non-Equilibrium Thermodynamic, Landscape Archaeology, Late Antiquity, SW Spain.**



For decades, Darwinian Archaeology has applied the Niche Construction Theory to understand sociocultural and environmental interactions. Combined with Non-Equilibrium Thermodynamics, it helps analyze settlement network evolution. In this presentation, apply these principles to study settlement strategies in the Lower Guadalquivir basin (SW Spain).

For decades, Darwinian Archaeology has applied the Niche Construction Theory to understand sociocultural and environmental interactions. Combined with Non-Equilibrium Thermodynamics, it helps analyze settlement network evolution. In this presentation, apply these principles to study settlement strategies in the Lower Guadalquivir basin (SW Spain). Between the 3rd and 6th centuries AD, rural settlement patterns fluctuated significantly. Historically, archaeologists focused on political, social, economic, and religious aspects, neglecting ecological factors. They aimed to correlate sociocultural evolution with human settlement dynamics, leading to an anthropocentric interpretative bias.

While human agency influences diversity in behavior and material culture, ecosystemic pressures also play a role. Evaluating past human communities resilience from a Darwinian perspective reveals objective outcomes rather than mentalistic interpretations.

After a surge in rural settlements between the 1st and 2nd centuries AD, a collapse occurred in the late 2nd to 3rd centuries AD. Subsequently, settlements increased in the 4th century AD, followed by a decline in the 5th to 6th centuries AD. This evolutionary process will be explored in the presentation.

ID: 88542

The Agrarianization in the Late Periods of Eastern al Andalus: The Huerta of Ontinyent (València) before the 13th Century

MIGUEL ROBLEDILLO SAIS- Universitat de València

KEYWORDS: **Uncultivated land, Plowing, Agrarianization, Irrigation, al-Andalus**

The *hışn* Untinyān (Ontinyent, València), dating back to the 11th century, likely emerged to oversee the surplus agricultural production of the communities in the surrounding countryside.

The *aljamas* had established an irrigation system that supplied water to the orchard spaces in the vega of Untinyān, situated amidst a landscape featuring extensive dry cultivated areas and numerous forested regions exemplified by ravines channeling their water runoff into the Clariano River.

Through a proposal involving a stratigraphic analysis of the landscape, coupled with the study of ceramics originating from archaeological endeavors serving as the primary chronological indicator, we suggest identifying the expansion of agricultural space during the 12th and 13th centuries. This expansion unfolded through the plowing of ravine areas stretching across the territory of the *hışn*, serving as sites for the extraction of raw materials and secondary products for the domestic economy of the local human groups.



With this study, our aim is to delve into one of the less explored themes in the historiography of Andalusí rural economy the utilization of uncultivated spaces or *mawāt* . Furthermore, we seek to demonstrate how demographic expansion and the reorganization of population in response to the Christian advances during the 12th and 13th centuries in Šarq al Andalus inevitably led to the expansion of agricultural space through the cultivation of uncultivated areas.

ID: 90772

Evolution of the territorial occupation in Islamic Elche and its surroundings. Interaction and evolution of the built spaces (8th - 11th centuries)

RAQUEL BUJALANCE SILVA- Universidad de Alicante, Instituto Universitario de Investigación en Arqueología y Patrimonio Histórico de la Universidad de Alicante (Inaph), (PRE2020-09372 en el marco del proyecto PID 2019-108192GB-I00)

KEYWORDS: **Elche, Islamic, landscape, materiality, evolution**

The purpose of this communication is to present the partial results of a research project that is currently being finalized, which aims to study the development of urbanism in Islamic cities in the southeast of the Iberian Peninsula and to contextualize it chronologically, taking into account their interaction with their closest environment.

This proposal focuses on the Islamic city of Elche and its surroundings. The comprehensive study of this city and the rural settlements in its vicinity, based on various sources and especially archaeological evidence, has yielded results of great interest regarding the evolution of the occupation of this territory, where the city will not always be the main focus.

The proposal analyzes the evolution of the occupation of the various rural settlements located near the site where the city will consolidate from the end of the 10th century and the beginning of the 11th century. This space will begin to be occupied in the 8th century, reflecting a complex network of small population centers related to each other that later, with the founding of the city, will start to fade, with the habitat area mainly concentrating in one place, the city. However, other settlements will be established that interact with the city. One of the main ones is coastal in nature, Santa Pola.

All these settlements are in continuous interaction, serving as links in a political and economic network that evolves and reestablishes itself over the centuries due to various social, cultural, political, and economic factors; which is reflected in the landscape through materiality.



ID: 88675

Making Visible al-Andalus. The Transformation of landscape between the 9th-11th centuries

SILVIA BERRICA- University of Alcalá

KEYWORDS: **Al-Andalus, Landscape, Materiality, Central Peninsula**

The present abstract focuses on how the Islamic presence in the central Iberian Peninsula during the 9th-11th centuries influenced the rural areas, and how this influence can be observed through material culture, architecture, and Muslim burials.

The Arab conquest of the Iberian Peninsula in the early 8th century resulted in the establishment of Al-Andalus, a Muslim-ruled territory that had a significant impact on the region cultural and social fabric. While much research has been conducted on urban centres, less attention has been given to the rural areas of the central Iberian Peninsula.

This study aims to fill this gap by examining the factors that contributed to the Arabs in the central Iberian Peninsula and their subsequent visibility through material culture. The main factors that determined their arrival in these rural areas were the strategic location of the region.

Through a detailed analysis of archaeological finds, including pottery, coins, and architectural remains, this study aims to shed light on the material culture of the Arab population of the central Iberian Peninsula. It will also investigate how the architectural style of Islamic buildings, such as mosques and domestic space, influenced the local landscape.

The findings of this study will contribute to a better understanding of the formation of Al-Andalus State in the central Iberian Peninsula. Highlighting the importance of material culture, architecture, and burials as visible markers of cultural change between the emirate and Taifa period.

ID: 88580

Landscapes of production and consumption in the southeast of the iberian peninsula in the early middle ages

VICTORIA AMOROS RUIZ- Universidad de Alicante

KEYWORDS: **Territory, Economic dynamics, Productive landscapes**

The work carried out in recent years at several key sites in the southeast of the peninsula (Tolmo de Minateda, La Alcudia and El Camino Viejo de las Sepulturas de Balazote) has allowed us to have a joint vision of urban and rural spaces between the 5th and 10th centuries in this area. Thanks to the data comparison, we have



verified that the production and consumption systems break with the classical conception of the early medieval economy based on local self-sufficiency processes where simplification is the primary characteristic of the productive systems. In contrast, relationships are detected at a regional scale, which tells us about a more complex production model, wherein in each habitat nucleus, productive strategies are adopted by their resources and needs. In these adaptive systems, we find different social, economic and cultural models, and the degree of simplification or standardization of these models will depend on the socioeconomic context in which each set is developed.

ID: 90745

Decolonizing landscapes, a transcultural approach

LAURO OLMO-ENCISO- Universidad de Alcalá

KEYWORDS: **Decolonizing landscapes, Otherness, Transcultural approach.**

The construction of the landscape by us, the observers, does not cease to be a mechanism of power to legitimize itself, but precisely because of this, the inclusion of otherness, of what is observed, includes the alternative narrative and reveals the gaps that much of the academic and political narrative hides and silences. Therefore, an interpretation from the landscape is revealed and claimed here, which includes a view from diversity, from otherness.

This critical position allows us to evolve from a hypothetical landscape constructed by the hegemonic official discourse and the academic and political distance that had appropriated a landscape interpreted as acculturated, but which was also a colonized landscape, where the main actor was not the landscape itself, the observed, but the observer constituted as the maker of an essentialist landscape. However, the plurality of the landscapes constituent elements, its structuring, its dialectical relations, its historical and social dynamics, its transformations, as well as a future not yet fully defined, lead to the updating and resignification of the landscape as a space and zone of encounter and perception of memories.

In conclusion, I argue here for the rupture of the model of landscape as otherness with which the historical narrative and the "reality" of heritage have been observed from the Western hegemonic construction of history and heritage.



LAC 2024

WATER USES
IN RURAL
ECONOMIC
ACTIVITIES:
EVIDENCES FOR
THE ROMAN
PERIOD IN
HISPANIA AND
THE ROMAN
WEST

SESSION 30



WATER USES IN RURAL ECONOMIC ACTIVITIES: EVIDENCES FOR THE ROMAN PERIOD IN HISPANIA AND THE ROMAN WEST

SESSION ORGANIZERS

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Water is an essential resource in any culture. During the Roman Era, the study of water often focuses on understanding its supply to cities, including its distribution through aqueducts and in public structures like baths. In rural areas, a similar process typically takes place concerning the provision of water to estates and the examination of bathhouses. However, the economic uses of water within rural economies are not scrutinized in sufficient detail. It is conventionally assumed that irrigation for crops emerged later during the Islamic period. Nevertheless, literary sources are replete with examples of these economic applications. The primary focus of this study is the inland region of the Iberian Peninsula, particularly between Extremadura, Spain, and Alentejo, Portugal, where evidence suggests the existence of a rural water-based economy infrastructure during the Roman Era without an apparent function. For instance, publications by Quintela, Cardoso, and Mascarenhas in the 1990s identify several Roman dams in significant estates, clearly associated with irrigation practices. In this session, we aim to explore the relationship between literary sources, these agricultural and other practices, and the archaeological reality. Additionally, we intend to provide an update on these archaeological sites using cutting-edge technologies. Therefore, the session's themes are organized into three key points. First, we will delve into the examination of these spaces and economies as described in literary sources, along with input from other experts, such as hydrological and geological studies to understand the potential for agricultural and livestock-related uses. Second, we will review both existing and newly discovered case studies where water played a role in rural economic activities. Lastly, we will assess these ancient and modern sites using advanced spatial tools, including remote sensing, non-invasive techniques, and Geographic Information Systems, to comprehend these areas better and propose new avenues for future research. This session will provide an up-to-date perspective on a highly relevant topic in the context of environmental studies. It aims to enhance our understanding of ancient rural economies by showcasing case studies and spatial analysis techniques.



ID: 89720

Water resources as a pole of economic attraction in the ancient world. Case studies on the Vía de la Plata (Spain)

BEATRIZ GONZÁLEZ MONTES- Instituto de Arqueología de Mérida (CSIC), *JOSÉ AVELINO GUTIÉRREZ GONZÁLEZ*- Universidad de Oviedo, *PEDRO MATEOS CRUZ*- Instituto de Arqueología de Mérida (CSIC)

KEYWORDS: **Economy, epigraphy, water resources, ritual**

Traditionally, water resources, especially since Roman times, have functioned as strategic places to be exploited in economic activities of all kinds: industrial, mining, agricultural, livestock or even ritual. In the latter, its use materializes, from an archaeological point of view, in the construction of certain structures (balnea, nymphaeums, fountains, sanctuaries) and in some objects (votive offerings, stypes, epigraphy) whose morphology adapts to all these types of production. However, one of the key questions is who manages these cultural centres, and what is their role in the rural economy of their immediate surroundings. In this regard, elements such as the patera of Otañes (Cantabria) – where a possible commercial cycle has been reflected – or inscriptions such as that of Boñar (León) seem to point to various realities: the Roman army, local landowners, religious elites, etc.

