

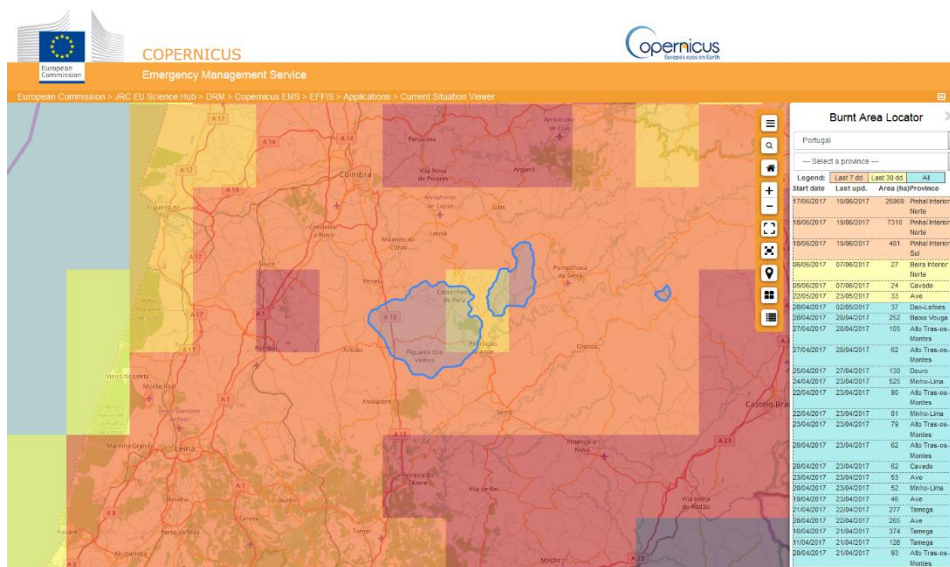


# EU-CIRCLE

A pan-European framework for strengthening Critical Infrastructure resilience to climate change

## EU-CIRCLE research activities on forest fires

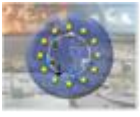
The wildfires of June 2017 in Portugal prove that the exacerbation of natural disasters due to climate change may be significant in terms of human lives and disruption of essential services. Long term planning of fire prevention, in order to protect citizens and essential services to society, requires the identification of credible future climate threat scenarios for addressing relative extreme situations.



Copernicus view of the June 2017 Portugal forest fires

EU-CIRCLE research outcomes can significantly contribute to this through the:

- Provision of long-term assessments of wildfire risk in various European regions, based on the elaboration of IPCC RCP scenarios and regional scale climate models using appropriate fire risk indices;
- identification of regions and time periods within the next decades that may experience increased hydrological risks (drought) and extreme fire behavior;
- assessing the impact of wildfire on the operation of critical infrastructures.

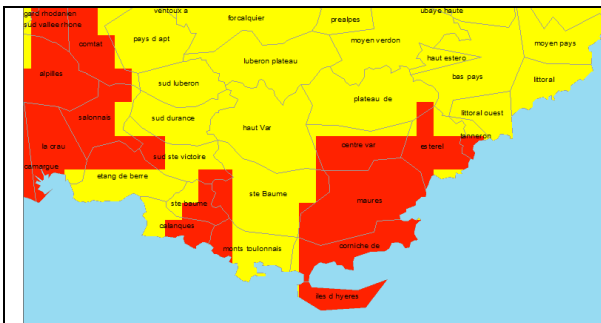


The contribution of EU-CIRCLE is quite important for planning wildfire prevention measures and critical infrastructure resilience, as it provides a platform and methodological framework that can support the long-term assessment of fire risk distribution in an area and support informed decisions for the investment required to mitigate the impact of eventual fires and to aid societies' adaptation to the new level of risk.

