

On the Trail of Spatial Humanities



Historical Materials and Geographic Information
Systems for Digital Humanities Projects

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Goals of Digital Humanities

- access to cultural / historical information
- tools to find, browse, mashup, query, map, and analyze this info
- communicate the resources, topics, and findings of digital scholarship
- utilize digital resources and methods for teaching and learning
- connect communities (across disciplines, across sectors, and the public)

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movement from

introverted projects by individual scholars ->

to collaborative cross-disciplinary projects ->

to exposing data and methods to wider academic communities & the public.

Challenges in Digital Humanities

how to bridge the gaps between

- (a) primary sources
- (b) scholars with domain expertise
- (c) technical implementations



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large investment up front for organizing, digitizing, transcribing, annotating historical texts, images, facts and figures so they become accessible to the scholarly community.

further development is needed to make the digital resources useful for analysis, and to expose them, or at least their metadata, in machine readable formats, which enables integration and re-use across the broader community of potential users.

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From raw data -> well organized information -> analysis -> knowledge

Historical Research ~ Spatial Humanities

History

- (a) evidence
- (b) “facts” (attestations)
- (c) people, places, events
- (d) narratives
- (e) historiography

geographic & temporal scale

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geographic & temporal scale

Geographic Information Systems

- (a) geodata (spatial objects)
- (b) “features” (attestations)
- (c) locations, areas, networks
- (d) spatial relations (adjacency)
- (e) networks, morphology

geographic & temporal scale

Historical Research ~ Spatial Humanities

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Spatial Humanities

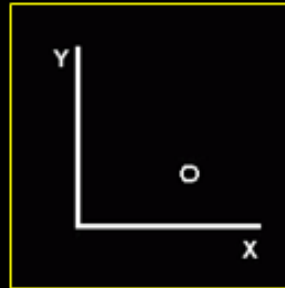
textual analysis
description
world-building

★ visualization
★ browsing content
★ synthesis

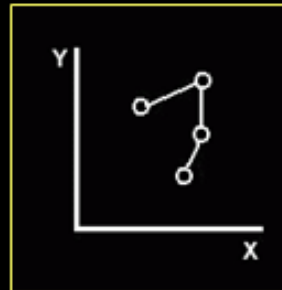
spatial analysis
delineation
map-making

Vector and Raster (Grid) Formats

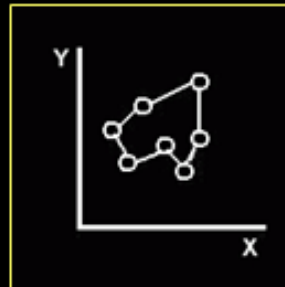
point



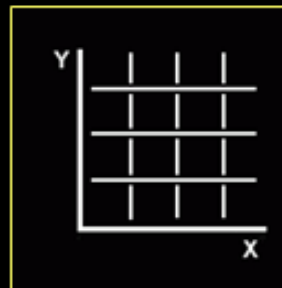
line



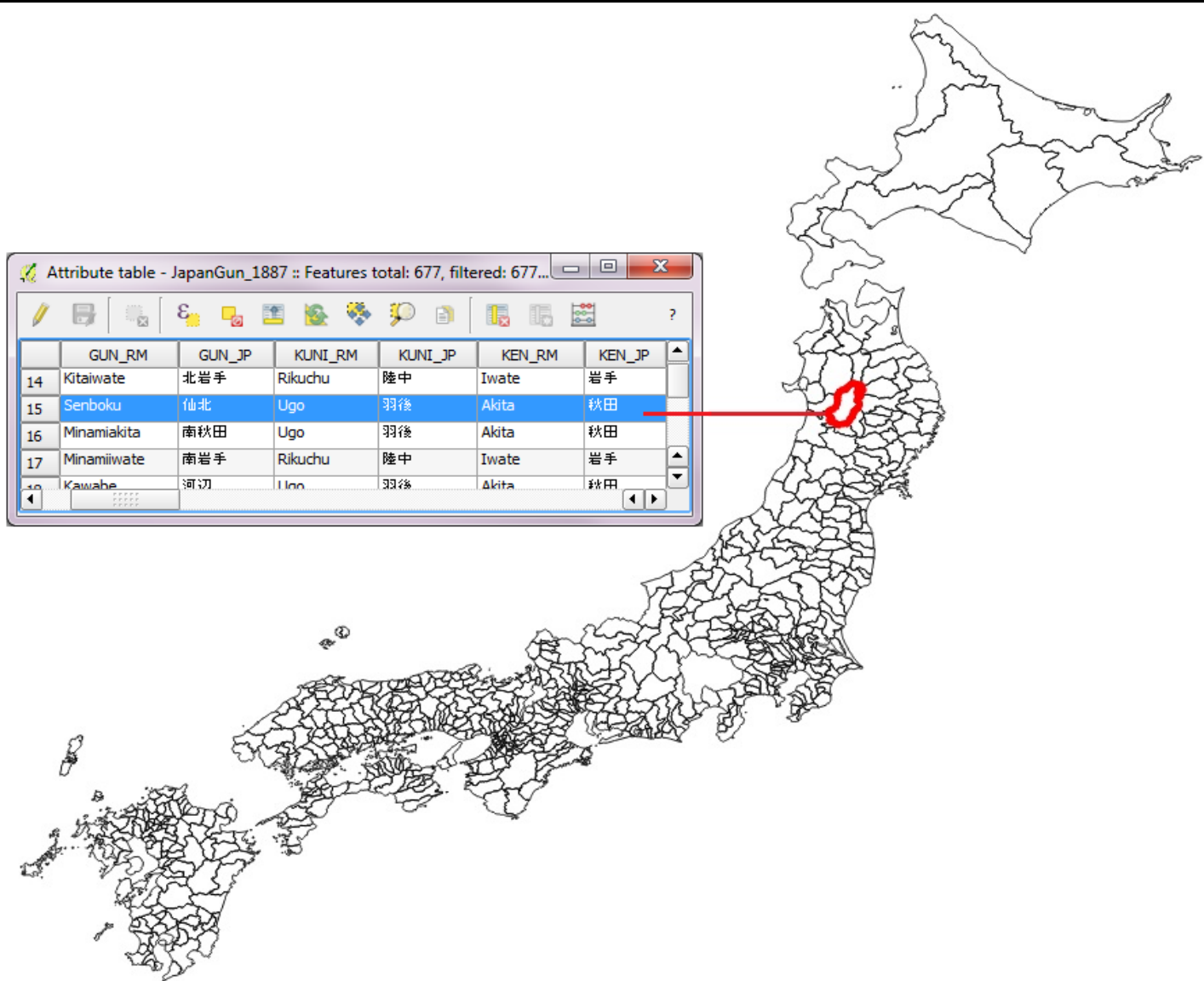
polygon



grid

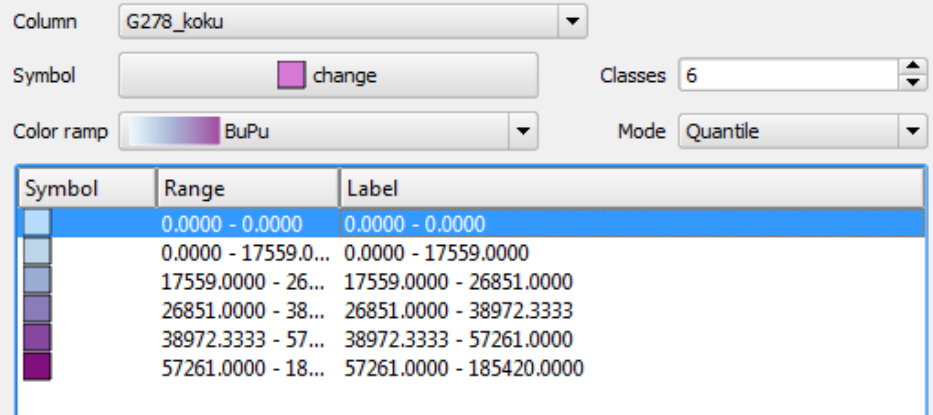
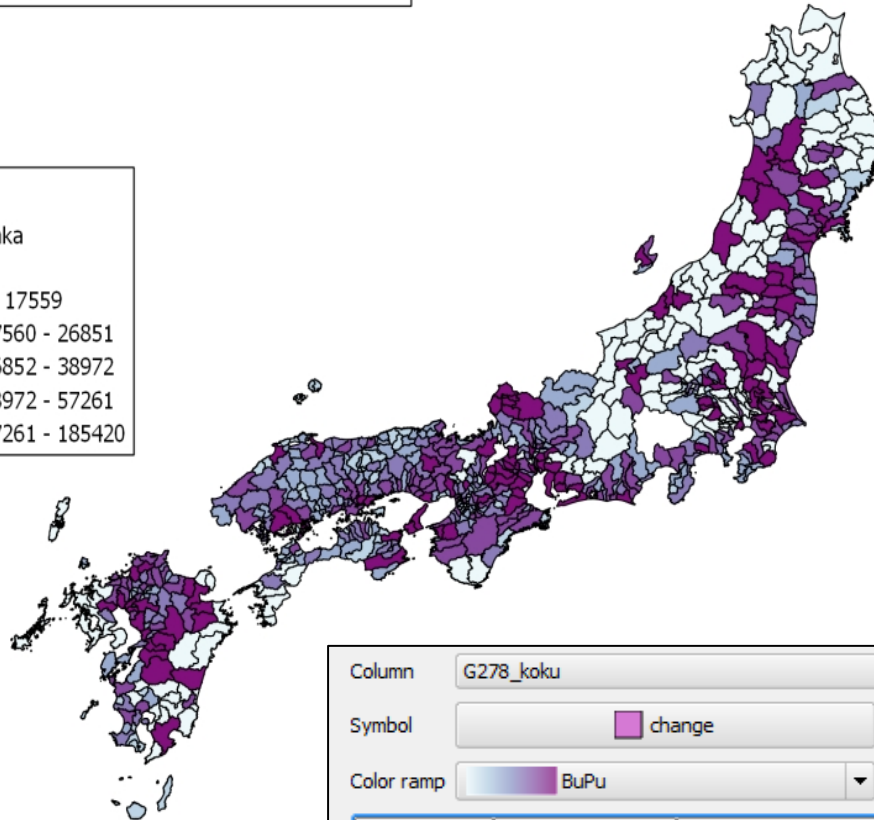
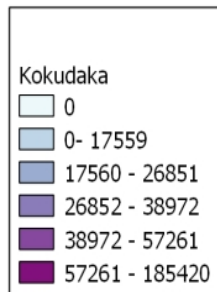


Spatial Objects relate to Attributes



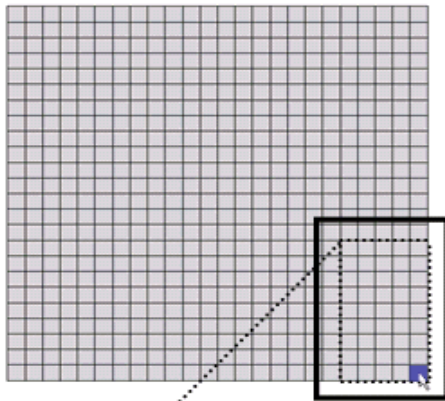
Symbolization of numerical classes

JapanG 1887 - Sample Map

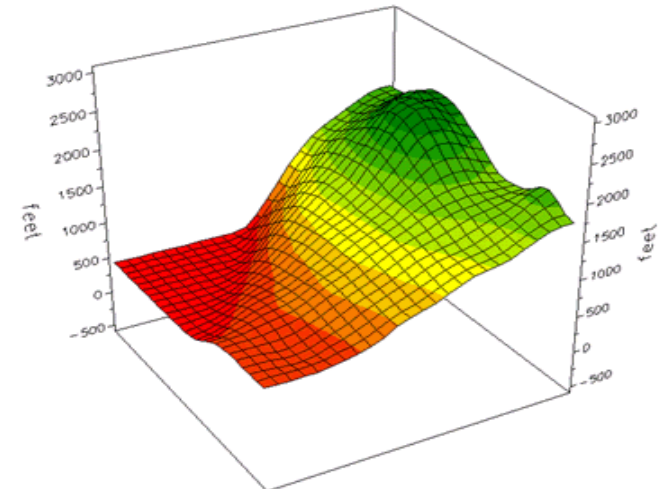
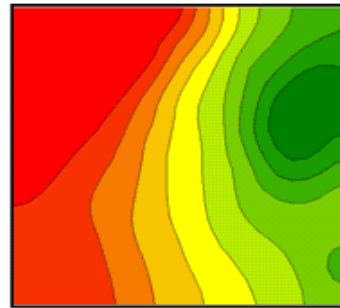