To try to delve into this problem, four case studies will be addressed, which are articulated around the Vía de la Plata. In the north, Oviedo with an unusual set of ancient and late antique hydraulic structures –both production and ritual– and León, specifically the territory of Boñar, where the presence of two balnea and the votive rock inscription to the sacred fountain made by an aquilegus stand out. On the other hand, in the south, the large bathing complex of Alange and its influence on the surrounding territory will be analysed. In contrast, there is Contributa Iulia, an example that allows a comparison between the rural and urban worlds, and where an important sanctuary consisting of a temple and a well has been recovered, in which an epigraph has appeared that links it to the cult of waters.

In summary, a reflection will be made on the influence of water resources, especially rituals, on the roman rural economy.

ID: 90660

L'Assut de l'Argamassa (Elche, Alicante): A Roman Hydraulic Structure in the ager Ilicitanus

JAIME MOLINA VIDAL- Universidad de Alicante, *DANIEL MATEO CORREDOR*- Universidad de Alicante.

KEYWORDS: **Hispania Tarraconensis, Roman economy, water uses, Irrigated landscapes, Stilla Project**



In the immediate surroundings of the Colonia Iulia Ilici Augusta, whose urbs is identified with La Alcudia (Elche, Alicante), lies l'Assut de l'Argamassa—a large hydraulic structure spanning the Vinalopó River, measuring over 100 meters in length and 4 meters in height. Its construction has traditionally been attributed to the Islamic period, although there are no material or documentary elements to support this hypothesis. However, a morphological analysis and the application of Optically Stimulated Luminescence (OSL) dating methods have unequivocally established its Roman origin. While the precise function as a regulatory structure for river flow remains open to discussion, it is highly probable that l'Assut de l'Argamassa is linked to colonial deduction and the productive organization of the ager Ilicitanus.

ID: 89932

Understanding landscape through water management in the suburban territory of Augusta Emerita

JESÚS GARCÍA SÁNCHEZ- CSIC, CARLOS CÁCERES PUERTO- Independent Resesarcher, SANTIAGO FEIJOO- Consorcio de Mérida, DIEGO GASPAR RODRIGUEZ- Consorcio de Mérida

KEYWORDS: Landscape archaeology, water management, Roman rural archaeology, remote sensing, Lusitania

In recent years, archaeological research in Roman Lusitania has seen new pathways of stressing environmental and landscape research with the traditional classic scope of Roman archaeology. Despite the abundance of research carried out in the region of Augusta Emerita, the capital of the Lusitania province, steaming from the fields of territorial analysis and spatial archaeology both linked to the French schools of thought. There has been little research on a topic of key relevance for understanding the impact of the new Roman foundations, the Dehesa-Montado landscape. The oak forest, termed Dehesa and Montado in Spanish and Portuguese languages, respectively, is conceived as a historical landscape that originated during the Neolith and survived until the day.

This paper will examine an area covered by this landscape north of the Roman city of Augusta Emerita from the optic of landscape archaeology and the results of a recent project that used non-invasive methods, such as field survey and remote sensing, to improve the understanding of historical occupation of this landscape. Moreover, we will examine the role of Roman damns around the city, known in the regional catalogue. We will explore the relationship of these damns with different realities in the countryside, such as areas of husbandry or agricultural production rather than domestic use. We will use remote sensing tools to characterise, namely, LIDAR data, better to understand this rural infrastructure position in the landscape. This research is the base for ongoing projects that will use further analysis as studies of the pollen record contained in these damns and machine learning applications to locate and characterise Roman rural damns in the Dehesa-Montado landscape in the South West Iberian Peninsula.



ID: 88515

Water Uses in a Suburban Agricultural Establishment in Northeastern Hispania: The Roman Villa of Pla de l'Horta (Sarrià de Ter, Gerona)

ANA COSTA- Arqueóloga Freelance

KEYWORDS: **aqueduct, pipeline, bath, fountain, Roman villa**

The water supply in any Roman establishment marked its prosperity and proper functioning. The ability to capture, transport, and distribute water within a Roman villa and how this precious asset was utilized, are factors of interest that help us understand the complexity of Roman engineering at a private level. The proximity of a reliable source of potable water was considered as a critical factor when selecting the location of a villa within the territory. Our case study focuses on the water cycle in the suburban settlement of the villa of Pla; Horta: the acquisition, circulation, and disposal of wastewater, the various uses thereof—otium et negotium—and its diachronic evolution from the establishment foundation in the late 1st century BCE to its abandonment in the 5th century. The main element to highlight is the private aqueduct that carried water from a natural spring to the rural settlement, where we find different channelized routes that ensured the arrival of water to both the residential area and the extensive productive sector. This villa not only offers us the possibility of analysing drinking water conveyance systems but also how they evolved over time: from the first channels dug into clayey soil, through trenches finished with masonry works, to terracotta tubuli or lead fistulae. We also have elements of daily life that allow us to verify the levels of comfort in this space located in the ager gerundensis: kitchens equipped with running water, bathrooms, a monumental garden fountain, etc. All of this, equipped with the corresponding waste and rainwater evacuation system, elements that outline the supply and sanitation system of the villa.

ID: 87475

The Use and Exploitation of Water in the Roman Villa of Pisões and Its Dam: Contributions from Geophysics and Topographic Analysis

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KEYWORDS: **Pisões-Portugal, roman villa, geophysical survey, roman Dam, topographic análisis**

The main problems of maintaining agriculture in Loess landscapes are erosion and drought. This is true for modern agriculture as it is for any historical period. The big difference is that today, we have big diesel-fed machines and hydraulic pumps to sort things out. However, there are clues that during the Roman Period and Early Middle Ages, the region of Picardie (Northern France) was able to produce bulk loads of agricultural products (possibly wheat) and exported this outside the region. So, the question is, how did they manage to cope with soil erosion and drought, which is so characteristic of this otherwise very fertile landscape? And how did they organize the agricultural landscape (and economy) to produce bulk goods in the first place?

This study focuses on the principles and possibilities of agriculture on hillsides that consist mostly of Loess, a fine-grained aeolian deposit. I will use a large dataset of settlement locations from the late Antique period to the Early Middle Ages to explore what characteristics of the landscape best explain the settlement pattern for the late Roman and early Medieval periods. By combining spatial analyses (GIS) with agricultural, geographical and socio-economic principles, I can draw conclusions on the organization of the landscape and the regional economy.

It seems that settlements are typically located where rainwater harvesting is optimal. The above-described settlement pattern would suggest that the landscape was organized to optimize agriculture while effectively mitigating the effects of erosion and droughts. But in a low-tech way, involving gravity-fed irrigation systems tailored to the local topography, allowing for surplus production. However, this pattern changes through time as particular places in the late Roman landscape are settled, and others during later periods.

ID: 89747

Research Methodology for the Management of the Historical Landscape of Water Wells

JOSÉ ANTONIO RUIZ GIL - Universidad de Cádiz, *JAVIER CATALÁN GONZÁLEZ* - Universidad de Cádiz

KEYWORDS: **Well, Landscape, Archaeology, History, Statistics**

In recent years, the escalating climatic stress, compounded by the notorious scarcity of fresh water in environmentally sensitive regions of the Bajo Guadalquivir, underscores the imperative to appreciate the historical insights provided by wells. Groundwater extraction points are frequently encountered during surface archaeological surveys, yet these valuable elements are often omitted in Archaeological Charts due to their continued utility.

Beyond the wells with historical documentation, the existence of undocumented wells necessitates consideration. These uncharted wells, not always current, can be



discerned through rational arguments. A fundamental classification distinguishes wells cited in archival documentation, bibliography, historical cartography, and particularly aerial photography. Building upon the premise that stone wells precede brick wells, we focus on historically or archaeologically documented stone wells. Additionally, the age of a well can be inferred from archaeological materials discovered. While such materials may span extensive time periods, they indirectly shed light on the historical activities within a specific location. This approach is tailored to the NW Cadiz province in Spain, leveraging abundant survey data we have previously published.

Our objective is to formulate a hypothesis exploring the possible association between the observed wells in the landscape and settlements, specifically of Roman origin, either surfacing or identified through excavation. This endeavor requires substantiating a discernible pattern, demonstrating that a notable collection of wells aligns with another significant set of distinctly Roman sites. By doing so, we aim to contribute valuable insights into the historical interplay between well utilization and Roman settlements in the region.

ID: 89864

Water and Roman stone working: Reassessing the hydraulic complex of Tanque dos Mouros (Estremoz, Portugal) in a landscape of marble exploitation

GIL VILARINHO- FCT; CHAIA; HERCULES; University of Évora

KEYWORDS: Tanque dos Mouros; Reservoir; Sawmill; Estremoz marble; Roman Lusitania

The water-related infrastructure constitutes one of the most recognisable elements of Roman technology and architecture, as sizable remains of often public and urban-related thermae and aqueduct bridges are conspicuously scattered across the Mediterranean basin and beyond. Comparatively, evidence of rural infrastructure tends to be not only more discrete but also often located on isolated areas, having thus received significantly less public and academic interest. In addition, water-powered technology has also for a long time been to some extent overlooked and rural aqueducts, dams and reservoirs have usually been associated either with human consumption or, more frequently, agricultural irrigation. Research undertaken in the past two decades has, however, been reassessing many of these rural infrastructures, providing new evidence not only for a widespread use of water-powered technology in the Roman world but also for its use in particular industries, such as stone sawing. In the Iberian Peninsula, the remains related to this activity have nonetheless been thus far elusive, arguably partly related to the frequent lack of interest for rural hydraulic infrastructure.

Emerging within the framework of the MARMORAT project and following a complementary approach that includes remote sensing techniques, literary and archaeological evidence this study aims to reassess the Roman-period reservoir



of Tanque dos Mouros. Based not only on new structural finds but also analysing its context on the wider quarrying landscape of Estremoz marble, it is possible to postulate some interesting hypotheses regarding the architecture, context and functionality of this rural hydraulic complex. Building on this case study, the supply and use of water in other Roman stone extraction and labor areas will also thereafter be examined, particularly analysing the available evidence for water-powered stone sawmills. Ultimately, this paper seeks to provide a better understanding on the use of water in Roman stone working landscapes.

ID: 89212

Roman Dams and reservoirs Systems in Lusitania: Question State with GIS and Spatial Data from the Alentejo Region

ANDRÉ CARNEIRO- Universidade de Évora, PEDRO TRAPERO FERNÁNDEZ- Universidad de Cadiz

KEYWORDS: **Roman agriculture, Lusitania, Alentejo region, Geographic Information Systems, irrigation.**

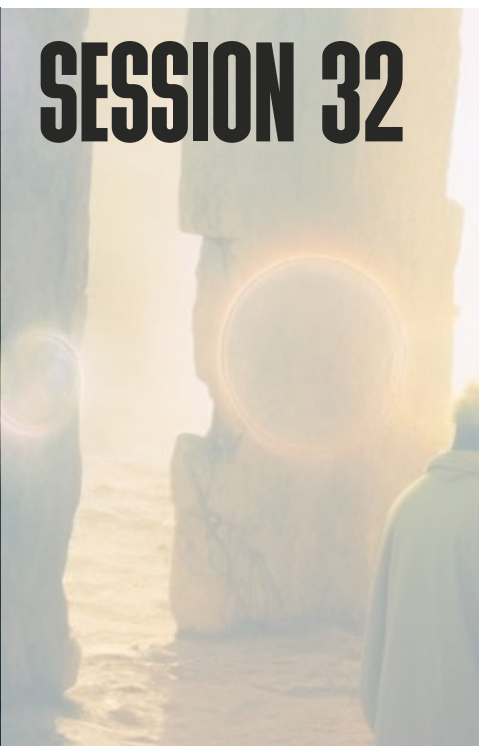
The understanding of agricultural practices in the Roman world is predominantly shaped by the preserved Latin agronomic texts authored by the elite, as well as by the uneven and partial archaeological information, primarily centred on notable discoveries and urban aspects. Generally, it portrays an agricultural system focused on the Mediterranean triad, characterized by limited technical innovation and a dearth of reinvestment for enhanced profitability. Matters like irrigation and intensive cultivation are typically relegated, historiographically, to different eras, such as the Middle Ages, which witnessed the advent of Islamic irrigation. Nonetheless, numerous agronomic sources expound on these practices, complemented by archaeological remnants like dams and reservoirs. This presentation offers an update on the research conducted by Quintela, Cardoso, and Mascarenhas in the 1990s within the Alentejo region, Portugal, encompassing a substantial portion of the Lusitania province. Utilizing Geographic Information Systems and available geographical resources, we propose a reevaluation of these elements, comprehending their immediate context and landscape, association with exploitation spaces, communication routes, and economic potential. We evaluate the feasibility of their application for various activities, notably irrigation. This study is supplemented by a scrutiny of literary references, delving into the Roman perspective on hydraulic works that necessitate potential investments, with a focus on benefiting cultivation, consumption, or diverse uses, including recreational purposes.



