

An operational overview of wildfires in Europe. State of the Art and HEIMDALL as technological solution

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The European Civil Protection and Humanitarian Aid Operations highlights that the severity and frequency of natural disasters has risen steadily over the past few decades in the EU, partly because of climate change, urbanization, population growth, and environmental degradation.¹

Climate change is amplifying the impacts of extreme weather events in Europe and worldwide.² Key trends show that climate change is contributing to increased intensity of extraordinary incidents as for instance rainfalls (causing floods and flash floods), wind storms, snowfalls and forest fires, among others. Forest fire season has experienced an increase in duration (number of months) in the Southern Europe and an expansion of fire-prone areas northwards. The current and predicted increases in droughts and temperature, combined with the lack of appropriate management within our forests, are expected to lead to more intense forest fire behaviour in most European countries³ (Figure 1).

In recent years, there have been several large fires affecting Europe. On one hand, relatively complex forest fires have affected the Central and Northern countries with a total of 247.017 forest fire events registered by the International Disaster Database [EM-DAT] during 2003 and 2013. Although the fire risk is low in Central and Northern countries, there is a large forest mass that is available and vulnerable to forest fires during drought events. For example, one single forest fire event in Sweden consumed 15,000 Ha in the 2014 Västmanland forest fire. Also, spring droughts provided favourable conditions for the spread of fires in grasslands from Sutherland and Stirling in Scotland in 5th of May 2017 to the Buskerud Oppland Fire in Norway in 7th of May 2017. On the other hand, the large forest fires in Southern Europe, with thousands of hectares burned in single forest fire events and thousands of people affected (e.g. Portugal in 2003, 2005 and 2017, Greece in 2007, Spain in 2015 and France in 2016), provides evidence of the need to improve international cooperation among affected countries to deal with these emergencies safely, effectively and efficiently. The EU is regularly called upon to support responses to major forest fires (Figure 2). Recent activations of the EUCPM include: France (2016) Sweden (2014), Bulgaria (2012), Portugal (2012, 2013, 2016), Greece (2012, 2014, 2015), Montenegro (2012, 2016), and

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¹ECHO Factsheet European Disaster Risk Management January 2018.

²IPCC, Climate Change 2014: Impacts, Adaptation, and Vulnerability.