Lattices and grids

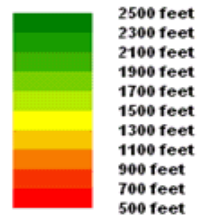
Reference Frame



2D Lattice



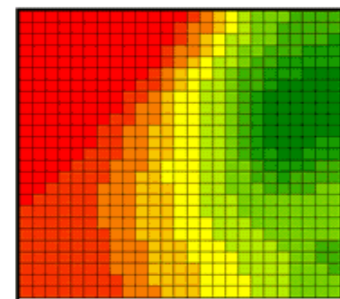
3D Lattice



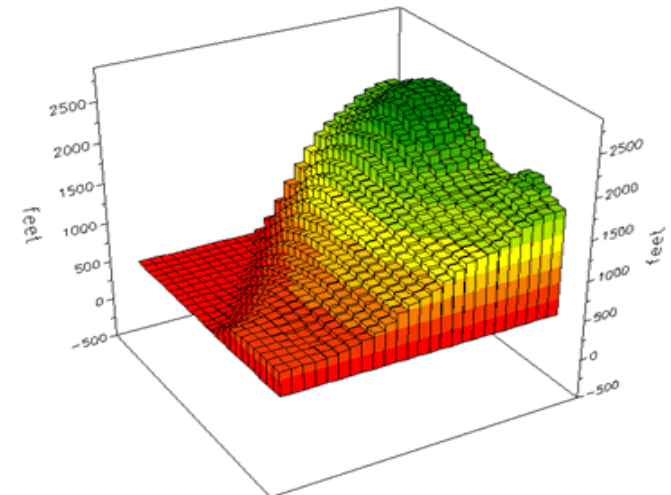
Data

| | 21 | 22 | 23 | 24 | 25 |
|---|-------|-------|-------|-------|-------|
| 9 | 1,879 | 1,877 | 1,846 | 1,817 | 1,802 |
| 8 | 1,814 | 1,818 | 1,812 | 1,804 | 1,805 |
| 7 | 1,781 | 1,794 | 1,801 | 1,816 | 1,823 |
| 6 | 1,756 | 1,784 | 1,814 | 1,863 | 1,894 |
| 5 | 1,725 | 1,770 | 1,841 | 1,927 | 1,990 |
| 4 | 1,693 | 1,754 | 1,847 | 1,944 | 2,016 |
| 3 | 1,664 | 1,737 | 1,826 | 1,896 | 1,943 |
| 2 | 1,636 | 1,718 | 1,784 | 1,826 | 1,843 |
| 1 | 1,623 | 1,709 | 1,768 | 1,795 | 1,800 |

Data Values

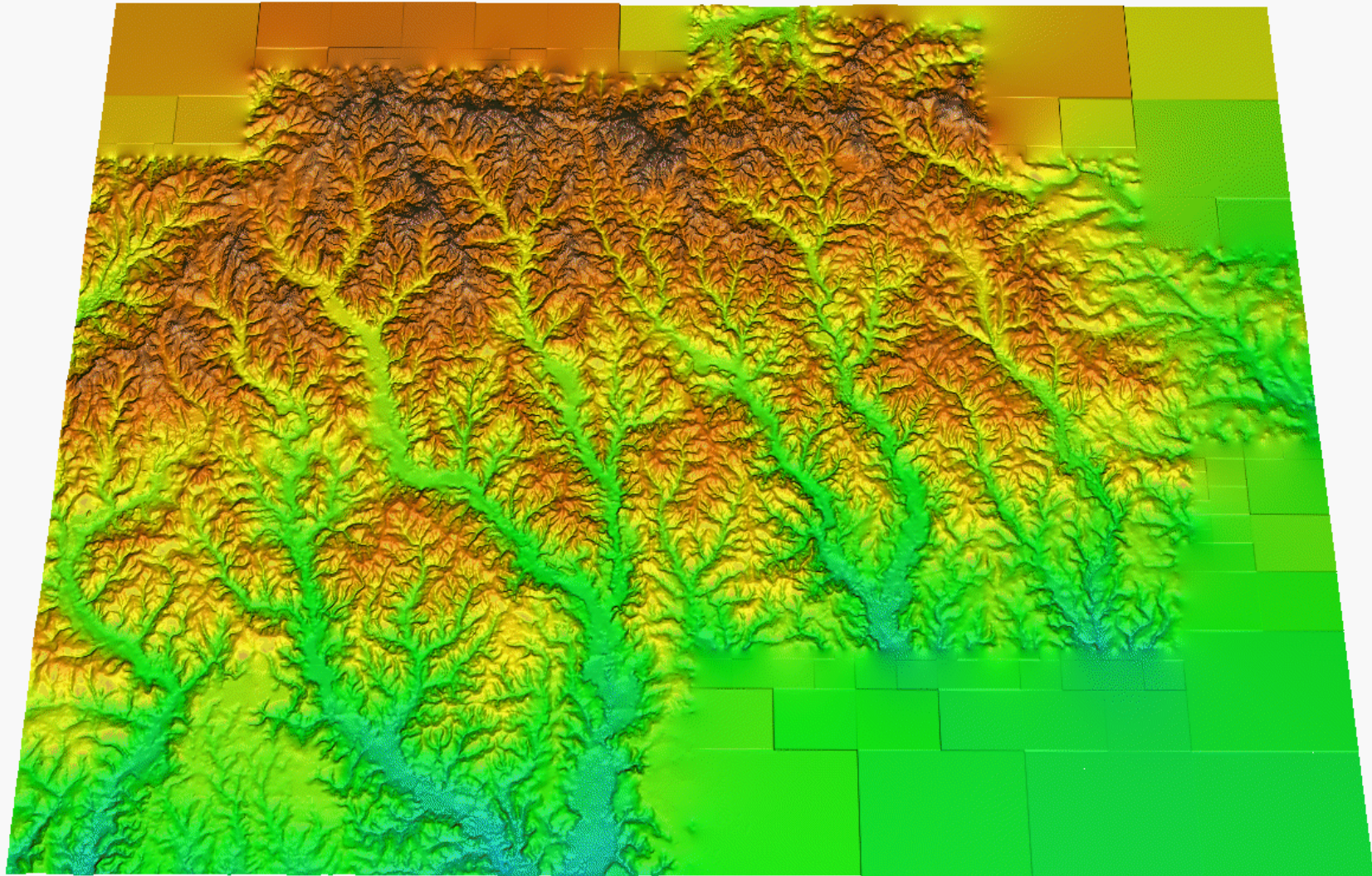


2D Grid



3D Grid

Classified raster data with hillshading



What software is used for GIS?



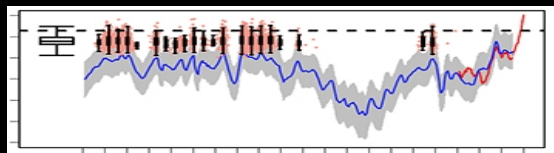
Desktop GIS

ArcMap
QGIS
GoogleEarth



Webmaps

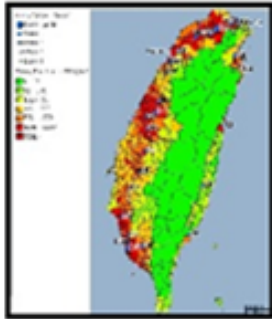
GoogleMaps API
Worldmap
Leaflet



Statistical Packages

R
Stata
Spss

Desktop GIS compared to webmaps



Google Maps compared to desktop GIS


Google

Namba station, Osaka Prefecture, Japan

SIGN IN

Get directions My places

Osakanamba Station
2丁目-3 Nanba, Chūō-ku, Ōsaka-shi, Ōsaka-fu, Japan



Directions Search nearby more ▾


Subway services from this station:

- Midosuji Line
- Yotsubashi Line
- Sennichimae Line

Timetables and more »
大阪市交通局

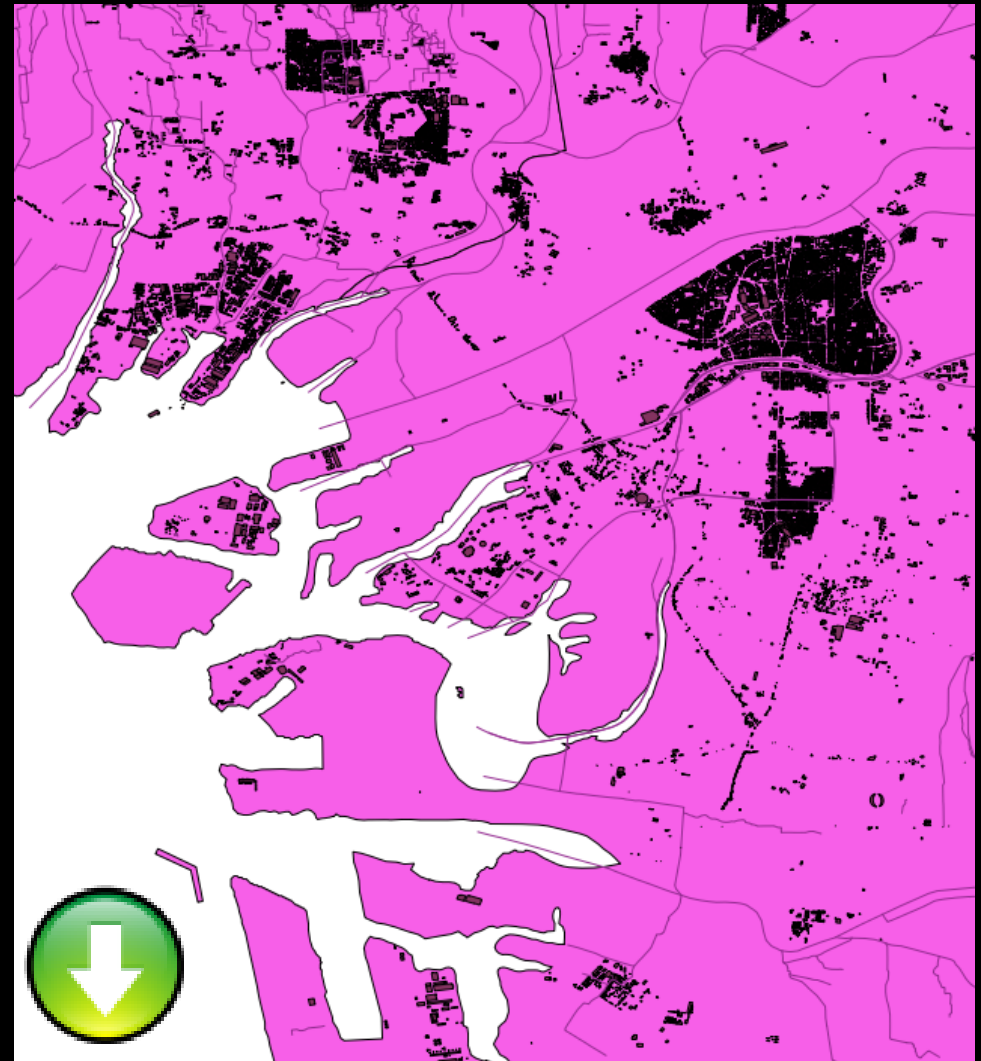
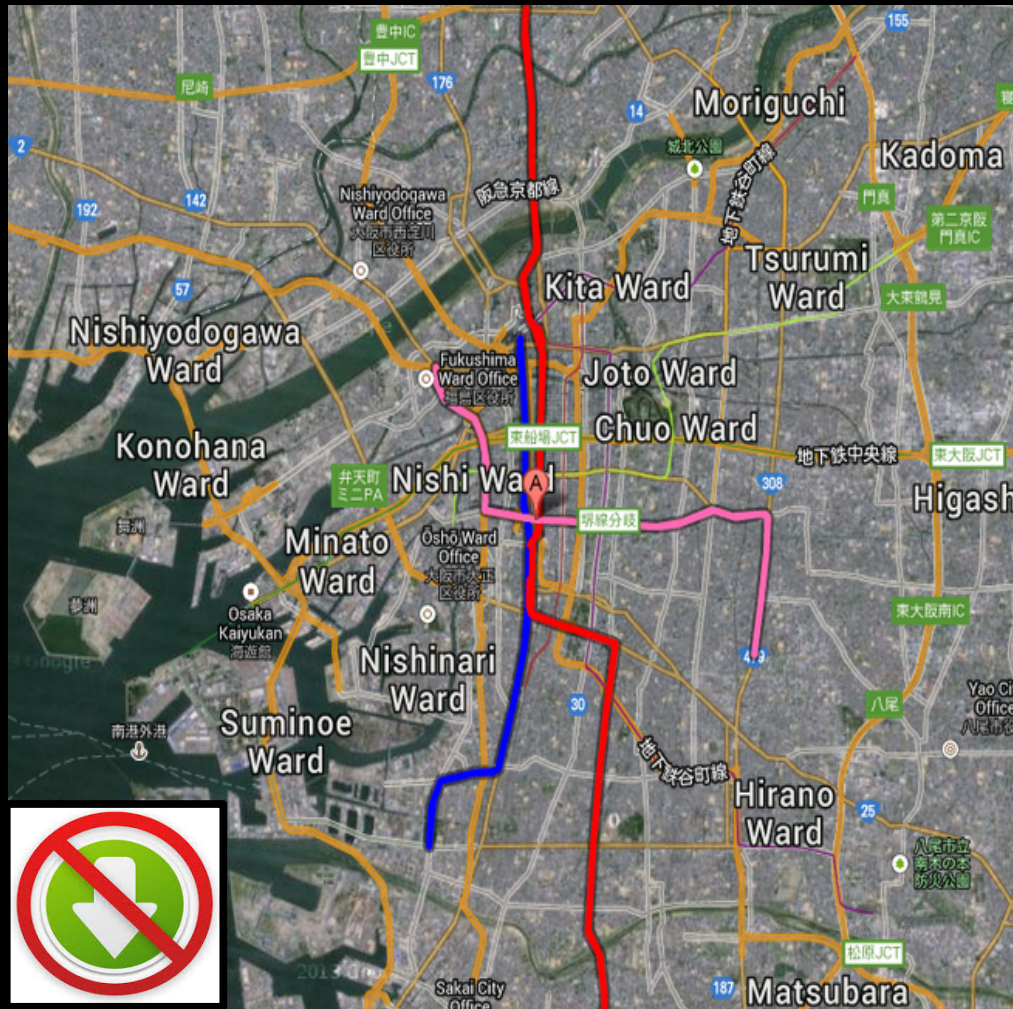
Hotels near Namba Station
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See your ad here »

Maps Labs - Help

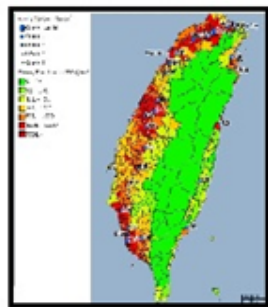


The map displays the Namba station area in Osaka, Japan. It features several subway lines: the Midosuji Line (red), Yotsubashi Line (blue), and Sennichimae Line (pink). Key landmarks include the Osaka Teikoku Hotel, Dotonbori Hotel Osaka, and the Osaka Prefectural Hospital. The map also shows the surrounding urban grid, including streets like Nishishinsaibashi and Dotonbori, and various commercial establishments like hotels and hospitals. A scale bar at the bottom left indicates 500 feet and 200 meters.

Proprietary basemaps vs. Public data



GIS + webmaps + collaboration = WorldMap



Creating a collaborative project on WorldMap

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Map Permissions

Select what kind of privileges to allow.

Who can view or download this?

- Anyone
- Any registered user
- Harvard Users
- Only users who can edit

Who can edit this?

- Any registered user
- Harvard Users
- Only users who can edit

Who can manage and edit this?

- DungeonMaster
- dokusho
- Lex



Contact: [dokusho](#)

Rectifying a scanned map using Warper

WorldMap Map Warper Logged in as: [Lex](#) [My Maps](#) [My Activity](#) [Settings](#) [Log Out](#)

[Home](#) [Browse All Maps](#) [Upload Map](#) [Browse All Layers](#) [About](#)

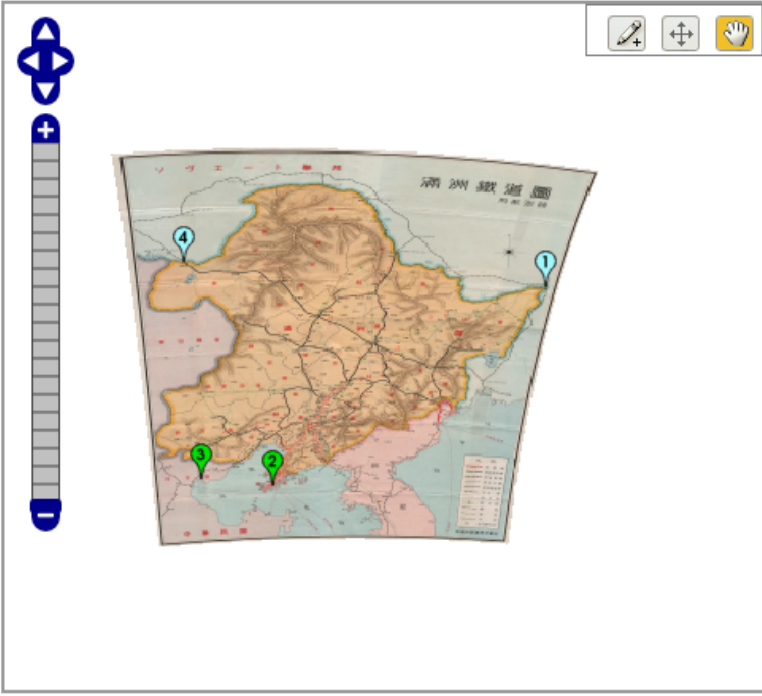
Home > Search > Maps > Map 4787

Manchuria Railway

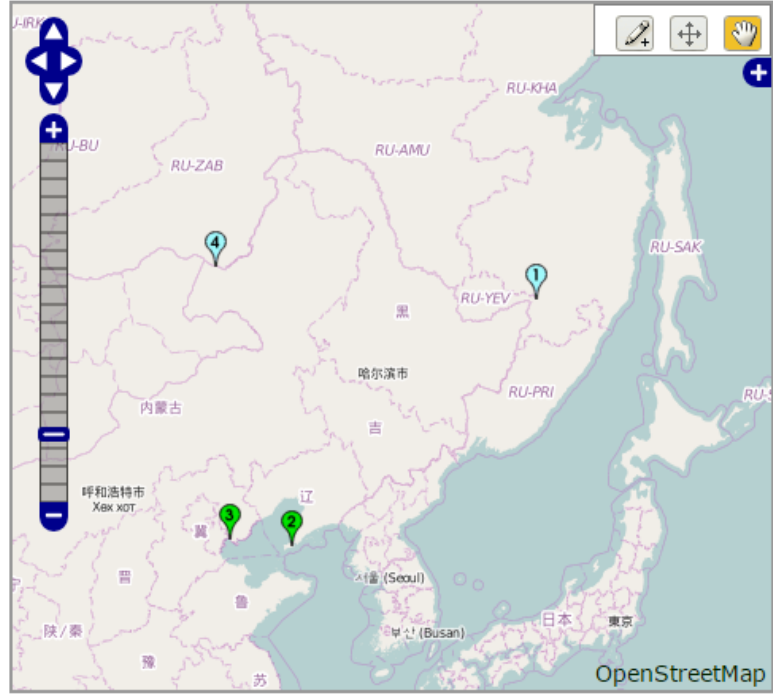
Uploaded by Lex. (*Not listed*) Last modified 20 days ago. 4 control points.
Tags: Manchukuo

[Remove from My Maps](#) | [Links: Source / Biblio Ref](#) | [Download KML](#)
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[Show](#) [Edit](#) [Rectify](#) [Crop](#) [Align](#) [Preview Map](#) [Export](#) [Metadata](#) [Activity](#) [Comments \(0\)](#)



A scanned, distorted map of Manchuria with four control points marked: 1 (top right), 2 (bottom center), 3 (bottom left), and 4 (top left). The map is curved and has a yellowish tint.



The same map of Manchuria, now rectified and straightened. It is overlaid on a modern OpenStreetMap background. The four control points (1, 2, 3, 4) are still present, showing their alignment with the modern map's features. Labels for various regions and cities are visible, such as RU-KHA, RU-ZAB, RU-AMU, RU-YEV, RU-PR1, RU-SAK, and RU-3.

Export as WMS using Warper

WorldMap Map Warper Logged in as: **Lex My Maps**

[Home](#) [Browse All Maps](#) [Upload Map](#) [Browse All Layers](#) [About](#)

Home > Search > Maps > Map 4787

Manchuria Railway

Uploaded by Lex. *(Not listed)* Last modified 20 days ago. 4 control points.
Tags: Manchukuo

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[Show](#) [Edit](#) [Rectify](#) [Crop](#) [Align](#) [Preview Map](#) [Export](#) [Metadata](#)

Map

- Original File: manchu_rail_qgis.tif
- GeoTiff: Download rectified GeoTiff
- PNG: Download rectified PNG (and associated .aux.xml file)
- KML: Download KML file (View KML in Google Maps)
- WMS: **WMS base URL** (for JOSM OpenStreetMap Editor)
- Tiles (Google/OSM scheme): Tiles base URL

← → ↻ worldmap.harvard.edu/maps/manchukuo

Add Layers

WorldMap Data **External Data** Upload Layer Create Layer Rectify Layer

View available data from: MapQuest Layers [+ Add another server](#) [+ Add Feed](#)

| Title |
|------------------------|
| MapQuest OpenStreetMap |
| MapQuest Imagery |


Add New Server...