LAC 2024

ROCK ART AND
MEGALITHIC
MONUMENTS
AS KEY
ELEMENTS TO
UNDERSTANDS
THE LATE
PREHISTORY
LANDSCAPES

SESSION 32



ROCK ART AND MEGALITHIC MONUMENTS AS KEY ELEMENTS TO UNDERSTANDS THE LATE PREHISTORY LANDSCAPES

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Late Prehistory is the chronology (VI-II millennium BC) when territories began to be constructed and well defined. Rock art and megalithic monuments are key elements that have traditionally been used to define these territories. These archaeological manifestations have been analysed in terms of distribution, density and location in order to interpret landscapes with territorial identities.

Prehistoric rock art is a manifestation of past societies that provides us with a knowledge that goes beyond the simple study of the elements depicted on the panels. Nowadays, there are areas of research focused on how this art covered the territory and their relation with other contemporary monuments. There are also works that have developed around the documentation with new digital technologies. The data obtained through these researches has shown that rock art is not an isolated expression and its location shows how and why these societies have settled on the territory. Regarding megalithic monuments, they have traditionally studied from an architectural and typological perspective and their archaeological remains. Besides, the introduction of new non-invasive techniques, such as LiDAR data and photo-interpretation, has allowed a significant change, giving a prominent role to the landscape in which they are integrated. Data obtained show a richer and more varied archaeological record than expected where landscape plays an important role in the occupation dynamics. The application of new methodologies to rock art and megalithic monuments provides an essential line of research for the study of occupation dynamics, transformation and recognition of the territory in which they are inserted.

This session aims to gather researchers specialised in Late Prehistory landscapes that focused their research through these archaeological evidences. We would like to receive papers exploring any aspect of Late Prehistory landscapes including rock art and megalithic moments as a proxy. Thus, works with theoretical and practical approaches such as viewshed analysis, site catchment analysis or other terrain analysis, documentation and data collection, graphical markers codification and distribution dynamics are welcomed.



ID: 89970

Looking for answers: the radial archaeological survey of Minateda rock art site (SE Spain)

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KEYWORDS: **archaeological survey, radial model, Abrigo Grande de Minateda, archaeological surface assemblage, geographical information systems**

The study presents a case analysis within the realm of archaeological surveying, focusing on addressing an archaeological anomaly. Drawing from the historical context, terrain features, and primarily, the proposed hypotheses regarding proximity and visibility, we devised a comprehensive radial model for intensive archaeological surveying and complete coverage. The data collected was meticulously scrutinized and visualized utilizing GIS technologies, including kernel maps, proportional symbols maps, and viewshed analyses. Through our investigation, we were able to provide cultural material contextualization to a paradigmatic rock art site belonging to the Levantine art of the Mediterranean Arc in the Iberian Peninsula.

ID: 90516

Analysing territorial occupation through megalithic distribution in the middle Guadiana River basin landscape

ESTHER NAVAJO SAMANIEGO- University of Alcalá

KEYWORDS: **Megaliths, southwest Iberia, GIS, viewshed analysis, TPI**

This communication stems from a PhD research project focusing on the study of the occupation dynamics of tomb builders in the middle Guadiana River basin, southwest Iberia, during the 5th and 3rd millennium BC. Our main objective is to develop an interpretive model for the distribution of megalithic structures within the landscape, correlating it with the occupation patterns across various landscape units.

Southwest Iberia is well-known for hosting one of the highest concentrations of megalithic monuments in southern Europe. Additionally, developments in remote sensing technology have led to the discovery of an increasing number of prehistoric settlements, complemented by a growing body of graphic evidence from systematic studies in megalithic and rock art.

Therefore, we aim to present the initial results derived from processing, analysing, and interpreting data collected during a previous phase focused on identifying and



quantifying megalithic structures, followed by field verification. We also seek to explore the natural and cultural variables that may have influenced the distribution of megaliths within the landscape. We will use Geographic Information Systems (GIS) as our primary tool and we will employ various terrain analyses such as viewshed analysis and topographic prominence index, among others. Furthermore, we are interested in researching potential correlations with the prominent graphic markers found in the study area.

For this purpose, several examples from the study area will be provided, enabling us a better understanding of the megalithic landscape developed in the middle Guadiana River basin within the proposed chronology, taking Landscape Archaeology as the best approach and methodology to carry out our objectives.

ID: 89946

The relationship between megalithic monuments and rock art in mosteirô, ponte da barca, north-west Portugal

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KEYWORDS: Megalithic necropolis; open-air rock art; spatial analysis; photogrammetry; 3D Stop-motion.

This communication aims to present some of the megalithic monuments of the Mosteirô necropolis, namely those of Lapa da Moura/Chão dos Cabanos and Chã da Escusalha 2, the largest of the necropolis, and their interrelationship with the landscape, with other megalithic monuments and with open-air rock art sites. This necropolis is located in a mountainous area, on different platforms on the western slope of the Serra Amarela, in the municipality of Ponte da Barca, in the district of Viana do Castelo, north-west Portugal.

The methodologies used were non-invasive. GIS technology was used to analyse the spatial relationship between the megalithic monuments and the open-air rock art sites in the vicinity. For the architectural study of the monuments and their rock art, 3D models were generated. The Stop-Motion 3D model presentation format used made it possible to visualise the spatial relationship between the burial chamber and/or the engravings and paintings in a single three-dimensional space. The “megalithic art” and the open-air engravings were studied using photogrammetry. The paintings, when they existed, were studied using the Dstrech programme.

By combining these methodologies, we were able to study these monuments in some detail, realise how they articulate spatially with the other monuments in the necropolis and that their combination with rock art seems to indicate the existence of ancestral paths marked by different narratives. The methodologies used also make it possible to build a playful-didactic discourse, with an interesting and comfortable visualisation of the study area, through platforms that could be available online and/or in museum spaces.





ID: 90649

Schematic Rock Art in the central Iberian Peninsula. La Sierra de Los Yébenes (Toledo) as territorial model

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KEYWORDS: **Late Prehistory, Rock Art, mobility, transhumance**

The following work aims to develop a methodological proposal for the comprehensive study of Schematic Rock Art, taking the Sierra de Los Yébenes (Toledo) as a case study. The scarcity of reference works and the absence of systematic surveys in the inner Iberian Peninsula, coupled with the nature of this archaeological record, often pose more questions than answers. In this regard, typological studies that have been conducted since the beginning of schematic phenomenon research, while allowing the characterization of different motifs, still fail to provide such attribution unless through some parallel in portable art.

Understanding that attempting to comprehend the significance of these graphisms is an overwhelming task, this research aims at functional characterization through the Analysis of Visual Basins and Areas of Influence of shelters with Schematic Rock Art that share geographical space with various Bronze Age settlements distributed in the same mountain range, along with a Chalcolithic one in the valley of the Algodor River.

Several questions need to be posed about the role these graphisms may have played in the frequentation, transformation, and occupation of this border zone between the Middle Tajo Basin and La Mancha during the Prehistory Late. Is the absence of occupation, or at least minimal frequentation, during the Neolithic genuine, and what could be the cause? What is the reason for the limited representation of sites during the Chalcolithic, in contrast to the proliferation of settlements during the Bronze Age?

ID: 90497

Basaltic quarries as sources for megalithic monument construction: insights from the Menjez area (Akkar, Northern Lebanon)

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KEYWORDS: **Basaltic quarries, Geoarchaeology, Megalithic architecture, Building archaeology, Lebanon**

This paper focuses on the basaltic quarries used for megalithic building in the Menjez area, located in the Akkar region of Northern Lebanon. As part of the



MEG-A Project – “First megalith builders in the northern Levant” (2022-2025) – our work is to provide an exhaustive analysis of megalithic building techniques based on building archaeology methods and a geoarchaeological approach. This study led us to explore the supply chain for the raw materials used to build the megalithic monuments in this part of the Akkar. Through a combination of field surveys, geological analysis, and archaeological investigation, we aim to identify and characterize the quarries from which the builders sourced their basaltic materials. By understanding the sources of raw material and employing building archaeology methods, we seek to gain insights into the logistics, organization, and technological skills of these megalith builders societies.

This research contributes to a deeper understanding of the socio-economic dynamics involved in megalithic construction practices in the Menjez area and the wider Levantine region. It also emphasizes the importance of considering geology as a central element in our archaeological reading, offering a new perspective on the interactions between these societies and their landscape.

ID: 89419

Development-induced changes in megalithic landscapes and challenges of reconstructing prehistoric-Iron Age life. Investigations into the impact of dam construction on the megalithic remains in the Malampuzha reservoir region of Kerala, India

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KEYWORDS: J Babington, Kerala, Palakkad, Malampuzha, Iron Age- Early-historic period

Kerala megalithic burial monuments were first noticed in the writings of a British antiquarian J Babington in the 1819-20 period. Urbanisation and its associated effects have been threatening the continued existence of the megalithic remains. The present study details the effects of developmental projects on the monuments as also the way the megalith builders had used the landscapes for erecting the burial monuments and examines the connection between these and the habitation sites based on survey of sites in the Palakkad district of Kerala. People in the Iron Age- Early Historic phase (c. 1000 B.C to the early centuries of common era) had used both the uplands and plains for erecting them. The megalithic types found in the surveyed sites are menhirs, cists, dolmens, stone circles, hood stones, umbrella stones, rock cut caves, and urn burials. The grave goods found in the burials include a wide variety of tools and weapons in iron, pottery in various shapes and sizes and bones. The distribution pattern of the burials indicates that the megalithic communities had been widespread in Kerala. They had also achieved complexities in various spheres of life. The megalith builders had a strong basis in agriculture





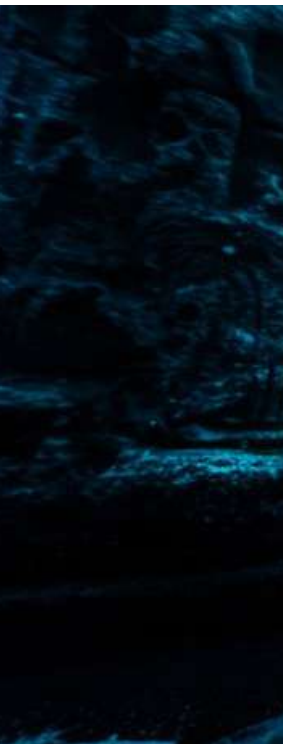
as is evident from the environs around the burial sites. Intensive field studies into the distribution pattern of the megalithic burials in the Malampuzha dam and its peripheries were conducted since 2019 for an indepth analysis of changes in megalithic landscapes. Post holes on rocky patches (granite and laterite) and tuyeres used for iron smelting in Iron Age were noticed during surface survey. Information on the rivers, streams, and the agricultural areas submerged after dam construction could also be collected from the official records from the 19th century onwards. A dozen prehistoric sites and 20 -odd megalithic sites were found in the study area.