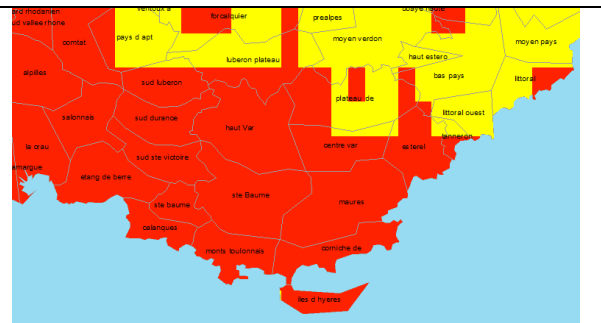
Key findings of EU-CIRCLE, thus far:

**1. More regions in South Europe will be exposed to extreme fire risk, and the fire season could be prolonged.**

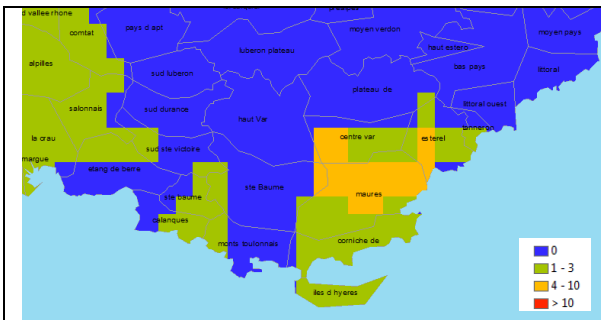
Currently EU-CIRCLE is organizing a case study in Southern France (Var Department) in order to demonstrate the capabilities of the project methodology to assess the future fire risk in the region. The Fire Weather Index<sup>1,2</sup>, an indication of the Fire Danger which also exists for daily forecasts in Copernicus Emergency Management Services / EFFIS, has been estimated for present climate and future RCP8.5 scenarios.



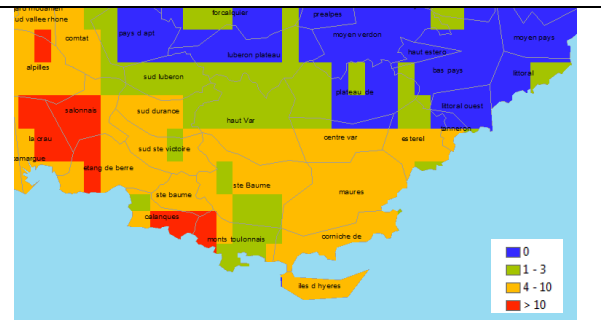
Regions in South France with max FWI values over 80  
2006-2010



Regions in South France with max FWI values over 80  
RCP8.5 2041-2045



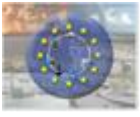
Number of days with FWI values over 80  
2006-2010



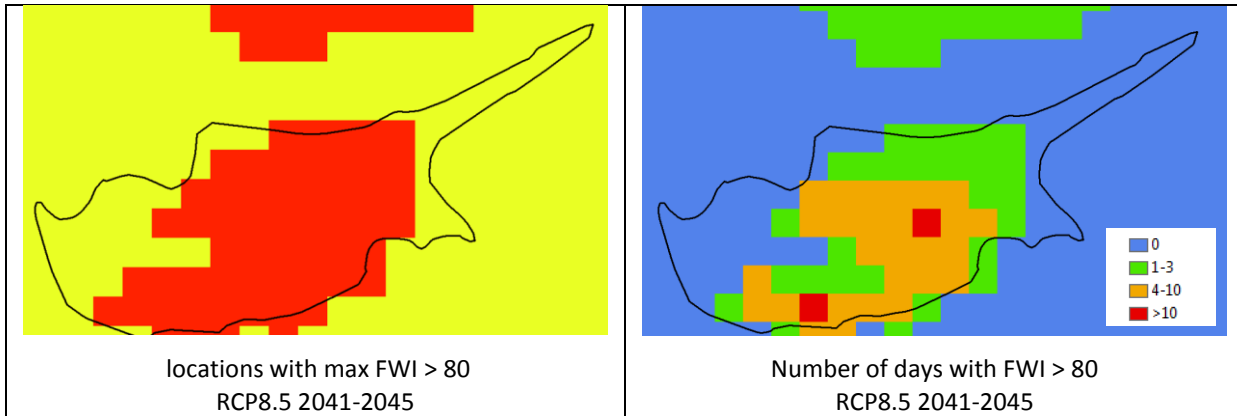
Number of days with FWI values over 80  
RCP8.5 2041-2045