URL:


⚠ Enter a valid URL to a WMS endpoint (e.g. <http://example.com/geoserver/wms>)

[Cancel](#) [+ Add Server](#)

Warped map is added to WorldMap project

 **WorldMap** Manchukuo 滿洲國 [Lex](#) | [Sign out](#) | [Create Map](#) | [View Map](#) | [Help](#)

[Add Layers](#) | [Save](#) | [Create Feature](#) | [Edit Feature](#) | [Identify](#) | [Link](#) | [Print](#) | [Gazetteer](#) | [About](#) | [Notes](#) | [Google Earth](#) | [Street View](#)



Google Imagery ©2015

200 km
100 mi

1 : 8735665

[Center for Geographic Analysis](#)

Mapping Objects from Digital Collections

Skillman Library at Lafayette College

Digital Scholarship Services



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[db0031] Celebration of the 30th Anniversary of the Russo-Japanese War

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Collect Metadata, Create Feature

Item Details

| | |
|---------------------------|---|
| Title.English | [db0031] Celebration of the 30th Anniversary of the Russo-Japanese War |
| Subject.OCM | 210 RECORDS 211 MNEMONIC DEVICES 520 RECREATION 527 REST DAYS AND HOLIDAYS |
| Description.Critical | Parade in Mukden/Shenyang to celebrate the 30th anniversary of the Japanese victory in the Russo-Japanese war of 1904/1905. |
| Coverage.Location | Mukden Shenyang |
| Coverage.Location.Country | Manchuria |
| Description.Ethnicity | Japanese |
| Relation.IsPartOf | East Asia Image Collection Gerald & Rella Warner Manchuria Negative Collection |
| Format.Medium | Photographic negative |
| Date.Image.Upper | 1935-03-10 |
| Date.Image.Lower | 1935-03-10 |
| Date.Original | 1935-03-10 |
| Item URL | http://digital.lafayette.edu/collections/eastasia/warner-negs-manchuria/db0031 |

Object Metadata

Location: Mukden (Shenyang)

Title: Russo-Japanese War Parade

Date: 1935-03-10

URL:

<http://digital.lafayette.edu/collections/eastasia/warner-negs-manchuria/db0031>

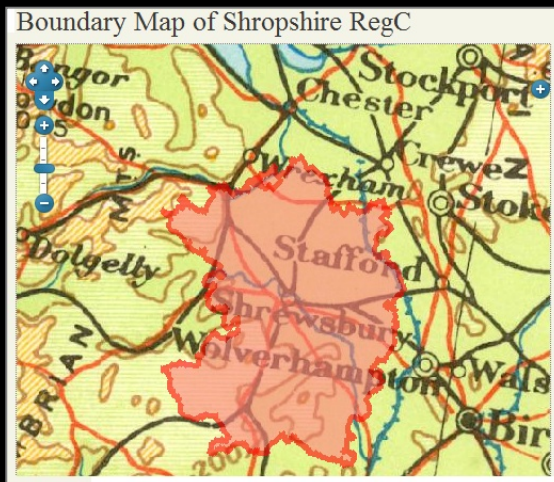
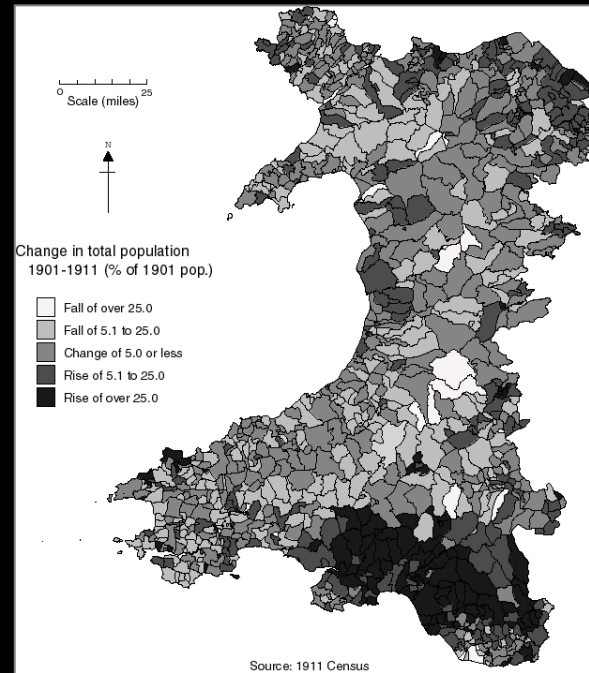
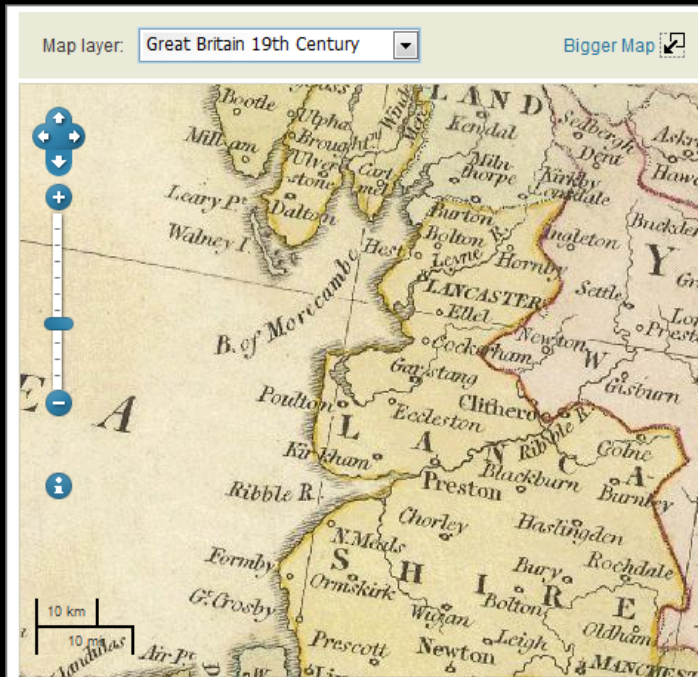
Thumbnail:

<http://digital.lafayette.edu/collections/eastasia/warner-negs-manchuria/db0031/thumbnail>

The screenshot shows the WorldMap application interface. The title bar includes 'WorldMap', 'Manchukuo 滿洲國', and 'Lex'. The menu bar contains 'Add Layers', 'Save', 'Create Feature', 'Edit Feature', 'Identify', 'Link', 'Print', 'Gazetteer', 'About', 'Notes', 'Google Earth', and 'Street View'. The left sidebar shows a tree view with 'Overlays' (Manchukuo Collection Materials), 'Boundaries' (gws_japanGun_1887), 'Imagery & Base Maps' (English Map Index, Japanese Map Index, Manchuria Railway Map), and 'Base Maps' (Google Roadmap, Google Hybrid, Google Terrain, Google Satellite, ESRI Light Gray Reference, ESRI World Imagery). The main map area displays a historical map of Manchukuo with a red star marker. A metadata form is open over the map, with the 'Name' field containing 'Russo-Japanese War Parade' and the 'Description' field empty. The form has 'Save' and 'Cancel' buttons at the bottom.

how to video

GIS Examples: Vision of Britain



Place: [Manchester](#)
[Lancashire](#)

Location

Historical writing

Units and statistics

Related websites

Place names

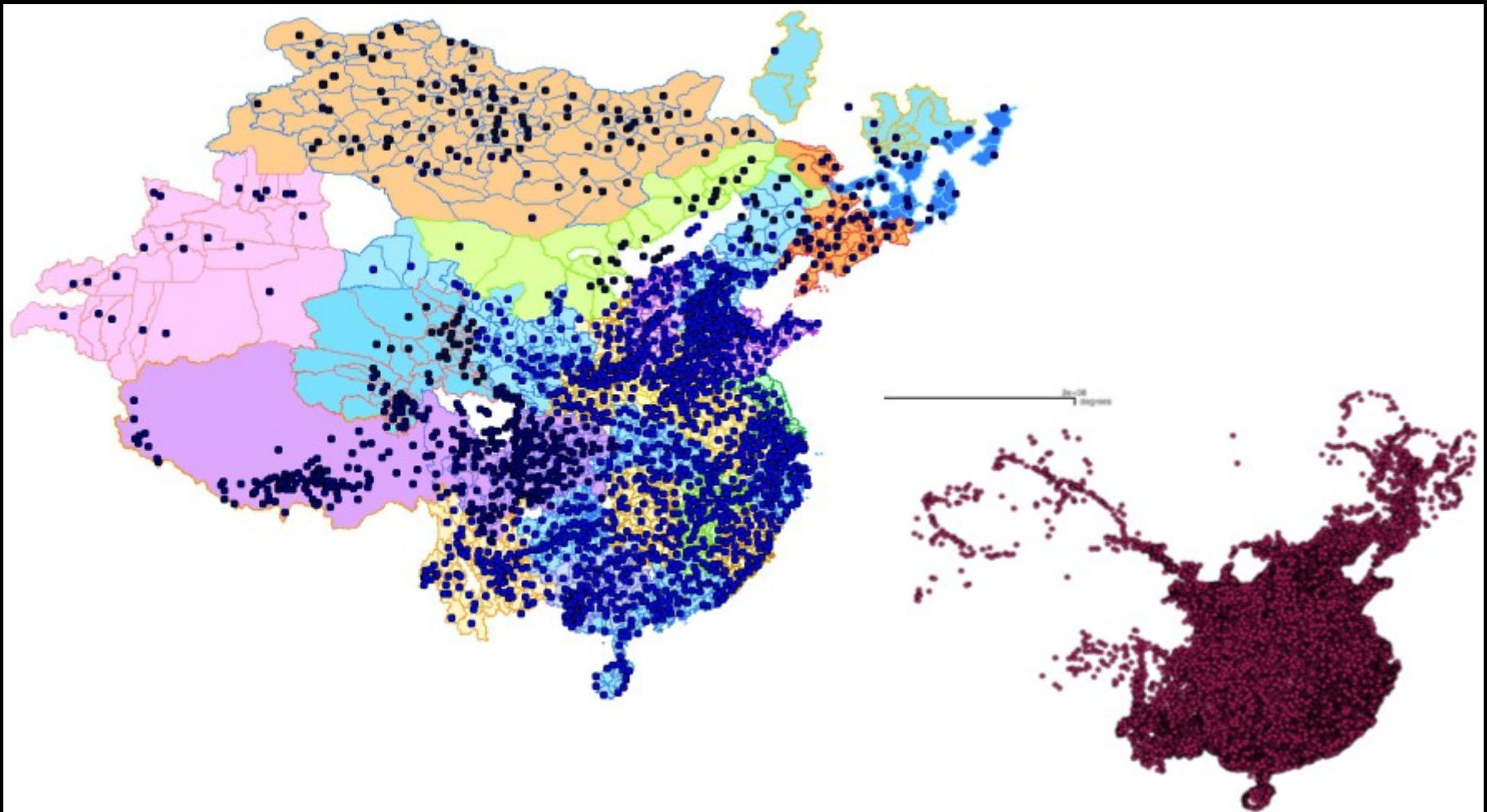
Names from historical writing:

The following appear as names for **Manchester**. Follow the links for what the author actually said:

| Name | Author | Source |
|------------|------------------------------------|--|
| MANCHESTER | John Bartholomew | <i>Gazetteer of the British Isles</i> (Edinburgh: Bartholomew, 1887). |
| | John Marius Wilson | <i>Imperial Gazetteer of England and Wales</i> (Edinburgh: A Fullarton & Co., 1870-72). |
| MANCUNIAM | William Camden | <i>Britain, or, a Chorographical Description of the most flourishing Kingdoms, England, Scotland, and Ireland</i> (London: George Bishop and John Norton, 1610). |
| MANCUNUM | William Camden | <i>Britain, or, a Chorographical Description of the most flourishing Kingdoms, England, Scotland, and Ireland</i> (London: George Bishop and John Norton, 1610). |
| MANUCIUM | William Camden | <i>Britain, or, a Chorographical Description of the most flourishing Kingdoms, England, Scotland, and Ireland</i> (London: George Bishop and John Norton, 1610). |

GIS Examples: CHGIS

- (a) based on changing administrative divisions over time
- (b) contains relationships between administrative units
- (c) can be used to model change over time as a network



Buddhist Temples Index

| | | | |
|-----------------|--------------|-------------|------------|
| | | | 崇聖寺 |
| 2220 | 267 | 265 | 265 |
| 224 大和 六峰 | 77 柳州の北郊外 | 73 昌邑県治東 | 67 嶧県治東 |
| 唐、南元中 | 宋、聖寧中 | | 宋、政和 |
| 今名、三塔寺。七樓八殿三塔あり | 明、洪武谷重建 | | |