LAC 2024

MARITIME
FRONTIERS:
INSULAR
LANDSCAPES,
AGENCY, AND
IDENTITY

SESSION 33



MARITIME FRONTIERS: INSULAR LANDSCAPES, AGENCY, AND IDENTITY

ORGANIZERS

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The archaeology of insular landscapes has focused on boundaries and borderlands. Often viewed as peripheral spaces defined in relation to their degree of isolation or interaction with the mainland, islands have yet to be analysed as landscapes of 'resistance' and 'opportunity'.

The power dynamics used in current models of interaction ascribes a passive role to islanders, while geopolitically-central regions in the neighboring mainland areas emerge as pro-active agents of change and interaction, of connections and disconnections imposed on island populations. Yet, the maritime frontier presented by insular landscapes bestows upon island communities hypermobility (when nautical technological solutions and knowledge have been developed), unbounded space, and access to seafaring networks that may extend across regions, three aspects that can nurture local autonomy and agency. Changing the focus from mainland to island, is it possible to explore insular landscapes as spaces of resistance or compliance defined by the agency of islanders?

A relatively new way of flipping the script in these terms has emerged in Southeast Asian scholarship through the concept of "zomia," popularized by James C. Scott in "The Art of Not Being Governed: an Anarchist History of Upland Southeast Asia" (2009). Although it originally refers to a large massif in mainland Southeast Asia whose elevated and rugged terrain has been home to minority groups that have historically avoided control and influence of states, "zomia" has now been redefined to describe regions whose geographic and environmental conditions enabled communities to craft their own social worlds while deliberately putting distance between themselves and systems of central authority.

In the preface to the book, Scott recognizes the need to expand the term to the maritime frontier, where societies could evade or stave off central authority equally, if not better than, in the rugged terrain of upland Southeast Asia. In this session, we want to pursue this discussion and examine the validity of shifting the narrative of island archaeology to one that is focused on agency, autonomy, and resistance of island communities. We invite papers that examine insular landscapes as zones of resistance and opportunity, exploring how the resources, the topography, and the environment of these landscapes may have been harnessed by island communities to develop a strong sense of independence and identity guided by their own agency. We also aim to explore the role of these spaces in their own right as havens in times of social and environmental crises, as places where communities could seek refuge, and where those newcomers could add, change, and develop landscapes and identities.



ID: 90707

Island ports and harbours as border spaces. The case of Sardinia (Italy) between the Middle Ages and the Modern Age

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KEYWORDS: **Archaeology, Sardinia, Border spaces, Ports, Harbours**

In addition to being commercial places, often analysed from the economic perspective or that of the settlements in which they are embedded, island ports can certainly also be considered border spaces. A frontier in two senses, in the first place between them and the outside world, but at the same time also an internal; border space in which conflict between different social actors is played out.

The subject of this contribution is the port areas of Sardinia, the second largest island in the western Mediterranean, in the period between the Middle Ages and the modern age, a period that coincides almost entirely with the domination of the Crown of Aragon on the island but in which the network of ports, landings and loading places is immersed in a complex political and administrative reality, with a large number of economic and institutional actors involved.

The aim of the paper is a reflection on how ports can enter the discourse as frontier places; in which to measure the conflict between local communities and the various political-economic actors involved in the management of ports and trade. In particular, starting from an interdisciplinary study involving the analysis of archaeological, cartographic and archival sources, the focus of the reflection will be on the possibility that the presence and activity of ports, but also the external planning linked to the possible establishment of new landings, may influence the environmental resource management systems implemented by local communities.

Is it possible to identify the material dimension of these conflicts? What changes has the presence of ports brought about in historical resource management practices? What changes in production activities? How are these changes reflected in the topography and landscape of the surrounding areas? What was the role of ports in the social life of local communities?



ID: 90806

Insular Connectivity – Autonomy and Interdependence in Viking Age settler communities on the Northern Isles of Scotland

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KEYWORDS: **Viking Age, Scotland, Identity, Insularity, Connectivity**

The Scandinavian Viking Age (AD 750-1050) society was pronouncedly maritime and expansive. Norse 'colonies' were established in many parts of the North Atlantic areas as well as in the east across the Baltic Sea from the Scandinavian Homelands. One such area is the Northern Isles of Scotland. From the 9th century we have evidence, most convincingly in the form of graves, of Norse people settling here. These graves are of distinctly Norse character, however, when studied in detail their common and most striking feature is a mix of grave goods originating from different geographical and cultural areas, such as Anglo-Saxon England, Ireland, Scandinavia, and the local Picts. Despite often being perceived as marginal, remote, and insular, the material culture of Viking Age Scotland suggests a profoundly interconnected society, actively celebrating its dispersed origin and ancestry. In this paper I will discuss the apparent contraction of isolation and accessibility that are present in island societies, and how these conditions can be utilised and manipulated by their inhabitants to establish autonomy. With focus on the Northern Isles of Scotland, parallels will be drawn to Island communities in the Baltic Sea, such as Gotland and Åland Islands

ID: 89930

Towards an Integral Management of the Fortified Maritime Cultural Landscape of Tierrabomba Island: Identity, Communities and Climate Change in Cartagena de Indias, Colombia

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KEYWORDS: **Maritime Archaeology, Fortified Maritime Cultural Landscape, Tierrabomba Island, Cartagena de Indias, Colombia.**





Tierrabomba Island, located in Cartagena de Indias (Colombian Caribbean), has historically been a strategic node for the socio-cultural dynamics of the entire bay that surrounds it to the north, east and south, and the open sea to the west of it. This island has a fundamental function in the configuration of what is called a “Fortified Maritime Cultural Landscape”, which has been analyzed from multiple perspectives, with the archaeology as a transversal axis, in recent years. Due to the historical trajectory of the city, and its relevance as a port for more than five centuries, the island played a particular role in the great events which marked the colonial geopolitics. There, the same local communities (that still inhabit the territory nowadays) were a key factor in the spatio-temporal continuity of the settlements subject of difficult environmental conditions. These challenges persist to this day against multiple factors, such as climate change, which are considerably affecting the Maritime Cultural Heritages and the communities that coexist and interact with them, integrating them as an essential part of their identity. In this sense, the goal of this paper is to present the different transdisciplinary, interinstitutional and multisectorial research approaches that have been formulated in Tierrabomba Island to understand its importance in the Fortified Landscape of Cartagena de Indias. This, considering a diachronic comprehension which allows understanding not only the tangible heritages that constitute this island and its landscape, but also those intangible ones that today persist in the territory and which are in constant risk of being affected by several conditions. Likewise, the way in which the communities have been articulated in a process of learning, research and protection, acting as generators of knowledge and producers of mitigation strategies for the short and long term is exposed.

ID: 90720

Ancient Interactions in the Maritime Peripheries of Northeast Asia and the Formation of a Hwandonghae Region

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KEYWORDS: Northeast Asia, Maritime Periphery, Hwandonghae (East Sea Rim) Region, Agency, Zomia

Located at the eastern end of the Eurasian continent is another ‘Middle Sea’ formed by the coastlines of present-day China, Korea, Russia, and Japan. As in the case of the Mediterranean, this sea can also be divided into two sections, located to the east and south of the Korean Peninsula. From ancient times, interactions in the western section have been structured predominantly by influences from the Central Plains of China, the ‘civilizing center’ of the greater region; the movement of people, things, and ideas has therefore tended to be one-directional, with political and ideological motivations playing a key role. Interactions in the eastern section, on the other hand, were of a different nature. From ancient times, the eastern coastal areas of the Korean Peninsula and Manchuria, and the western coastal areas of the



Japanese Archipelago have been peripheral, due to their geographic distance from China's Central Plains region, as well as due to their distance from the locales of central authority in their respective regions. Located beyond the sphere of direct influence of these central powers, the maritime interactions this eastern section therefore tended to be based upon the common needs of the local communities, and not the the agency of non-local groups. This paper traces the maritime interactions that took place around the body of water surrounded by the eastern coastline of the Korean Peninsula and Manchuria, and the western coastline of the Japanese Archipelago – known as the 'East Sea (Donghae).' It also explores how the nature of these interactions makes it possible to regard this region – referred to as the 'East Sea Rim (Hwandonghae)' region – as a maritime 'zomia' of sorts.

ID: 88522

More than Maritime

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KEYWORDS: Late Iron Age, Economy, Agriculture, Cultural Niche Construction Theory, Agency

Islands and coastal settings have often been assumed to be heavily reliant on maritime resources in prehistory, for obvious reasons. In my presentation, I challenge this assumption by presenting cases of versatile subsistence strategies, where agrarian practices have proven to be important aspects within the economy of the Late Iron Age (550–1050 CE) in the northernmost part of Europe. Northern Atlantic islands, such as The Shetlands, Orkneys, Faroe Islands, Iceland, and Greenland, have often been understood as driven by opportunism – turning resources such as whale bones and walrus tusks into commodities and selling these in external markets. However, this is only one side of a two-sided coin. The other side depicts agrarian practices, which also played an essential part in the Late Iron Age economy and have, as I argue, been somewhat overlooked in studies of these islands' economies. I provide examples of versatile resource utilisation from the Åland Islands (Finland) in the Baltic Sea and compare this with the Atlantic Islands, as well as coastal settings of neighbouring mainland Scandinavia during the Late Iron Age. I argue that there is a need to acknowledge all economic aspects of these areas to better understand the versatile subsistence in the northern Iron Age, avoiding a focus on the extraordinary – which could risk leading to a form of “exotification” of islands and other types of non-typical agrarian regions. I argue that the economic orientation of the Norse population most of the time relied on versatility, where the climate, natural resources, and geographical placement, combined with human agency, resulted in various cultural niches.





ID: 88906

The resilient social world of a volcanic landscape in central Vanuatu, southwest Pacific

ROBERT HENDERSON- The Australian National University, *STUART BEDFORD*- The Australian National University, Max Planck Institute, *SALKON YONA*- Vanuatu Cultural Centre, *JACK SARGINSON*- Burumba Community, Epi Island

KEYWORDS: **island archaeology, resilience, volcanism, interaction and exchange**

Pacific societies emerged among a “sea of islands” – a vast oceanic universe connected by equally expansive networks to facilitate movements of people and the exchange of materials and ideas (Hau’ofa 1993) [1]. In this universe, the sea acts not as a barrier separating distant islands, but as a conduit between skilled sea-faring communities. This view serves as a prism through which to explore ideas about ‘insularity’ in a way that counters perceptions about island life which have developed in other parts of the world, particularly in continental settings. Here we explore an example from a volcanically active region of central and north-central Vanuatu, in the southwest Pacific, where maritime networks between communities promoted the development of a resilient social world. We present on recent field work carried out on Epi Island in 2022 and 2023 which has yielded insight into the relationship between these networks and the long history of volcanism in the region, including the catastrophic Kuwae eruption of the mid-fifteenth century AD. [1] -Hau’ofa, E. (1993) Our sea of islands. In E. Waddell, V. Naidu and E. Hau’ofa (eds.) A New Oceania: rediscovering our sea of islands (2-16). Suva: School of Social and Economic Development, University of the South Pacific.