³IPCC, Climate Change 2013: The Physical Science Basis

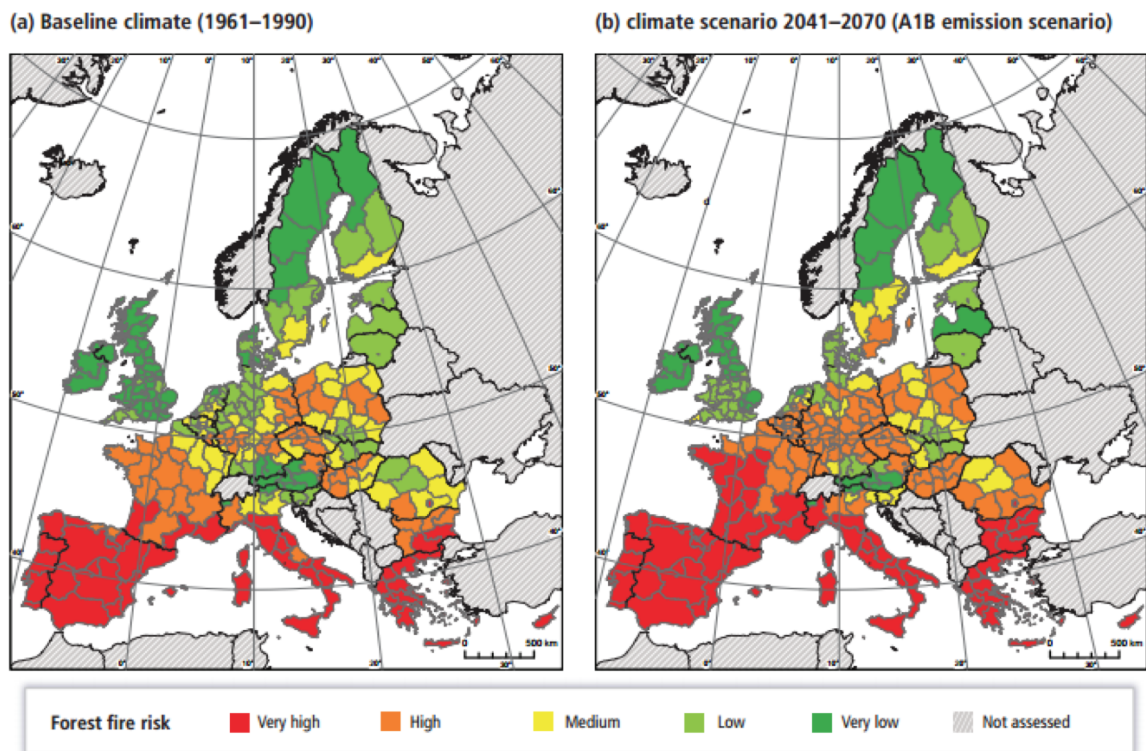


Figure 1: Screenshot of the forest fire risk in Europe for the 1961-1990 period (left) and the predicted 2041-2070 period (right) based on the A1B emission scenario. Source: IPCC WGII Report, Kovats et al. 2014, pp. 1287).

Cyprus (2016)⁴.

In 2017, there was a disastrous series of forest fires inside and outside Europe. More than 600.00 hectares were burnt in Chile in January 2017, during the fire season in the southern hemisphere that caused ten fatalities among the fire brigades. Over one million hectares of forest was destroyed (almost three times the five-year EU average) half of which was in Portugal alone. This represents an area four times the size of Luxembourg, or over ten times the area of Berlin. Many people tragically lost their lives. More than 100 people were killed in Portugal between June and October 2017 alone. These fires resulted in significant destruction of property and major impacts on the economy including to network infrastructure, businesses (commercial and industrial), agricultural and forestry activities⁵. Due to that, during the 2017, European Union sent international aid to Chile (Las Maquinas Fire, 2017)⁶, through the activation of EU Civil Protection Mechanism and also to Portugal and France. In the future, extreme fire events will occur more frequently, with also increasing the intensity and impact of these fires, that will derive into more actions of international emergency cooperation to manage such extremely incidents.

Forest fires usually affect multiple disaster management organizations, in the worst case even multiple jurisdictions and countries. Following the initial disaster event, cascading effects can further amplify the degree and complexity of disaster situations. This imposes a high demand of cross-organizational communication and cooperation not only during response but also in the preparedness phase. Furthermore, decision makers are often not able to base their decision on all available information which leads them to skip a fundamental plan formulation phase and to make incorrect decisions.

These recent episodes of extreme forest fire inside and outside the EU have shown that it is needed to ensure an efficient preparedness of societies to cope with complex crisis situations in case of for instance extreme forest fires. It means that improving the efficiency to respond to any larger incident or emergency contributes to minimizing the consequences on people, property, environment, and society as a whole. Among others, it can be reached by providing a flexible platform for multi-hazard emergency planning and management, which

⁴European Commission: Overview of Natural and Man-made Disaster Risks the European Union may face, 2017

⁵European Commission: Strengthening EU Disaster Management: rescEU Solidarity with Responsibility, 2017