崇聖寺

2220

224
大和
六峰

今名、三塔寺。七樓八殿三塔あり

唐、南元中

Digitizing Source Text

崇聖寺

在太和县西北蒼山十六峰
之下。寺有七樓八殿。三塔高
十餘丈。凡十六級。唐開元中
建。今名三塔寺。

今名三塔寺。七樓八殿三塔あり

2220
224
大、和県蒼山十
六峰

唐、開元中

崇聖寺

| | |
|--------------|--------------|
| Name: | 崇聖寺 |
| Temple ID: | 2220 |
| Site ID: | 224 |
| Location: | 大和县蒼山十六峰 |
| Established: | 唐開元中 |
| Notes: | 今名三塔寺，七樓八殿三塔 |

Geocoding Locations in Source Text

227 麗江府 (227) 州 (253)
 228 大理府 (228) 州 (253)
 229 廣南府 (229) 州 (253)
 230 開化府 (230) 州 (253)
 231 昭通府 (231) 州 (253)
 232 普洱府 (232) 州 (253)
 233 楚雄府 (233) 州 (253)
 234 永昌府 (234) 州 (253)
 235 臨安府 (235) 州 (253)
 236 元江州 (236) 州 (253)
 237 順寧府 (237) 州 (253)
 238 鎮

224
 大理府
 (2219)
)
 2229
)

| site_id | site_ch | site_alt | site_rom | chgis_id |
|---------|---------|----------|---------------|----------|
| 217 | 曲靖府 | 曲靖府 | Qujing Fu | 9757 |
| 218 | 臨安府 | 臨安府 | Linan Fu | 9765 |
| 219 | 澄江府 | 澄江府 | Chengjiang Fu | 9760 |
| 220 | 廣南府 | 廣南府 | Guangnan Fu | 9762 |
| 221 | 開化府 | 開化府 | Kaihua Fu | 9766 |
| 222 | 昭通府 | 昭通府 | Zhaotong Fu | 9747 |
| 223 | 普洱府 | 普洱府 | Puer Fu | 9767 |
| 224 | 大理府 | 大理府 | Dali Fu | 9753 |
| 225 | 楚雄府 | 楚雄府 | Chuxiong Fu | 9754 |

| | |
|---------------------|--------------|
| Name: | 崇聖寺 |
| Temple ID: | 2220 |
| Site ID: | 224 |
| Location: | 大和县蒼山十六峰 |
| Established: | 唐開元中 |
| Notes: | 今名三塔寺，七樓八殿三塔 |

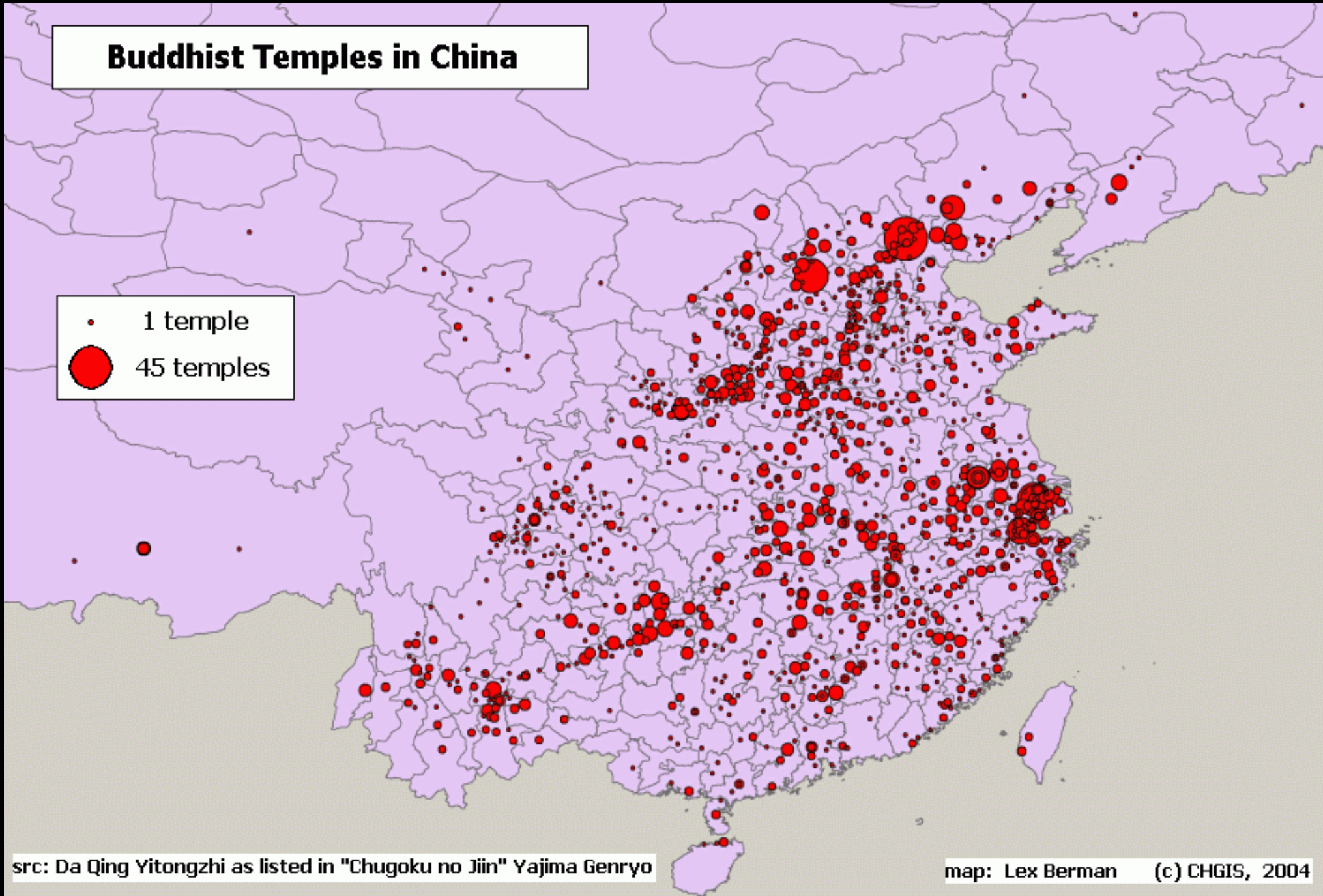
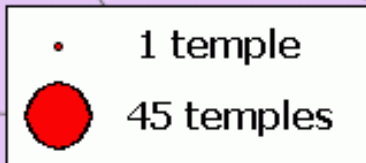
Mapping the Geocoded Points

| | |
|---------------------|--------------|
| Name: | 崇圣寺 |
| Temple ID: | 2220 |
| Site ID: | 224 |
| Location: | 大和县苍山十六峰 |
| Established: | 唐开元中 |
| Notes: | 今名三塔寺，七楼八殿三塔 |