ID: 89938

From the ashes they rise: crafting insular resilience and group identity in times of environmental catastrophe

VERONICA WALKER VADILLO- University of Helsinki

KEYWORDS: **Åland, Baltic, Climate Change, Island, Coastal**

In the mid-6th century AD, the Nordics experienced major societal and cultural changes following a prolonged volcanic cooling and subsequent plague pandemic. Demographic decline is obvious in many regions of the North. Meanwhile the Åland Islands, a large archipelago in the Baltic Sea, experienced an unprecedented boom in population, an event attributed to the arrival of climate refugees from the mainland. Applying a Socio-Ecological Systems approach that studies the dynamic interaction between humans and their environment, this presentation will discuss how Late Iron Age populations in the Åland Islands maximized the archipelago’s resources, transforming their identity in the process. The presentation



examines how the ecological resources, and the geography of the islands allowed this booming population to develop a highly resilient subsistence strategy that not only sustained newcomers, but also allowed them to thrive and develop new societal structures and cultural traditions. While the archipelago has traditionally been assigned a peripheral role, in this presentation we examine how this climatic anomaly may have served as a conduit for the transformation of Late Iron Age societies seeking refuge in the islands, taking full advantage of the opportunities that the island space provided to them. We conclude the presentation by exploring the concept of Zomia within the Ålandic context, and whether the insular landscape of the region served not just as a haven in times of climatic uncertainty, but also as a regenerative space where islanders could redefine and transform their own social world.



LAC 2024

OPEN
SESSION

SESSION 34



OPEN SESSION

SESSION ORGANIZERS
SCIENTIFIC COMMITTEE

This is an open session for all attendees who are interested in the general themes of the LAC2024 but feel their contributions do not clearly fit with any of the accepted sessions.

In this session we try to accommodate all those researchers who are interested in presenting the progress or results of a specific project that is related to the themes of the conference.

The conference themes are:

- Mobility, settlement and people: an environmental approach
- Places, people and identity: a conceptual challenge for Landscape Studies
- Space vs site: human dynamics in landscape.
- Cutting-edge technologies and theories: a new perspective from Landscape Archaeology
- Knowledge transfer and local communities in Landscape Studies.
- Landscape heritage values
- Climate change and ancient natural and human-shaped landscapes: interdisciplinary approaches
- Landscape Archaeology: visual and virtual perceptions
- Landscape Archaeology and Landscape Ecology



ID: 90673

Testing settlement models in the Late Antique Egypt landscape of the Thebaid

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KEYWORDS: **Egyptian landscape, Coptic church, iconoclasm, GIS-Based análisis**

The story of religion in Roman Egypt was dominated by the triumph of Christianity at expense of pagan religion. Generally studied in binary terms, the decline of the old gods of Egypt had its own dynamic away from the orthodox Church. Indeed, there were material signs that all was not well with the Egyptian paganism before Christians had achieved the religious control of the Empire. And Thebes, the old capital, is an excellent example of that.

Since the middle of the third century the hieroglyphic and Greek texts on the walls of temples showed a very low quality work. For thousand years, pharaohs and Ptolemaic kings had recorded their involvement to the restauration and embellishment of temples as a sign of wealthy cultic activity. This legacy continued under the Roman Empire but at a speedily declining rate. At Deir el Medina there is nothing later than Domitian; at Philae of Caracalla; at Esna of Decius. So, it is difficult to avoid that the imperial support for decoration of Egyptian temples drop after Tiberius, shrank after Hadrian and fade away with Constantine.

This communication will give a panoramic view of the sunset of institutional Egyptian and Greco-roman religion through the study of the pagan temples in the Thebaid and how this was related with the outset of Coptic Church. Furthermore, through the historical analysis it will be reconsidered the historiographical phenomenon of the abandon, destruction, and Christianization of pagan temples and which are the new archeological perspectives for its study.

ID: 89131

A landscape and environmental study of historic charcoal production in West and South Yorkshire

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KEYWORDS: **Charcoal Production, Ancient Woodland, Landscape Survey, Geophysics, Remote Sensing**

Charcoal has been an important fuel resource since at least the Iron Age, largely fuelling the iron and steel industries up until the industrial revolution of the 18th century, before being replaced by fossil fuels. The fuel has also been important for the textile industry, heating, cooking, as well as for other applications. Despite its importance in society, the archaeology of charcoal production within the UK has



received limited archaeology attention compared to its European neighbours, with investigation relating principally to the identification of individual charcoal burning platforms during chance woodland surveys. These surveys are often associated to the development of woodland management plans, or as part of short-term community or research projects.

This paper summarises on-going White Rose College of Arts and Humanities funded PhD research at the Department of Archaeology, University of Sheffield which takes a multi-disciplinary approach to the investigation of charcoal production sites within South and West Yorkshire in England.

Utilising traditional woodland survey techniques, remote sensing, historic map regression, historic archives, place-name evidence, geophysical survey, trial excavation, charcoal and pollen analysis, and radiocarbon dating, this research aims to improve the understanding of the charcoal industry in the region.

This integrated research aims to examine the distribution of the charcoal industry across the study area, whilst serving to assess the characteristics of charcoal burning platforms. Excavation also highlights patterns of fuel selection choice and woodland management; narratives of woodland character change; and a chronology of charcoal production at five case-study locations.

This presentation will focus on the multi-disciplinary approach, including the use of geophysics, to understand the distribution of the charcoal industry within South and West Yorkshire.

ID: 90628

Historical landscape and cultural enhancement. Integrated methods and technologies for the study and promotion of the middle ages in the verbanò area

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KEYWORDS: verbanò area, medieval landscape, cultural heritage, integrated methodology, gis

Since 2018, our research group, supported by a network that includes the Archaeological Group of Mergozzo, the competent Soprintendenza, the Universities of Pavia and Turin and many local institutions and foundations, is working in the province of Verbania (Northern Piedmont, Italy) with the project Romanesque Itineraries.

The project, which has so far led to the publication of two monographs, the setting up of an exhibition and the organization of several public talks, aims to study and enhance the Medieval historical landscape of the Verbanò area, defined by the natural boundaries of Lake Maggiore and the Pre-Alpine elevations, starting from the analysis of the numerous still preserved Romanesque buildings (X-XII century). Each building is analyzed not only as an individual site but, above all,



as an expression of a broader historical, social, political and economic framework, which is linked to the dynamics of settlement and exploitation of the surrounding natural resources.

This territorial study is led with a multidisciplinary method and has been designed for a dual use: scientific and tourist. The research methodology combines historical, artistic and architectural analysis to the stratigraphy of elevations, relating them, whenever it is possible, to archaeological excavation data; it also makes use of photogrammetry and 3D modeling, as well as GIS technology.

This contribution aims to present how we are studying the Romanesque sites of the Verbano area in relation to the landscape and the historical roads through the use of GIS technology. The goal is developing immersive and active paths for enhancement and fruition. These itineraries are meant to guide users in the discovery of the complex landscape, social and cultural system for which Romanesque sites were thought and built.

ID: 89384

‘Between culture and nature’: the Archaeological Park of El Julan and the heritage potential of El Hierro, Canary Islands (Spain)

GLORIA MARÍA PÉREZ NOVILLO- Complutense University, Madrid

The island of El Hierro (Canary Islands) is a geographically uneven territory with a complex geology, which have generated a series of ecosystems of great environmental value; internationally and nationally recognized. Its location, being the southernmost island of the Canary archipelago, has resulted in a certain isolation, leading to the existence of a low population density. This is one of the reasons why its natural environment has remained relatively intact over time and has provided it with very important declarations of protection: Biosphere Reserve (2000). All this has generated a very strong awareness among the local population, who have understood the importance of conserving their physical environment, but ironically have “forgotten” the cultural and human factor associated with it. This reality has meant that the landscape associated with the Archaeological Park of El Julan is highly valued and its purely historical or cultural elements are overshadowed, instead of both aspects being addressed as a whole.

As a result of the fieldwork carried out in 2022, part of the research project ‘preliminary assessment for the creation of a diffusion system for the Archaeological Parks of the Canary Islands, it has been possible to understand the differentiated treatment that the island heritage sites receive according to their cultural or natural values, with a special emphasis on the treatment given to the Archaeological Park of El Julan. However, international institutions have put forward a series of methods for the management of the heritage sites, such as the Biosphere Reserves, which aim to combine both aspects (cultural and natural), as they are inherent to a territory.



ID: 90269

“From LiDAR to Legacy”: Mapping the Archaeological Landscape of the Topolog River Valley (Romania)

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KEYWORDS: **landscape archaeology, landscape analysis, GIS, Iron Age**

Large infrastructure projects offer a unique opportunity for thorough documentation of impacted areas. In the Topolog River Valley (TRV), this is particularly valuable due to its historical significance and limited previous assessment. The study focuses on understanding past habitation patterns and cultural development, emphasizing the TRV's importance as a distinct geographical-cultural unit within the broader regional context.

With a temporal focus on the end of the first Iron Age, specifically the Ferigile-Bârsești cultural group, the study examines settlement patterns and spatial organization. A multidisciplinary approach, including LiDAR data, aerial photographs, and magnetometer surveys, ensures a comprehensive landscape analysis and identifies archaeological sites.

The ongoing research has identified six new archaeological sites and three areas of potential interest, expanding the TRV's archaeological map. Spatial analysis aims to understand ancient community behaviors, shedding light on interactions with the environment and each other.

Furthermore, data collection facilitates landscape archaeology, integrating historical datasets into a GIS complex database. This will update the heritage map, supporting affected communities by documenting landscape changes over time. Overall, the study contributes significantly to understanding how the TRV was inhabited and organized during the First Iron Age, providing insights into past cultures and their interactions with the landscape.

ID: 90295

Two worlds apart? Contested biocultural connections across the Icelandic and Sicilian landscape heritage

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KEYWORDS: **Biocultural heritage, Nature-based solutions, Iceland, Sicily, Contested worldviews**



Neo-liberal and Late Capitalism ideology can be considered an ontological force that consumes and squashes any realm that falls outside it. Any ontological difference is thus a threat to be engulfed, but the vibrancies of such a collapse still remain. This metaphor encapsulates two keys for this paper: 1. Capitalism imposes itself –colonises– previous historical realities, and 2. These realities form archaeological heritage that tells alternative stories—they contest the hegemony. Our proposal applies this framework to explore the pluriversal biocultural dimensions of landscapes by bringing world archaeology examples from the Mediterranean (Sicily) and the North Atlantic (Iceland). Seemingly two worlds apart, these examples are connected by the contested essence of their landscape heritage. Turf architecture is probably the most iconic Icelandic feature, whereas irrigation systems represent an important archaeological feature of the Sicilian landscape. Both elements can be harkened back to the Middle Ages, the former developed during the Icelandic Viking period and the latter stemming back to at least the Sicilian Islamic period. In our present, however, such heritage is either forgotten or mostly considered against modern progress (Hafsteinsson, 2019; Martín Civantos et al., 2023). This paper seeks to reinvigorate and connect them by assessing their socioeconomic and biocultural significance. We argue that these heritages are valuable for our present because they represent alternative approaches to the present logic in two spheres: how humans relate to humans and how humans interrelate with non-humans. Moreover, these alternative ontological approaches can be of aid in mitigating the current human-driven climate change: they can be considered as nature-based alternatives to the logic of intensive and ‘modernistic’ mode of production.