⁶See ERCC Portal, Chile Forest fires EU support, 02 February 2017

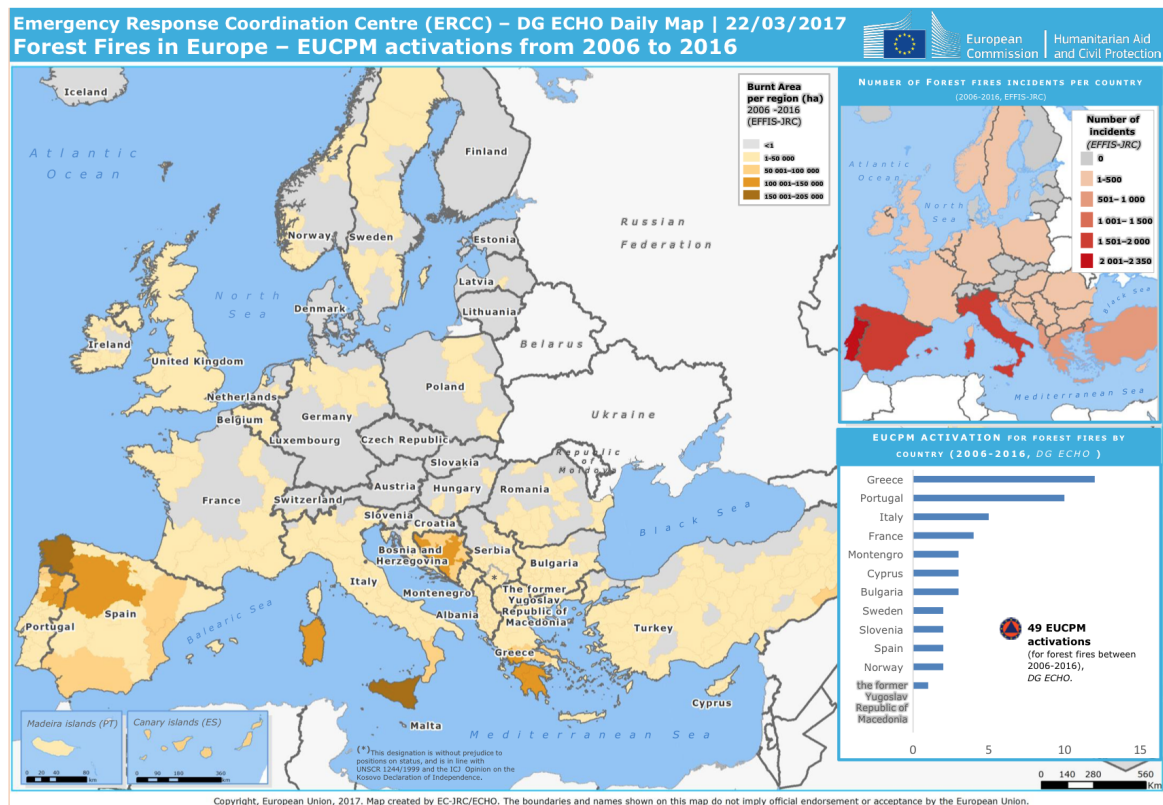


Figure 2: Mapping of forest fires in Europe: EUCPM activations from 2006 to 2016, DG ECHO/JRC.

makes use of innovative technologies for the definition of realistic multi-disciplinary scenarios and response plans. Therefore the HEIMDALL projects goal is to provide a platform as an integrated assets to support emergency management, such as monitoring, modelling, situation and risk assessment, decision support, communication tools, and organizational coordination among many actors, integrating a wide range of support tools to be used operationally by a large variety of stakeholders (firefighting units, medical emergency services, police departments, civil protection units, command and control centres).

Knowledge capitalization and management it is also crucial for HEIMDALL. Most of these fires had similarities in terms of spread patterns and fire behaviour, which needed specific response actions concerning strategic and tactical objectives. The lessons learnt from past fire events, concerning the decisions that were taken and the strategical and tactical plans deployed, can be in many cases applicable to current fire episodes. First-responders expressed that it is crucial to capitalize the existing knowledge from managing the emergencies of such extreme events and shared it among other emergency actors. There is then the need to design efficient tools for knowledge and experience sharing among different emergency actors and agencies. HEIMDALL will gather the experience and knowledge from first-responders organizations by identifying a series of relevant case studies (Figure 3).

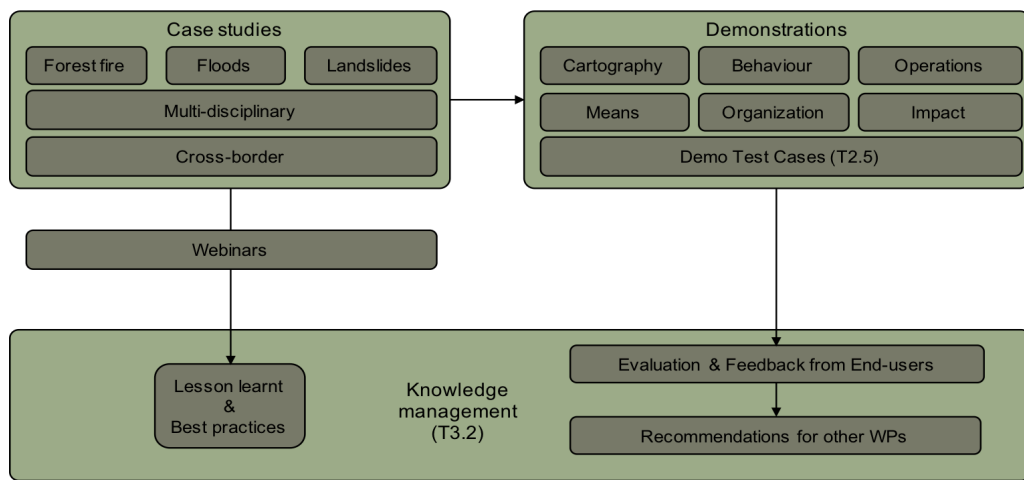


Figure 3: HEIMDALL case studies knowledge management. HEIMDALL Deliverable D3.4. HEIMDALL Demonstrations Issue 1.