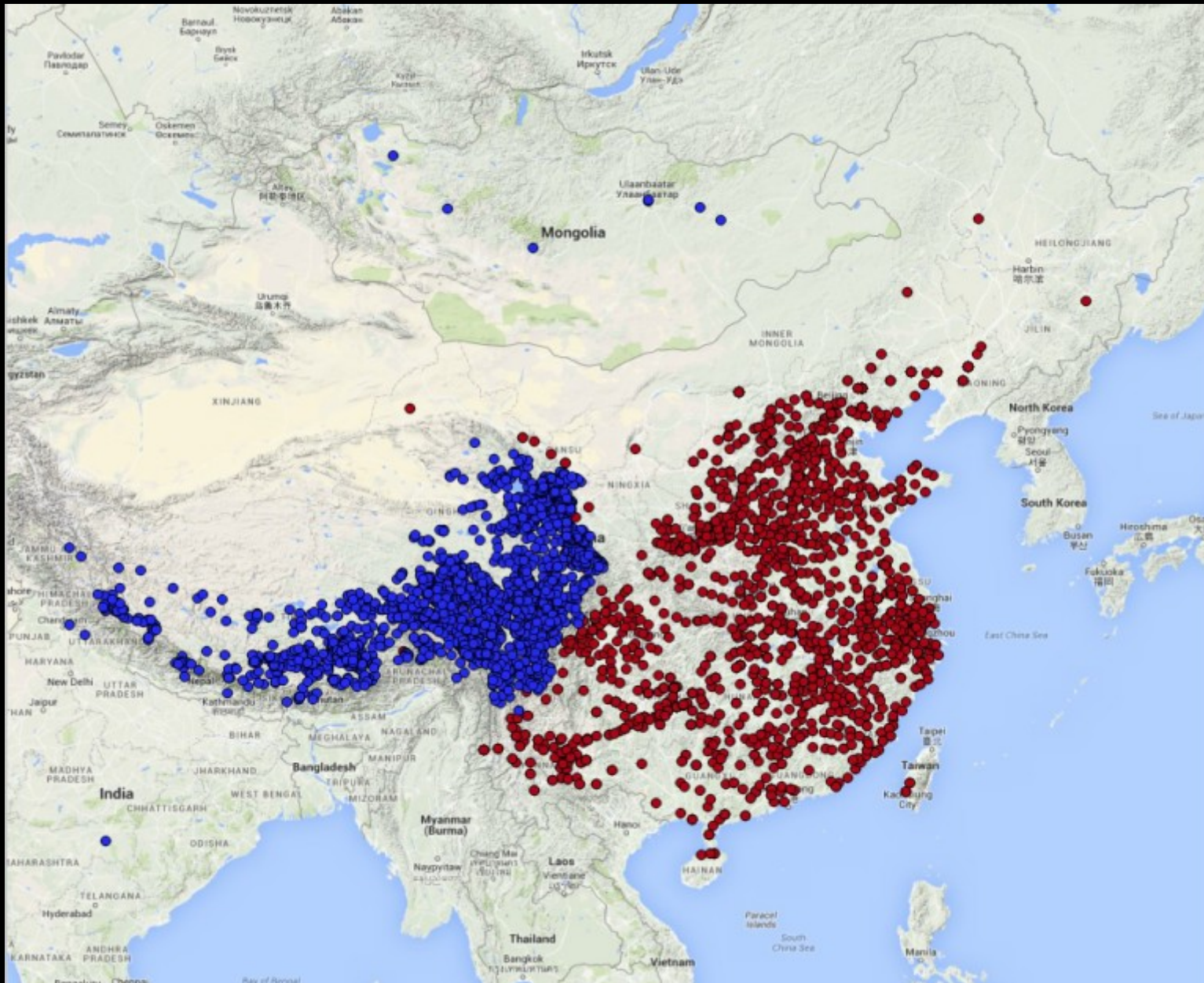


Distribution of the Geocoded Buddhist Sites

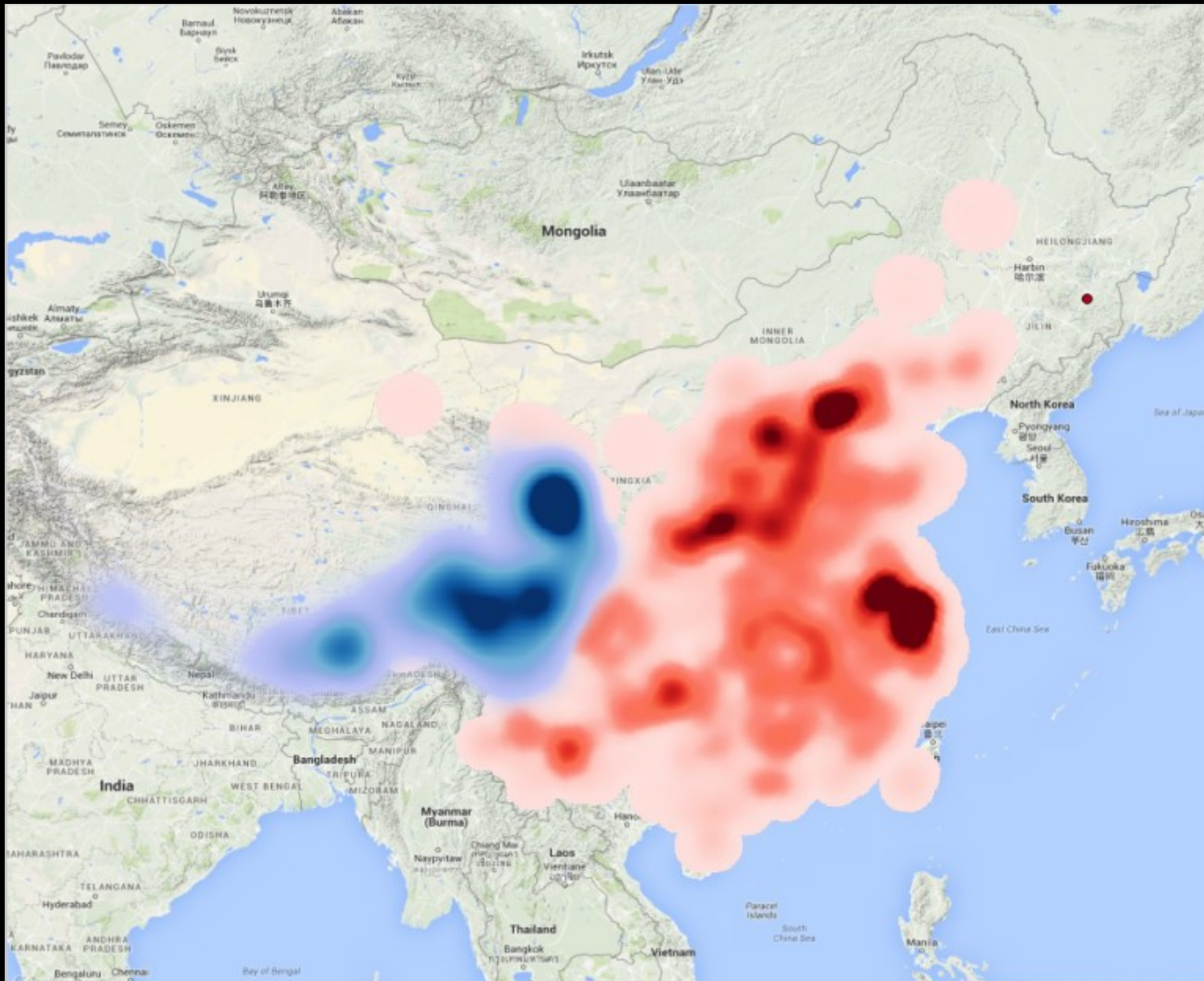
Buddhist Temples in China



Revealing Bias in Sources



Geoprocessing - Heatmap



Data Legend

N. Song Entry Exams (Persons)

- 1 - 5
- 6 - 10
- 11 - 15
- 16 - 30
- 31 - 45
- 46 - 90
- 91 - 215

High Speed Railways (2011)

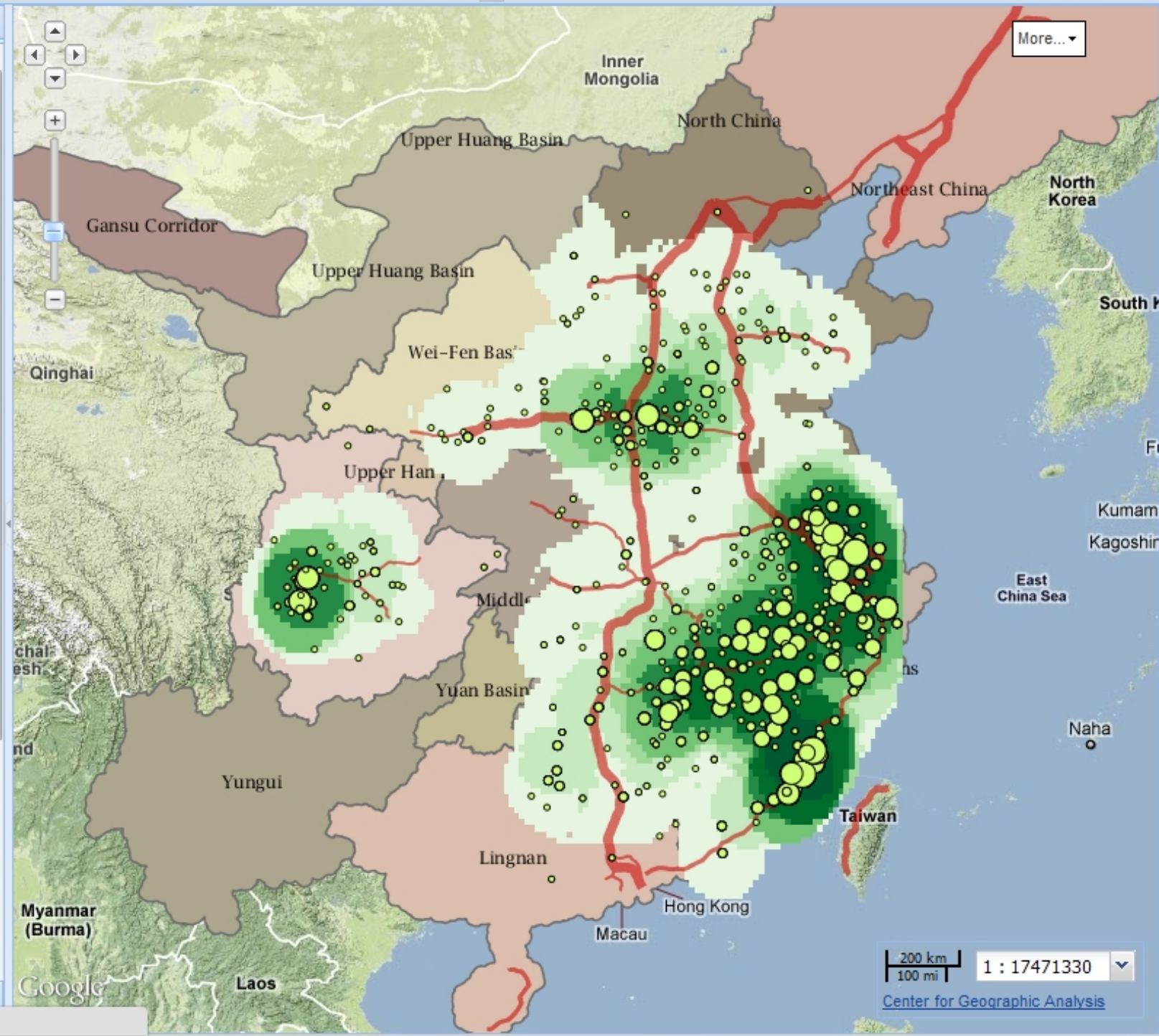
- 200 kmh
- 250 kmh
- 300 kmh
- 350 kmh

N. Song Exams (Heat Map)

- n/a
- 1 - 5
- 6 - 10
- 11 - 15
- 16 - 30
- 31 - 45
- 46 - 90
- 91 - 215

Physiographic Macroregions

- Yungui
- Lingnan
- Yuan Basin
- Middle
- Upper Han
- Wei-Fen Basin
- Upper Huang Basin
- Gansu Corridor
- Inner Mongolia
- North China
- Northeast China



Data | **Legend**

Ming Entry Exams (Persons)

- 1 - 5
- 6 - 10
- 11 - 15
- 16 - 30
- 31 - 45
- 46 - 90
- 91 - 215

High Speed Railways (2011)

- 200 kmh
- 250 kmh
- 300 kmh
- 350 kmh

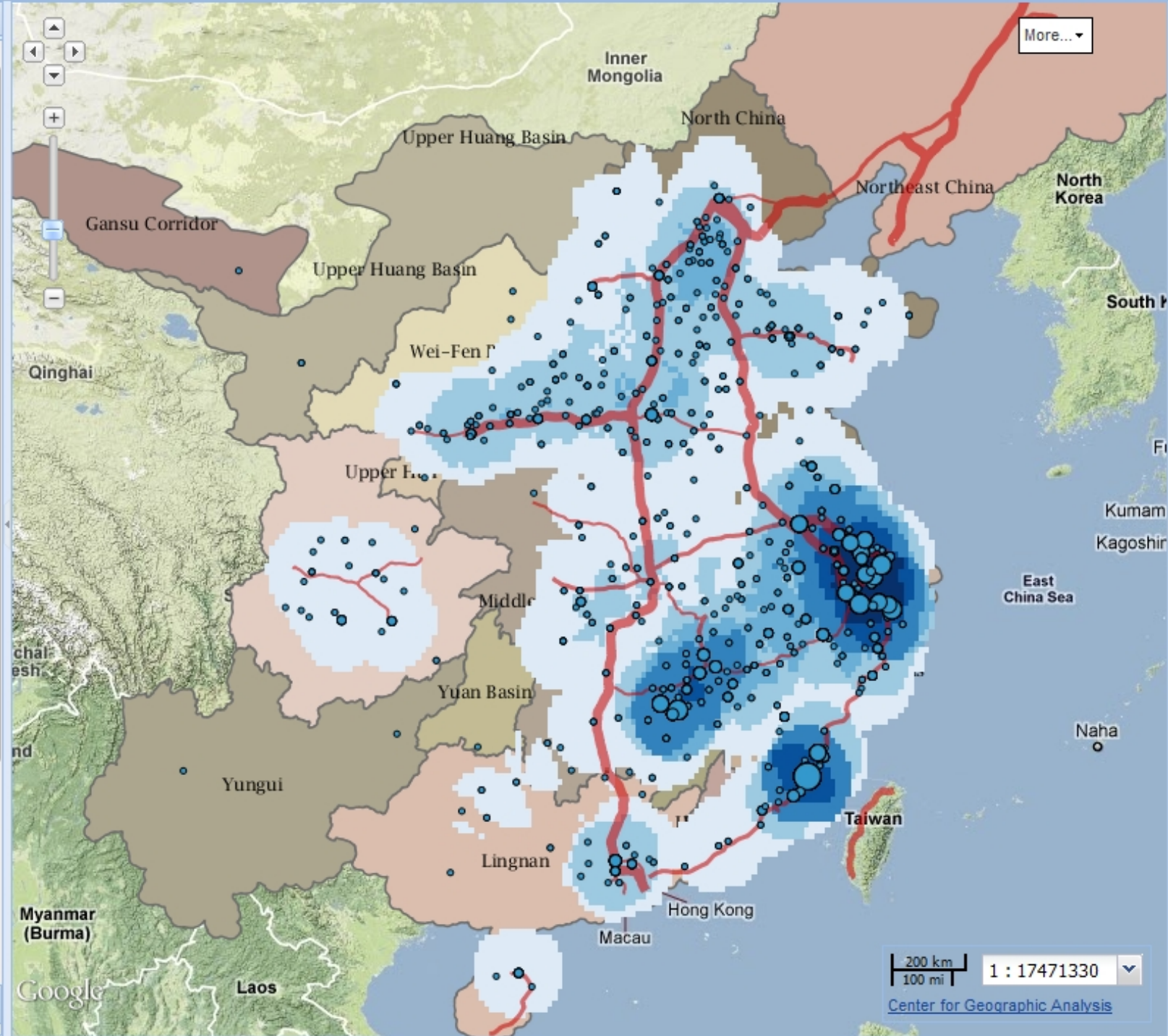
Ming Exams (Heat Map)

- n/a
- 1 - 5
- 6 - 10
- 11 - 15
- 16 - 30
- 31 - 45
- 46 - 90

Physiographic Macroregions

- (Color swatches)

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Data | **Legend**

Qing Entry Exams (Persons)

- 1 - 5
- 6 - 10
- 11 - 15
- 16 - 30
- 31 - 45
- 46 - 90
- 91 - 215

High Speed Railways (2011)