ID: 89103

Settlement Diversity: 3000 years of History in Menjez, Lebanon

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KEYWORDS: Megaliths, aerial photographs, orthophotographs, 4th-3rd millennia BCE, Lebanon

This paper discusses the preliminary findings from the project “Megalith Builders of the Northern Levant: An Interdisciplinary Investigation of the Archaeological Landscape of Akkar (Lebanon, 4th-3rd millennia BCE).” Overall, this project examines the lasting monumental and environmental impacts that ancient megalith builders had on the surrounding landscape in the mountainous Akkar Governorate of Lebanon. Specifically, this paper focuses on the initial findings of the digital agricultural landscape survey and the archaeological excavations of terraces, path and megalithic structures in the municipality of Menjez, Lebanon. Through a comprehensive archaeological investigation, we have gained valuable insights into the environment in which these builders operated and constructed impressive megalithic structures. This project utilized a range of data sources,



including historical aerial photographs from the Lebanese army and modern orthophotographs of areas containing megalithic structures dating back to the 4th-3rd millennia BCE in the Menjez municipality. Paired with the archaeological context provided by the excavations of terraces, path and megalithic structures in the municipality, the data acquired has shed light on the surroundings and challenges ancient megalith builders could have potentially faced.

Incidentally, a wildfire ravaged five hectares of land north of the Menjez municipality on October 22, 2022, and provided a unique opportunity for further exploration. This fire permitted for greater aerial visibility, and coupled with the subsequent excavations of structures, has allowed for a more in-depth typo-chronological analysis of the landscape. These investigations have enriched our understanding of the ancient settlements, offering a deeper perspective on the lives and practices of the megalith builders.

ID: 91663

Analyzing the landscape archaeology of the Susiana Plain during the 7200 to 4000 BCE through paleoclimatological evidence

BIJAN BAJOORVAND- University of Tehran

KEYWORDS: Susiana plain, settlement patterns, Holocene, paleoclimatology, landscape archaeology

The formation, expansion, displacement, and abandonment of archaeological settlements are influenced by various natural and human factors. The Susiana Plain in the northern part of present-day Khuzestan Province in southwestern Iran is one of the earliest archaeological regions in the world that has been subjected to systematic and new archaeological studies since the 1960s due to agricultural development schemes in southwest Asia, aiming to preserve its sites and archaeological information. These archaeologists, who often engaged in studies and field research using new approaches and methods in the Susiana Plain, produced valuable information on the formation, displacement, and overall settlement patterns of the plain from the earliest prehistoric settlements to historical and Islamic periods. During the studied period, changes and shifts in settlement patterns in the Susiana Plain in various prehistoric phases are traceable, and the causes have been investigated by many researchers with different approaches in archaeology, geoarchaeology, and archaeological surveys. Studies conducted, with minor discrepancies in results, generally agree on the changes in settlement patterns of the plain in different phases. Interestingly, the onset of settlements growth in the Susiana Plain and the peak number of settlements during the prehistoric period (6500-4000 BCE) occurred in the early and middle Holocene (9200-6300 years ago). Here, we aim to examine and study climatic changes during the Holocene period on a large geographical scale, encompassing all ancient paleoclimatological studies conducted primarily in western Iran and neighboring



regions with western Iranian borders such as Turkey and Iraq. By analyzing these studies based on over 50 years of archaeological evidence in the Susiana Plain, we seek to investigate whether the climatic changes during the Holocene period have significantly influenced the formation and displacement of settlements in the Susiana Plain during prehistoric times or not? and if so, how?



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ID: 90731

We Are But A Part of This World: Tracing Human-Environmental Entanglement from the Middle/Late Pleistocene through the Holocene. (PhD Dissertation)

ANDREA PINTAR- Vrije Universiteit Amsterdam, SJOERD KLUIVING- Vrije Universiteit Amsterdam

To better understand the environments that humans are a part of, not separate from, what if people considered landscapes as a collective of agents, engaging with one another in a multitude of ways, contexts, and differing spatiotemporal scales? The doctoral dissertation presented here uses an integrative review of (bio)archaeology, geology, anthropology, earth science, folklore, and other disciplines to challenge the Biography of Landscape framework and investigate the complex web of human-environmental entanglements. The result of this thesis is the creation of three M/L. Pleistocene – Holocene “living biographies.”

One Arctic, Many Stories (Beringian & Greenland Arctic): This narrative utilizes a dataset with a heavy focus on folklore and Indigenous archaeology to create a supra-regional biography which combines social archaeology theories and calls to reintegrate Indigenous histories and archaeology. The focus here is on the human perspective.

Palaeolandscapes, Sacred Places, and Geomythology (Fennoscandian Arctic): The Fennoscandian narrative pushes the limits of the traditional landscape biography through deep geologic time, transcending anthropocentric ideations of landscape, engaging with non-human environmental agents as creators of eco-narratives. Understanding human interpretations of such eco-narratives involves linking Sámi sacred places and Nordic folklore with geomythology to highlight potential ways Weichselian and Holocene landscapes may have shaped people’s perceptions, actions, and emotions for millennia.

A Tale of Two Rivers, The Rhine-Meuse Delta (Central Netherlands): The chronostratigraphic (Saalian-Eemian-Weichselian-Holocene) narrative is told from the perspective of the Rhine-Meuse system as collectives of agents, using “we narratives” (Caracciolo 2020), challenging ideas about non-human biotic and abiotic (e.g. sediments, water, ice) agency. Ending with “Humans of the Riverlands,” the narrative examines the intersecting drivers in Palaeolithic human expansion into interior parts of the Dutch river area, especially connected to the dynamic fluvial and marine drainage networks which heavily shaped the now inundated “Doggerland” (S. Bight of the North Sea).

ID: 90746

Contesting the role of economic drivers and responses in historical energy regime transitions; drivers or consequences?

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Change and Sustainability at Universidade de Évora, Departamento de Paisagem Ambiente e Ordenamento at Universidade de Évora, **CÉSAR BORJA BARRERA**- Facultad de Geografía e Historia at Universidad de Sevilla, Asociación Española para el Estudio del Cuaternario AEQUA, **PABLO FRAILE JURADO**- Facultad de Geografía e Historia at Universidad de Sevilla

As early as the appearance of productive economies in European agrarian societies along with the Neolithization process (starting ca. 9,000 cal BP), trade and exchange networks were developed and organized between European communities. These economic systems allowed agrarian societies to develop further into always more complex political entities, draining power from successful economic trades. However, the Holocene prehistory and history shows a great number of rising and falling societies. Such societal evolution is also reflected in the economic systems. Both economic and societal trends in Europe were investigated through the lens of Energy Regimes. The framework of Energy Regimes is a functional societal approach independent from time series and cultural successions that considers patterns of resources and energy use. Hence, it represents a valuable tool to explore the evolution of past economic systems, which were very often centered around key materials (ie. obsidian during the Neolithic, copper during the Bronze Age, etc.). Five major economic transitions were identified and closely related to changing Energy Regimes: 1) Incipient trade networks during the Neolithic, 2) the Atlantic Koine network during the Middle Bronze Age, 3) the Roman network during the Roman Period, 4) the Globalization of the economy during the Colonial Period, and 5) the Industrial economy from the Industrial Revolution onward. Quantitative data of population growth, human impact on the landscape and energy use were analyzed and compared through all five transitions in order to document the effects and consequences of each transition. This approach allows direct comparisons between past energy regime transitions and our current transition toward low carbon societies. Thus, it represents one possible and concrete way to 'learn from the past' in order to inform present-day land-use policies and management offices that are facing energetic and economic challenges in transitioning toward low-carbon societies.

ID: 90753

The landscape may not have been as species-poor in the Ice Age as previously thought – a new hypothesis for Central Europe

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The dominant paradigm about the Quaternary history of Central European landscape says that ecosystems were repeatedly impoverished by regional extinctions of species during the Ice Age glacial periods followed by massive recolonizations from southern refugia during interglacial periods and the Holocene. Recent scientific advances support our new alternative hypothesis, the Flora Continuity Hypothesis, which states that the flora could survive even the coldest periods of the Ice Age in the Carpathian Basin, and the Ice Age landscape may not have been as species-poor as previously thought.

In order to establish this hypothesis we synthesized recent advances in paleoecological, paleoclimatological, ecological, and phylogeographic research, and the long-term history of the flora of the Carpathian Basin. We also analyzed the cold tolerance of the native flora of a test area (Hungary, the central part of the Carpathian Basin). We extracted species occurrence data from the Global Biodiversity Information Facility database (<https://www.gbif.org/>) for 18 reference areas in Europe and Northern Eurasia and the percentage overlap between these and the list of native Hungarian flora was calculated.

We found that many species have likely been continuously present locally since before the Last Glacial Maximum (LGM) period, and most of the present-day native flora (ca. 80%) can occur under climates as cold as or colder than the LGM (mean annual temperature $\leq +3.5^{\circ}\text{C}$ MAT). Our results show that habitats (especially grasslands and forests) may have been similarly species-rich under the coldest climate of LGM than today and long-term and massive flora continuity is more probable than LGM extinction followed by postglacial recolonization in the Carpathian Basin.

The long-term continuity of Central European regional flora may have fundamental consequences not only for biogeographical and ecological understanding but also for archeological or environmental reconstructions, landscape planning, and conservation strategies (e.g. increased need to protect ancient ecosystems).

ID: 89901

Tor dei Pagà (Vione, Valcamonica - Italy): the local environment and its exploitation in the Iron Age and Later Medieval period

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The site of Tor dei Pagà, situated in upper Valcamonica at elevation of 2250 m asl was frequented during two distinct phases: the first in the Iron Age when ritual fires (Brandopferplatz) were lit there and the second in the Later Middle Ages (13th/14th century AD) when the site became a fortified refuge for men-at-arms. We identified some interesting contexts for archaeobotanical analyses and collected samples, doing washing and initial screening on site. The anthracological remains allowed us to reconstruct the natural environment and to infer how, in the



Later Middle Ages, firewood was collected and stored. We also studied the types of wood used for construction and for the Iron Age ritual fires. The carpological remains have allowed us to better understand the vegetal food resources available in local context in the Later Middle Ages, and what foods were offered at the brandopferplatz. Finally, we plan to carry out palynological analyses on samples obtained from historic mortar from the site, in order to deepen our knowledge of the natural environment in the Later Middle Ages.

ID: 90239

Trans-Mediterranean Greco-Roman landscapes. An integrated comparative study around Abdera (Greece) and Emporion (Spain)

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KEYWORDS: Greek colonisation, Roman Empire, landscape change, North-eastern Iberia, Aegean Thrace

The development of integrated comparative approaches in landscape archaeology is particularly relevant when dealing with trans-Mediterranean phenomena, such as the Greek colonisation and the Roman Empire.

The territories of Abdera (Aegean Thrace) and Emporion (North-eastern Iberia), fall fully within this context. Indeed, they share parallel histories since they were both settled in the VII-VI c. BC by Ionian colonists and later incorporated into the Roman Empire. Furthermore, they were located in comparable and highly dynamic fluvio-costal environments, characterized by the presence of wetlands and by periodical modifications in the coastline and water courses.

In order to allow the comparison of long-term landscape dynamics in the two areas, this study aims to implement an integrated approach that combines multidisciplinary data to achieve a more comprehensive perspective in three main interrelated research lines: 1) the identification of settlement patterns, 2) the archaeomorphological analysis of road networks and field systems, and 3) the palaeogeographic and palaeoenvironmental reconstruction.

The research strategy is based on the use of a GIS database for the integration of available data and the archaeomorphological analysis of aerial and satellite images,



accompanied by the survey of targeted sites and areas, and the geomorphological and geoarchaeological study of pedo-sedimentary sequences.

The initial collection and standardisation of existing data has already allowed to discuss how settlement developed in the two areas, in relation to the Greek and Roman presence and to known environmental changes. These first results will be integrated with new data that will be obtained from forthcoming survey, archaeomorphological and geoarchaeological research. This will allow us to achieve a more integrated understanding of shared patterns and local differences in the impact of Greco-Roman presence and landscape evolution, in these two micro-regions at opposite sides of the Mediterranean.

ID: 90119

(Late) Holocene landscape development of the lower Bakırçay plain (Pergamon Micro-Region, western Türkiye) and its modern alteration

JORIS STARKE- Freie Universität Berlin, *FABIAN BECKER*- Freie Universität Berlin, *ROBERT BUSCH*- Freie Universität Berlin, *BERNHARD LUDWIG*- German Archaeological Institute, Istanbul Department, *MORITZ NYKAMP*- Freie Universität Berlin, *BRIGITTA SCHÜTT*- Freie Universität Berlin

The landscape of the lower Bakırçay plain surrounding the ancient city of Pergamon is highly altered by modern human activity. This is evident in various modifications, including the diversion and canalisation of the main river channels, the construction of dams in the headwater areas of its tributaries, and the establishment of an irrigation network and drainage ditches. The late Holocene landscape reconstruction of the lower Bakırçay plain is one of the goals of an ongoing international interdisciplinary research project on the ancient Pergamon Micro-Region. To contribute, we combine geoarchaeological data, geomorphological research, historical maps and travelogues from the 19th and 20th centuries, and GIS-based analyses. Methods used to calculate and analyse DEM derivatives include Relative Elevation Models (REMs) and flow patterns. Seismological data, archaeological evidence of settlement patterns and aspects of settlement history are also considered. Various hypotheses on the course of the Bakırçay have been discussed since the late 19th century, e.g., the "Dörpfeld-scenario" of a paleo-bay and mouth of the Bakırçay more than 20 km to the north. Some of these have been questioned by recent research, but can still provide important insights into the extent of landscape change since antiquity. Sediment analyses provide indications of paleoenvironmental conditions and their development and help to understand historical land use and human influence on the landscape. Several recently discovered archaeological sites seem to be located in geomorphodynamically stable parts of the plain, while other areas have been simultaneously shaped by fan progradation and floodplain aggradation. Generally, the landscape of the past seems to have been more diverse than today as the area has been heavily influenced by recent land use. Our data therefore help to interpret recent regional studies, including settlement patterns and dynamics, contribute to the interpretation of existing environmental data, and highlight potential future research areas.



ID: 89890

Space, time, territory and landscape in the megasites of the 3rd millennium

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LEONARDO GARCÍA SANJUÁN- Universidad de Sevilla, Grupo de Investigación Atlas (HUM-694)

At the beginning of the 3rd millennium BC, during the transition between the Neolithic and the Copper Age, the settlement hierarchy in the Iberian Peninsula - or at least in its southern half - presents three types of settlements: the “ditches enclosures” with perimeter trenches, the “walled enclosures” with terraces and stone walls and the so-called “megasites”. The seven megasites identified so far have a very similar spatial organization, with locations on flat lands, near first-class river courses, next to highly fertile soils, sizes of tens or hundreds of hectares, circular shape with concentric circles of ditches, structures (mainly pits) scattered within, no orderly urban plots and an endurance spanning more than a millennium. The location of these settlements and the visual relationships established between them and other territorial elements such as watercourses, ports, roads and megalithic burial mounds generate specific cultural landscapes emblematic of the Copper Age. Only by means of 3D methodologies for the study, analysis and visualisation of these landscapes is possible to interpret the functional reason and symbolic values of these territories, the first fully anthropised.

ID: 89833

The semi-automatic vectorization of historical maps - Example of vectorization of maps of imperial imprints of the stable cadastre of the village Kámen and the town Kraslice

KLÁRA HANÁKOVÁ- University of West Bohemia in Pilsen, Muzeum Cheb

The author uses the poster to introduce her methodology for semi-automatic vectorization of historical maps. One part of her thesis is to process the historical maps (imperial imprints of the stable cadastre from 1842), which she then uses to determine the land use of a selected part of the landscape and its reconstruction. The selected part of the landscape is the western part of the Ore Mountains, located in the western part of the Czech Republic. For vectorization the author uses a graphic program (Adobe Illustrator), in two steps vectorizes maps and then creates layers for the ArcGIS Pro program. The results of semi-automatic vectorization are imported and georeferenced in the ArcGIS Pro program for their further analysis.



ID: 89910

The Ironworking Landscape - the example of Brdy Mountains, the Czech Republic

TOMÁŠ KROUPA-University of West Bohemia in Pilsen

Ironworking and its products played a vital role in world's history and in many ways formed human society. The process of making iron actually consisted of several steps in the chain of operation, some of which can be examined by the methods of landscape archaeology.

The poster presents results of a non-destructive research of historical ironworking in the region of Brdy Mountains, western Bohemia (the Czech Republic), an area which is well-suited for landscape archaeology survey thanks to its restricted access in the past (military training area) and a significant rate of afforestation. The methodology combines the landscape archaeology approach (aerial laser scanning, terrain prospection) with the evidence provided by the historical written and cartographic sources. By these means the research examines the spatial structure of ironworking areas and their relation to other crafting areas relevant to the process of making iron (mining sites, charcoal making areas) in a region with rich ironworking history and tradition dating from the 14th century until the 19th century.

ID: 90294

Resources of Animal Products in Medieval settlements of Moldavian Plain (NE Romania)

BEJENARU LUMINITA- Alexandru Ioan Cuza University of Iasi, Romania, *STANC MARGARETA SIMINA*- Alexandru Ioan Cuza University of Iasi, Romania

KEYWORDS: **archaeozoology, animal husbandry, hunting, Middle Ages, Moldova**

Moldavian Plain (NE Romania) is a depressionary area corresponding to the Jijia River basin, displaying a hilly relief, eastern climatic influences, semi-permanent hydrographic net. It is a forest steppe area, with isolated wooded patches and wide surfaces covered with grassy vegetation, which began centuries ago to be replaced by crops. From this area, several medieval sites (i.e., Hudum, Nicolina, Hlincea, Iasi) were studied from an archaeozoological point of view.

A comparative approach shows similarities and differences in animal exploitation in rural and urban settlements. The studied samples include remains of domestic origin, as it is indicated by traces of cutting, burning, and processing. Animal breeding had a major importance in the economy of analysed settlements, most of the remains belonging to domestic species. Cattle (*Bos taurus*) have the highest frequency, followed by sheep/goat (*Ovis aries/Capra hircus*) and pig (*Sus*



domesticus); remains of horse (*Equus caballus*) and dog (*Canis familiaris*) are quite rare. Hunting, fishing, and collecting molluscs are poorly represented

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ID: 9853

Paleoenvironmental research in the hinterland of Göbekli Tepe, SE Türkiye

MORITZ NYKAMP- Freie Universität Berlin, Institute of Geographical Sciences, *FABIAN BECKER*- Freie Universität Berlin, Institute of Geographical Sciences, *BRIGITTA SCHÜTT*- Freie Universität Berlin, Institute of Geographical Sciences

The Pre-Pottery Neolithic site of Göbekli Tepe (c. 11,500–10,000 cal. a BP / c. 9500–8000 BCE) is certainly among the most prominent archaeological sites in southeastern Türkiye—a region that is known for its rich cultural heritage and that repeatedly witnessed cultural and socioeconomic key developments during the last 12,000 years. However, this region is also characterized by a distinct scarcity of paleoenvironmental studies and lacks high-resolution continuous paleoclimate proxy records. Beyond this, paleoclimate records that are available on a supra-regional scale often show diverging trends throughout the Holocene. Therefore, the consideration of the evolution of the natural environment for this historically-cultural significant area is a difficult task and still poorly understood compared to other regions in the Eastern Mediterranean. This contribution presents a synthesis of the late Pleistocene to Holocene evolution of the natural environment in the hinterland of Göbekli Tepe by integrating our recent results of analyzed local sediment profiles from slope deposits and alluvial archives that roughly cover the last 20, 000 years and literature-derived findings from previous local to regional geoarchaeological and paleoenvironmental research.

ID: 89418

Approaching territorial patterns in Late Prehistory in the Campo de Montiel (Albacete). The case of Cerro de la Encantada

MARTA TORRES-University of Alicante

The archaeological results derived from the study of the Cerro de la Encantada site because of the survey tasks carried out in September 2019 and 2021 in the town of Balazote (Albacete) are presented. The data is divided into two areas. On the



one hand, the work carried out on a macro scale, where within the archaeological survey project of the municipality we will study what relationship the archaeological site has with its most immediate landscape and its relationship with other nearby settlements. On the other hand, through a micro scale, we will try to understand the phases of occupation of this site as well as proposing a planimetric proposal based on non-invasive techniques.

ID: 91625

Cityscape and Collective Memory: Clandestine Materialities of WWII Polish Refugees in Iran

MARYAM NAEIMI- Freie Universität Berlin

KEYWORDS: Refugee landscapes, Contemporary Archaeology, WWII, Polish Refugees, Tehran

My work is about urban landscape, WWII and Polish refugees in Iran. In my poster I will discuss the relations between Polish refugee camps and other materialities, Anglo-soviet occupation forces and the local landscape.

In 1941, Anglo-Soviet forces occupied Iran. After Poland was invaded in 1939, Polish citizens were deported to Soviet Union. In 1941 they were granted "amnesty" by Stalin and by Allied support they were evacuated to Iran: some 100.000 people. They formed their spaces in some Iranian cities, especially in the capital Tehran which was hosting thousands of Polish refugees during WWII who mostly were living in the refugee camps.

I would like to show how the exclusive, controlled and specific experience of the Polish refugees shaped their conception of the urban area. Locals and refugees were experiencing different land-/cityscapes. For instance, the camps were in the periphery of Tehran, separated from the body of the city, controlled by occupation forces, the refugee administration and to lesser extent: Iranian government. As well, I'd like to show how politics of segregation made their contact with locals limited and thus the collective memory in Iran about Polish refugees in the 1940s is faded and absent. And the materialities of Polish refugees' lives is clandestine and vanished from cityscape of Tehran.

In my poster I will show the condition of the Polish associated sites in today's landscape of Tehran in order to discuss memory and forgetting in the urban landscape. How growth of urban body and ever-growing city is eating up its own history and collective memory especially those memories that are not useful for politics and virtues of policy makers, states and governments.