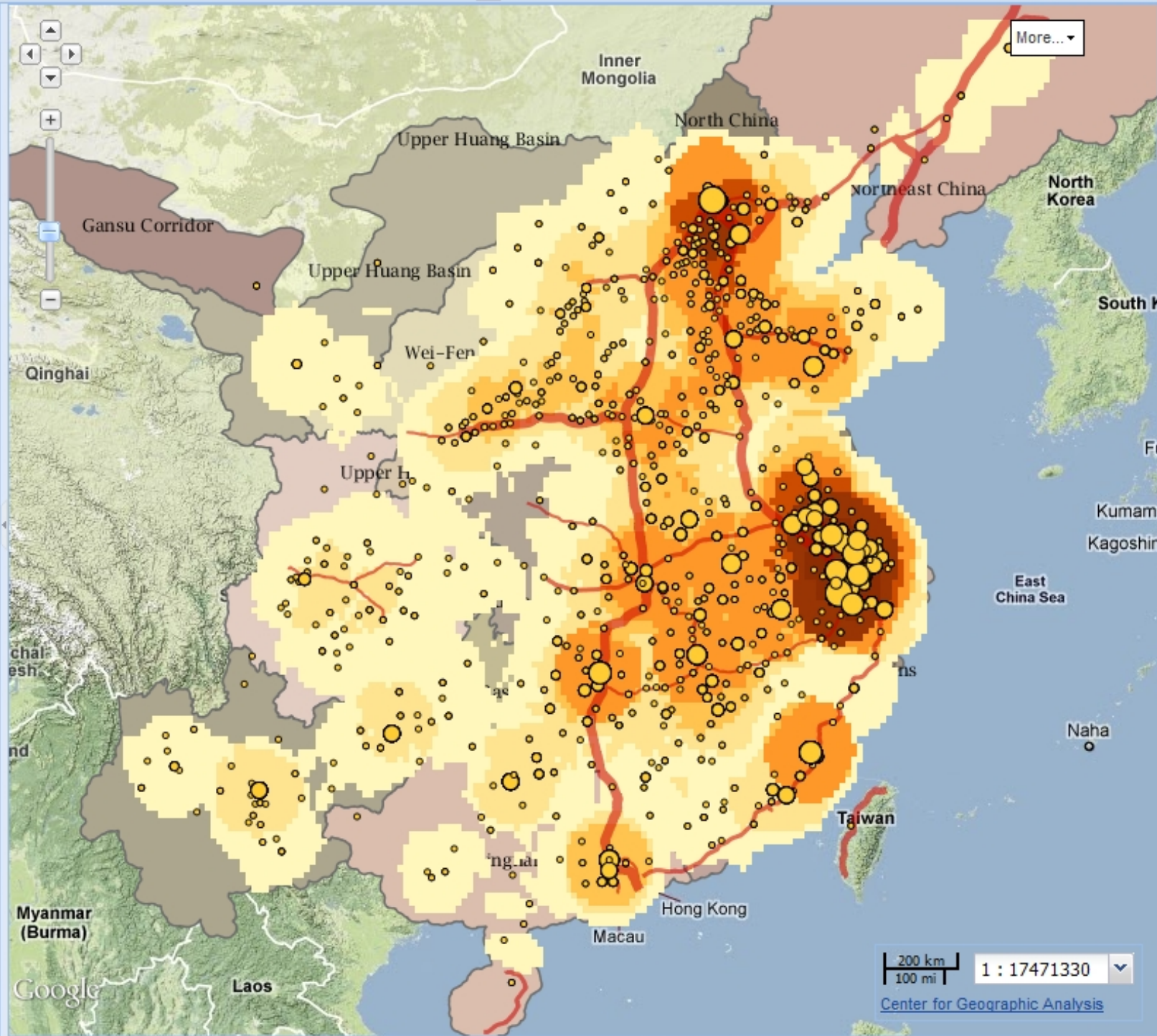
- ▬ 200 kmh
- ▬ 250 kmh
- ▬ 300 kmh
- ▬ 350 kmh

Qing Exams (Heat Map)

- ✕ n/a
- 1 - 5
- 6 - 10
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Physiographic Macroregions

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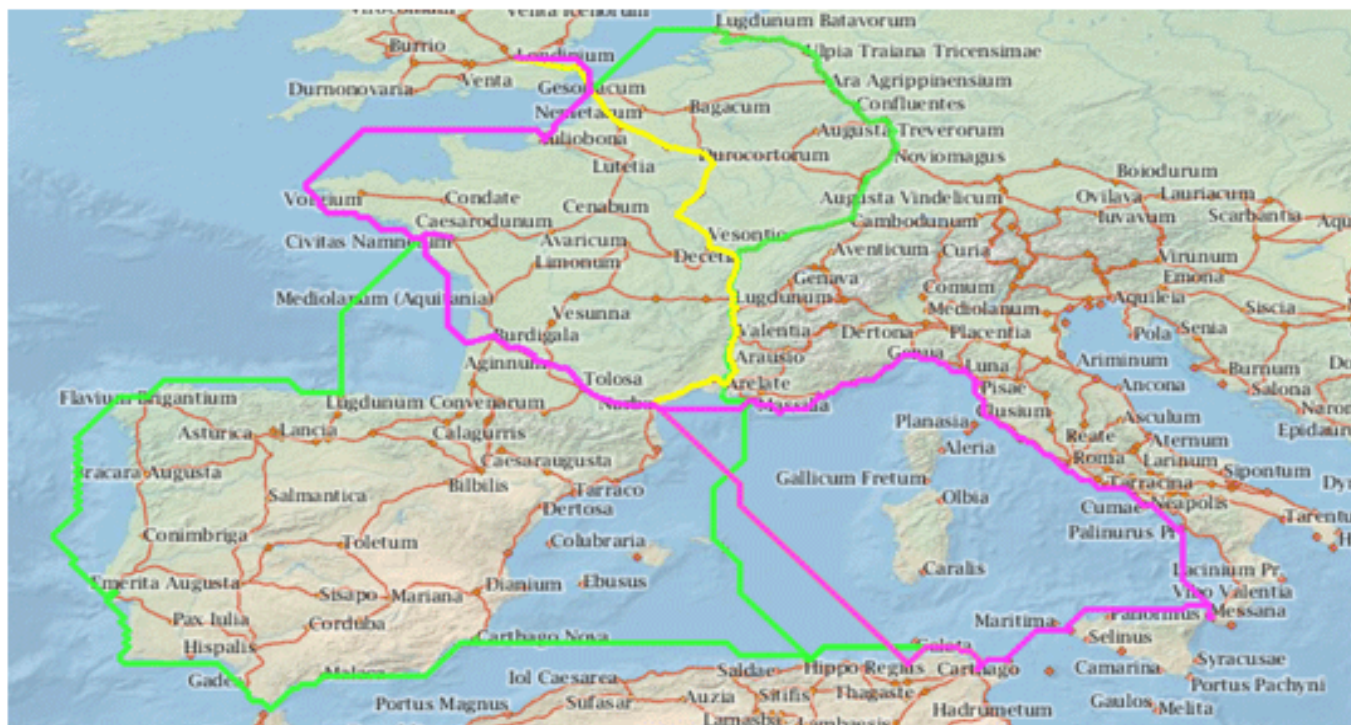
GIS Examples: ORBIS Roman Network

ORBIS The Stanford Geospatial Network Model of the Roman World

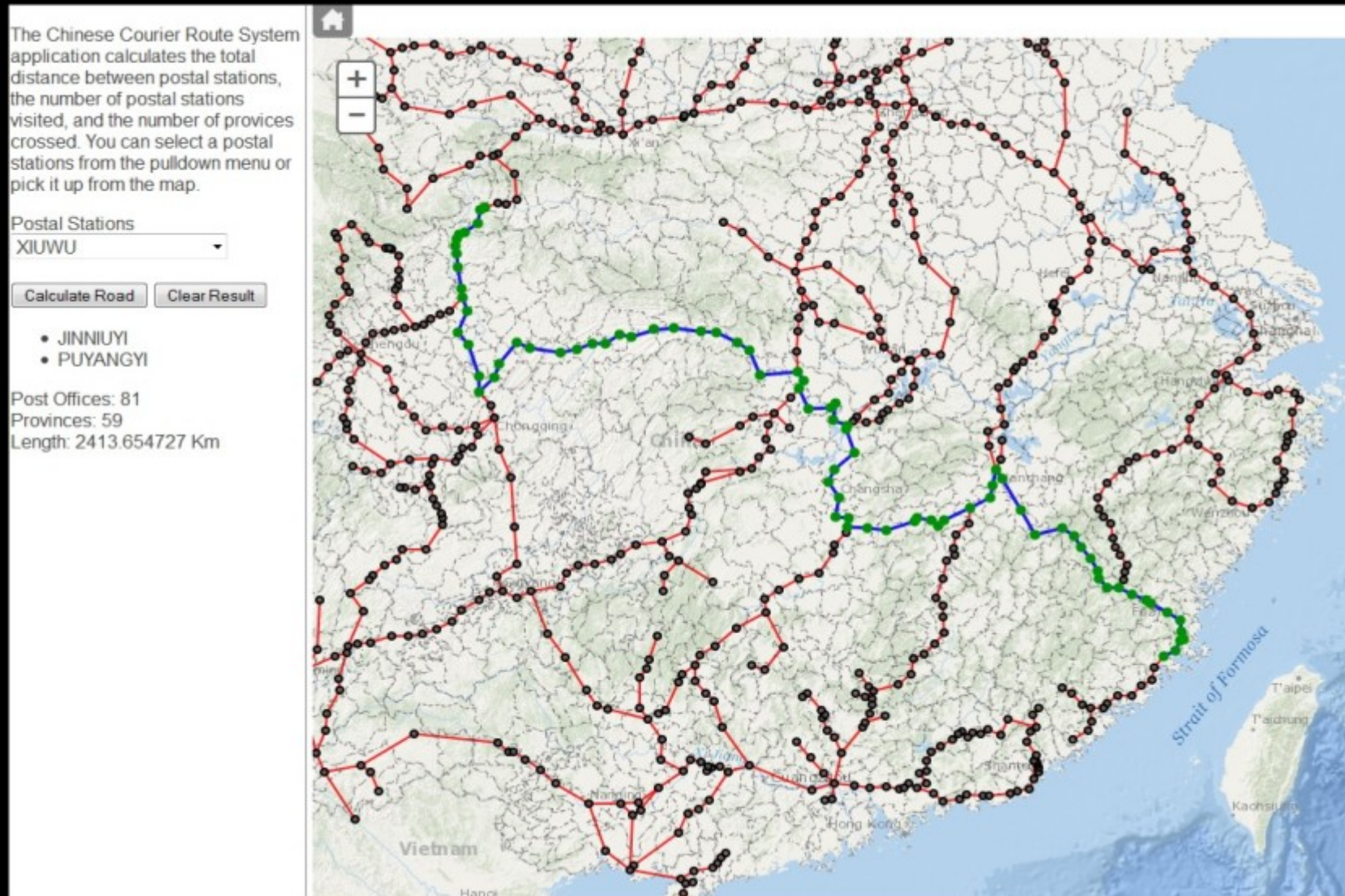
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Time, price, and distance

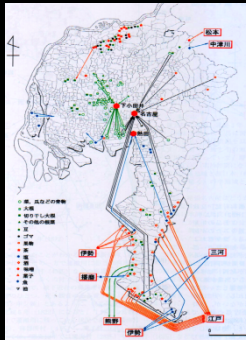
A long-range route simulation from Carthago (in present-day Tunisia) to Londinium (London) highlights difference in outcomes depending on priority, mode, and season.



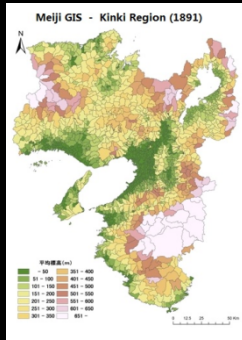
Ming Dynasty Courier Routes & Post Offices



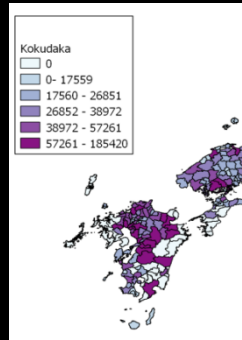
Japanese Historical GIS Examples



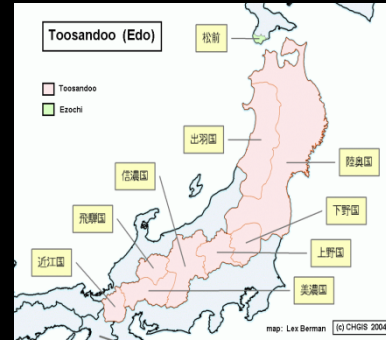
Edo Nagoya GIS
Mizoguchi



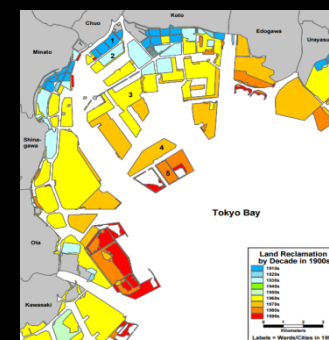
Meiji GIS
Murayama



Skinner Meiji
Skinner



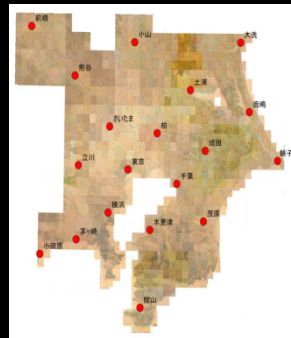
Tokugawa GIS
Berman



Tokyo Urban History
Loren Siebert



Historical Maps
David Rumsey



Agricultural History GIS
NIAES



Castle Explorer
Dan O'Grady



Kyoto Historical Photos
Kondo / Yano / et al

The Future of Spatial Humanities

movement away from

- Creation of large GIS databases
- Creation of “one-off” datasets for single projects
- Creation of custom site-specific or dataset-specific platforms

The Future of Spatial Humanities

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Moving toward

- Open platforms with multiple access methods (UIs, APIs, RDF)
- Feeds and web-services that are easy to integrate or mash-up
- Queries based on spatial and temporal extents + space time visualizations
- Curation of selected data for analysis, annotations & markup by experts

Exemplars: Spatial History Project

STANFORD UNIVERSITY



The Spatial History Project

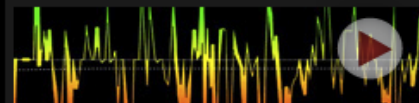
AUGUST 12, 2012

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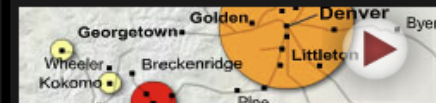
SEARCH



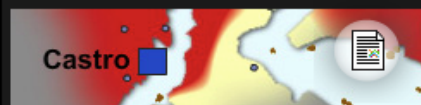
A Data Model for Spatial History



Machado de Assis: Memórias Póstumas



Colorado Railroad Accidents, July 1884 - June 1885



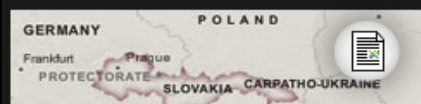
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Land Speculation in Fresno County: 1860-1891



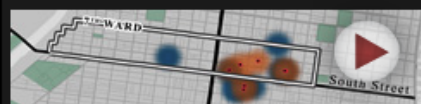
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Chasing an End to Perpetual Deforestation



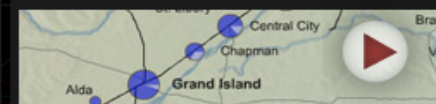
From Salt Ponds to Refuge in San Francisco Bay



Prostitution in Philadelphia: Arrests 1912-1918



Union Pacific Shipping from Nebraska: Forwarded/Received



Union Pacific Shipping from Nebraska: East/West

Exemplars: Addressing History

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AddressingHistory

I'm searching for... **people**

Select a specific Scottish Post Office Directory: **All Years**

Surname: **jameson** **Search**

Show historical map overlays: Alexander Kincaid, 1784 Bartholomew Post Office Plan, 1865 Johnston Post Office Plan, 1905



Exemplars: VGI Volunteer Geo Information

oldWeather

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USRC Thetis



Cutter
Tonnage: 1250
Fate: Decommissioned and sold to Messrs. W. and S. Job and Company, Inc. New York City for \$24,800
Learn more at Naval-History.net

67% COMPLETE

Transcribe logs

<http://whaling.oldweather.org/#/>

The New York Public Library presents

BUILDING INSPECTOR

Kill Time. Make History.

Welcome citizen cartographers!

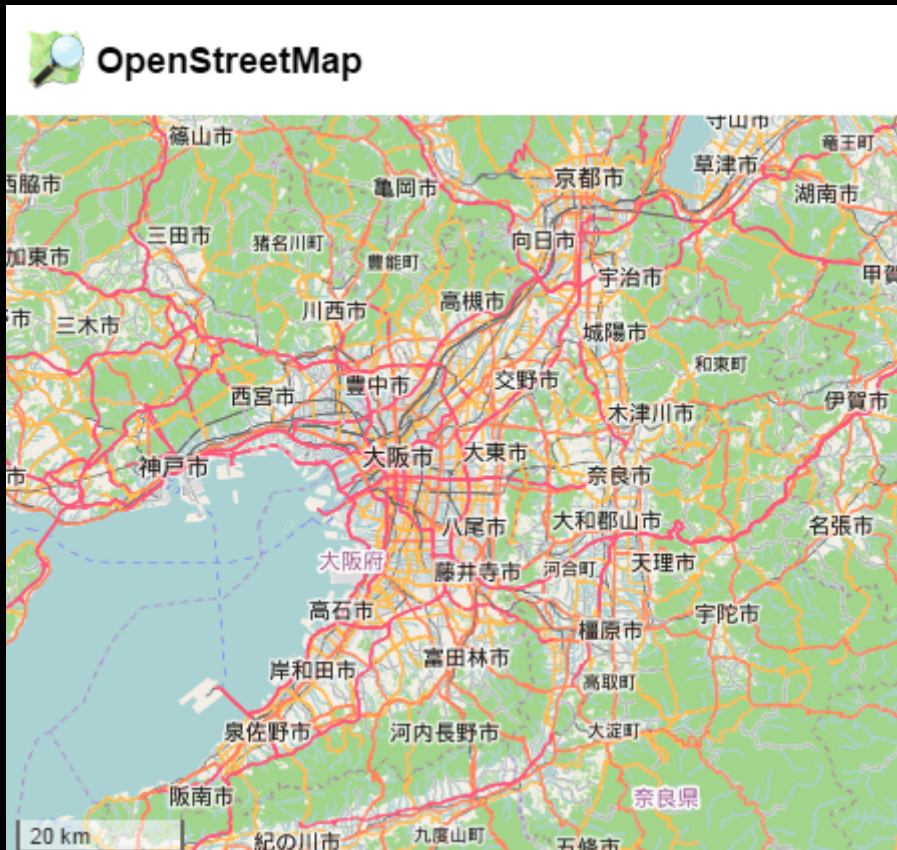
Help unlock New York City's past by identifying buildings and other details on beautiful old maps.

NEW MAPS!

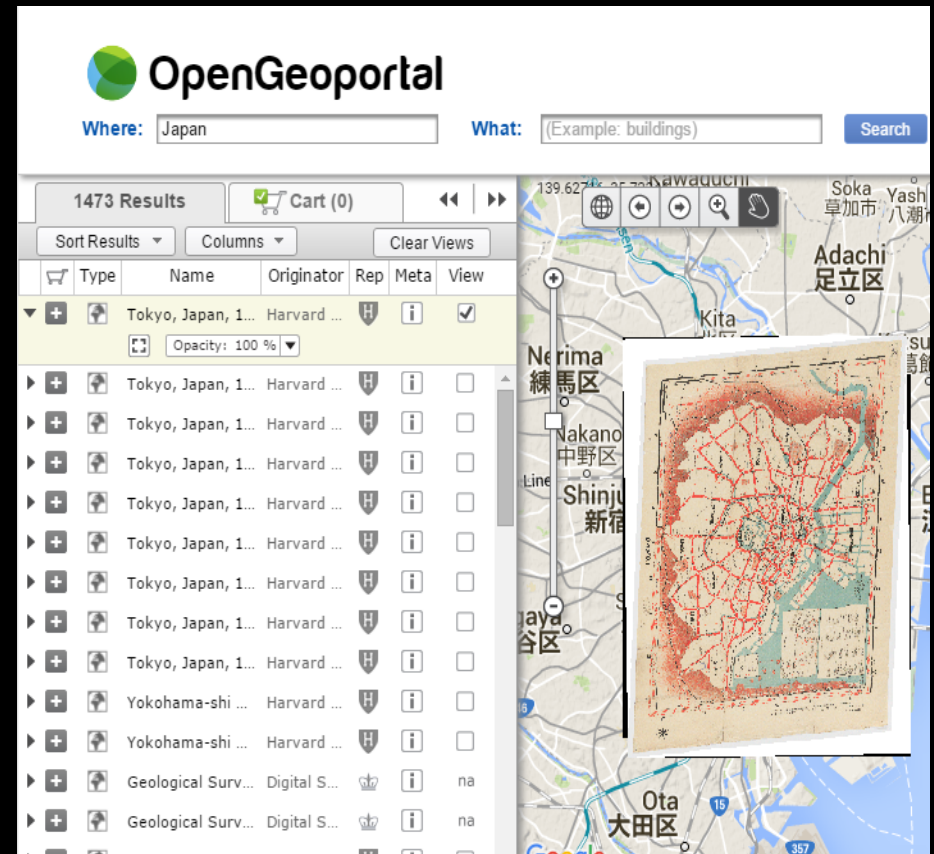
GET STARTED

<http://buildinginspector.nypl.org/>

Open Data is the new paradigm

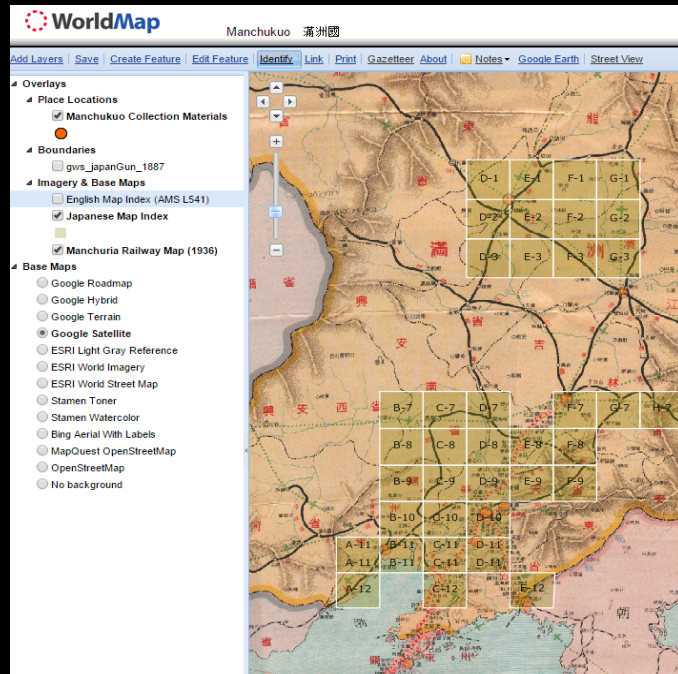


OpenStreetMap
GeoFabrik downloads



OpenGeoportal

Working demonstration projects



<http://worldmap.harvard.edu/maps/manchukuo>



<http://maps.cga.harvard.edu/ncc/>