ID: 90705

Reconstruction of the Historical Landscape through the Results of Macroremains Analysis from the Great Moravian Hillfort Neštich (Svätý Jur, Slovakia)

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KEYWORDS: **Great Moravian period, macroremains, landscape, Hillfort, Slovakia**

The study of macroremains is a valuable source of data on the cultivation, collection, and use of plants by humans. However, the intentional use of plants by humans can provide significant insights into the landscape they inhabited. Through an archaeoecological approach, it is possible to identify potential locations of fields or gain knowledge about man-made ecosystems that host ruderal plant species. The aim of the research was to reconstruct the landscape near Hillfort Neštich based on the macroremains analysis of charred seeds. The archaeological site Hillfort Neštich is located in western Slovakia, in the Little Carpathians, above the town of Svätý Jur. A part of the current cadastral territory extends into the Little Carpathians, and another part into the Danubian Lowland. The territory of Svätý Jur has been interesting for people since ancient times due to its rich resources. However, it gained more significant influence during the period of the Great Moravia, to which the studied site is dated. Neštich was a fortified settlement, serving as an administrative and production center during the Great Moravia period. The systematic archaeological research at hillfort has been ongoing since 2006, and in recent years, archaeobotanical samples have also been systematically collected. Macroremains were extracted using a combination of flotation and washing methods, charred remains were analyzed under a stereomicroscope and identified based on their morphological characteristics. For the purposes of ecological analysis, we assigned Ellenberg indicator values to individual species. The results of the analysis provided information about the species composition of weeds that occurred in fields alongside the main crops. This also gave us an overview of the ecological requirements of individual species. These data have helped us to gain an insight into the possible location of fields in the medieval landscape of Svätý Jur.

ID: 0704

Relics of medieval cultivation in current forest flora of Svätý Jur, Slovakia

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KEYWORDS: **Medieval flora, plants cultivation, current vegetation, cultural heritage**

Historical land use is an important factor in the study of contemporary vegetation. In this paper, we focus on mapping contemporary vegetation at two historically significant sites. The aim of the work is to record plant species that could have been cultivated during the medieval period. The research was carried out in the cadastral area of the municipality of Svätý Jur, located near the capital in the south-western part of Slovakia. The northern part of the territory extends into the Little Carpathians, while the southern part lies on the Danube plain. The area has been inhabited since prehistoric times, but it gained importance in the early Middle Ages when a Great Moravian hillfort was built above the town. In the 13th century, Biely Kameň Castle was constructed on the other side of the territory, where the nobility who administered the village and the surrounding area resided. Vegetation mapping was conducted at both historical sites in the summer of 2022. At the Great Moravian hillfort, we mapped the acropolis, both fortifications, and the remains of the ramparts. In order to preserve the same methodology, the relevés in the castle were made in the courtyard, the remains of the castle walls and in the surroundings in the castle moat. We also recorded individual species with coverage according to the Braun-Blanquet scale. Through our research, we were able to record the biodiversity of the historical structures in the current secondary forest. We characterized species according to residence time and recorded both native and non-native plant species. It is possible that some species, such as *Viola odorata* or *Vinca minor*, are relics of medieval cultivation.

ID: 90390

Tracing pathways: the funerary landscape and the spreading of metal technology in the Southern Caucasus (4th-1st mill. BC)

STEFANIA FIORI-Kiel University

In the 4th millennium BC, the Southern Caucasus witnessed pivotal transformations: the widespread adoption of the Kurgan tradition and the evolution of metal craftsmanship. Traditionally studied in isolation, these changes now reveal emerging elements of connection, showing how the evidence of gold craftsmanship decreases with the abandonment of the burial mound as a funerary typology. The poster will showcase my PhD research project, which aims to investigate the relationships between these two phenomena, providing an in-depth exploration of the transhumant societies that thrived in this region and their interconnection with the landscape. Employing a multifaceted methodology that integrates contemporary literature analysis, remote sensing investigations, and on-site fieldwork, this research embraces a landscape archaeology approach. The imagery dataset spans recent and historical satellite imagery from the 1960s and 1970s, including CORONA, Gambit, and Hexagon datasets. The gathered information is managed within a GIS program, with the intent to undertake various



spatial analyses, such as density analysis and linear pattern distribution. Such an exploration is vital for unravelling the intricate social and cultural dynamics of these past civilizations, offering a holistic perspective on their beliefs and ritual practices.

ID: 90655

Bioarchaeological Remains from sites of Iasi City (NE Romania) in view of economic and environmental evaluation

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Animal and plant remain originating from two archaeological sites of Iași City (NE Romania) are analysed in this work, aiming to economic and environmental reconstruction of the settlement. The studied sites, both of archaeological preventive research, are dated to the 18-19th centuries, and the 17-19th centuries respectively. Archaeozoological analysis consisted of anatomical and taxonomic identifications, taphonomic evaluation, quantification, estimations of age at slaughter and sex, and osteometry. Animal remains are described in terms of their frequencies based on the number of identified specimens and the minimum number of individuals. The archaeozoological data highlight a preference for domestic mammals (cattle, sheep/goat, pig, horse, dog); cattle were preferred for consumption. Few remains were identified for wild mammals (red deer, wild boar, hare), birds, and molluscs. We notice the presence of forest wild species (i.e., red deer, wild boar), as well as those of forest-edge and open field (i.e., hare).

The phytolith study make it also possible to indicate plant resources in the economy of this settlement. The analysis of the opal silica bodies reveals besides grasses, the presence of cereals too.

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ID: 90696

Reconstruction of Medieval landscape to the East of Carpathian based on phytolith and archaeozoological analyses

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Archaeobotanical and archaeozoological studies in medieval Europe have provided valuable information on various aspects of human–animal–plant interactions, subsistence strategies, economic activities, and cultural practices, contributing to a better understanding of societies and their relationship with the environment. In the case of Medieval Moldova, bioarchaeological research has become essential, since written documents are generally lacunary and ambiguous.

Phytoliths (microscopic silica opal corpuscles produced in plant tissues) and animal skeletons are important bioindicators highlighting aspects of the past economies and environments. Particularly phytoliths could indicate vegetation's composition, cereal processing, the meals of herbivorous animals, as well as the use of space.

This study focuses on several medieval sites of 14-19th centuries, located in the Eastern Romania, more precisely in the Subcarpathians (Neamț County) and in the Moldavian Plateau (Iași County). Bioarchaeological investigations aim to reconstruct the medieval landscape and better understand the aspects related to the conditions offered by the environment for daily life, habitation according to the geographical forms, and also to the specific climate and sometimes to the political-military context. Analysis of vegetal remains (phytoliths) and animal remains (e.g., bones, teeth etc.) show that the medieval agricultural economic system at East of Carpathians was mainly based on plant cultivation (e.g., cereals) and animal husbandry (e.g., cattle, sheep/goat, pig), with particularities linked mainly to the characteristics of the relief and of site types (i.e., rural, urban or military).

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ID: 90309

Reuse, Christianity, borders and contemporaneity: Historical notes about the megalithic evolution of the Gipuzkoan landscape

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For several decades now, the concept of landscape has been on the rise. Since then, history and mythology have gone hand by hand to create a collective memory inscribed and, on many occasions, hidden in our own daily landscape. By giving



importance to the reuse of the landscape and to the living societies of the living of the time, based on an understanding these elements that have come down to us as heritage to the present day. For this, new technologies and, above all, the concept of communication are necessary. We cannot leave aside the origin of elements that we can find in our landscape, and the megalithic is one of them. However, its origin has been the focus of the study. It has rarely been said that there has been a diachronic evolution of this megalithic landscape. Starting from the assumption that these are elements that are maintained in the landscape, the importance of this evolution is the subject of this study lines in the north of Spain. By giving importance to the reuse of the landscape and to the living societies of the living of the time, based on an understanding these elements that have come down to us as heritage to the present day. However, two-way socialization will be the key to this infographic. Megalithism follows the same line. During the year the topic has been treated as a prehistoric element without understanding the course of different contemporary communities around it.

ID: 90273

Finding a place for nature and heritage: Investigating the relationship between cultural heritage management and the rewilding movement in Britain

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Rewilding is emerging as a key component of landscape management strategy, increasingly part of mainstream dialogues and influencing landscape policy (DEFRA 2022). Consequently, it is increasingly important to assess rewilding's relationship with cultural heritage, both tangible and intangible. Few rewilding studies discuss heritage as a valuable aspect of landscapes and there has been little discussion in heritage landscape studies on the impact of rewilding (Webster 2022) despite the significant impacts rewilding can have on these assets.

The European focus on 'wildness' rather than 'wilderness' allows for a mutually beneficial process for both culture and biodiversity, but there still remains significant potential for neglect and damage to cultural landscapes (Herring et al 2022). Whether real or imagined, such a threat presents a potential barrier to productive relationships between rewilding projects and stakeholders concerned that rewilding might damage heritage assets, practices, and local identities (Webster 2022; Schofield 2022).

Interviews with Cumbrian rewilding practitioners revealed that some current practitioners recognised the benefits of cultural heritage but lacked the tools and time to engage with it (Swinbank 2022). The potential for rewilding to integrate cultural heritage into their stakeholder relations was explored as a resource from which to create adaptive co-management networks through which conflict could be resolved. A Northern Bridge Funded PhD project started October 2023 to examine the relationship between British rewilding and cultural heritage landscapes by working with a group of rewilding sites and key landscape stakeholders through



interviews, site surveys and GIS analysis. This will lead to the production of a toolkit for rewilding projects to develop positive working relationships and achieve their aims whilst protecting and engaging with cultural heritage.

This poster aims to display the findings from this initial research and highlight the importance increased interdisciplinary research into the relationship between rewilding and cultural heritage landscapes.

ID: 90244

Hidden places? A preliminary approach to testing the visual perception visibility surrounding funerary caves during the Early Neolithic in the Maciço Calcáριο Estremenho (Portugal)

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KEYWORDS: **Early Neolithic, Caves, Landscape, Visibility, GIS**

Visibility studies have emerged as a crucial element in interpreting the function of archaeological sites, guided by both functionalist and phenomenological landscape approaches, where perception visibility plays a critical role in the site's interpretation. In the Portuguese Estremadura, Early Neolithic funerary sites are predominantly situated within caves. Particularly, in the southeastern region of the Maciço Calcáριο Estremenho, habitat places are found in close proximity to these funerary caves, indicating significant potential for spatial and visual landscape analysis.

The ritual and symbolic significance of these caves, acknowledged for their roles in both funerary and ritual practices, has been frequently highlighted. Yet, from the perspective of the living landscape, little has been explored concerning how the funerary cave's location was perceived by the communities that frequented them and their spatial relationship to habitat sites. Questions arise regarding the landscape dynamics: Were funerary caves considered elements within the landscape to be avoided, positioned away from main circulation routes? Were they visible from the habitat sites, and vice versa, were the habitat sites visible from the funerary caves? Could the selection of their locations have been influenced by the site's visibility or invisibility?

To investigate the visibility or concealment within the landscape, we conducted a cumulative viewshed analysis and established an intervisibility network. Furthermore, to discern their placement in relation to principal circulation routes, we identified several circulation paths.

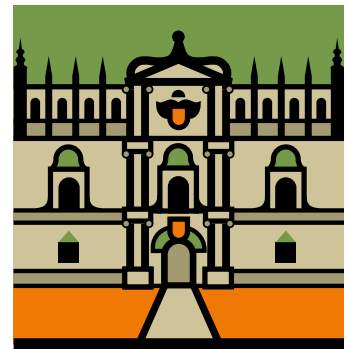
This study serves as an initial step toward exploring the Early Neolithic visual landscapes in this region, aiming to delineate new research questions and problematics.



HUMAN
CHALLENGES
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BOOK OF ABSTRACTS

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