<sup>1</sup> Van Wagner CE (1987) Development and structure of the Canadian Forest Fire Weather Index System. Canadian Forestry Service, Headquarters, Ottawa. Forestry Technical Report 35, 35 p

<sup>2</sup> Stocks BJ, Lawson BD, Alexander ME, Van Wagner CE, McAlpine RS, Lynham TJ, Dubé DE (1989) The Canadian Forest Fire Danger Rating System: and overview. Forestry Chronicle, 65(6), 258-265.



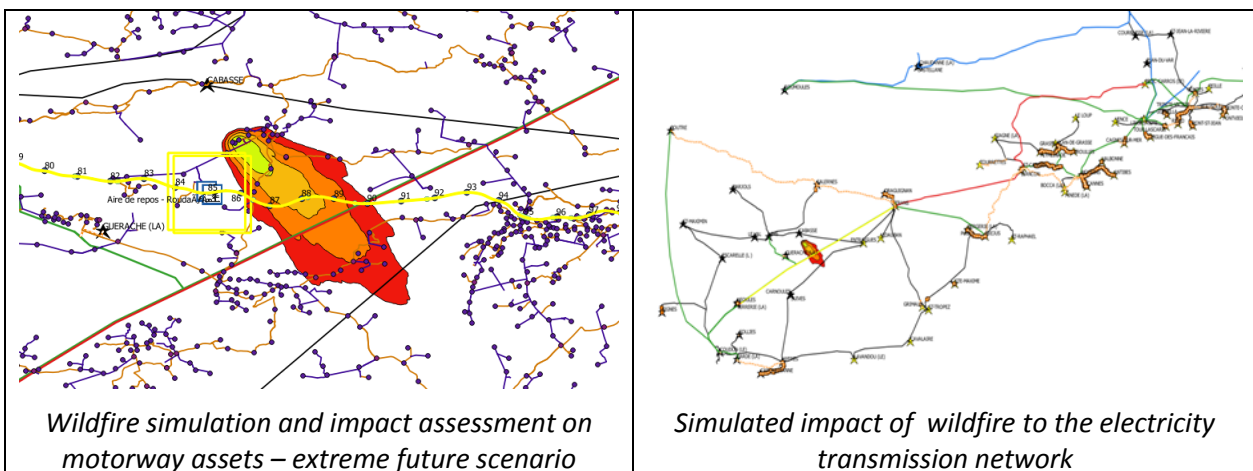
Furthermore, similar findings were found for Cyprus which were extensively discussed during the Cyprus workshop<sup>3</sup> organized by EUC with the participation of more than 50 local stakeholders. In the next 30 years there will be an increase of extreme values of fire risk according to the estimation of the FWI.



## 2. Better coordination is needed between stakeholders to effectively respond to wildfires.

The South of France case study coordinated by CEREN and ARTELIA is engaging a variety of stakeholders from the emergency response community and CI operators to understand the impacts of extreme fire behavior to critical infrastructures, mainly on the assets of the transport and energy sector<sup>4</sup>. The joint analysis and assessment of extreme future scenarios, identified a multitude of impacts on the interconnected electricity and transportation networks, effectively reaching areas located tens of km away from the incident location. Work during the next period of the project will include an assessment of the resilience of the interconnected infrastructures and identify possible adaptation options.

Emergency services are considered as part of the critical infrastructure of modern societies and thus EU-CIRCLE considers the impact of extreme weather events, such as mega-fires, and climate change on the performance of the respective public services, highlighting inter-dependencies between their assets, which may jeopardize the overall response capacity. The interoperability issues of rescue services and police forces that have to manage extreme situations and that are not used to do that, is another emerging issue that will be addressed during the French case study of EU-CIRCLE.

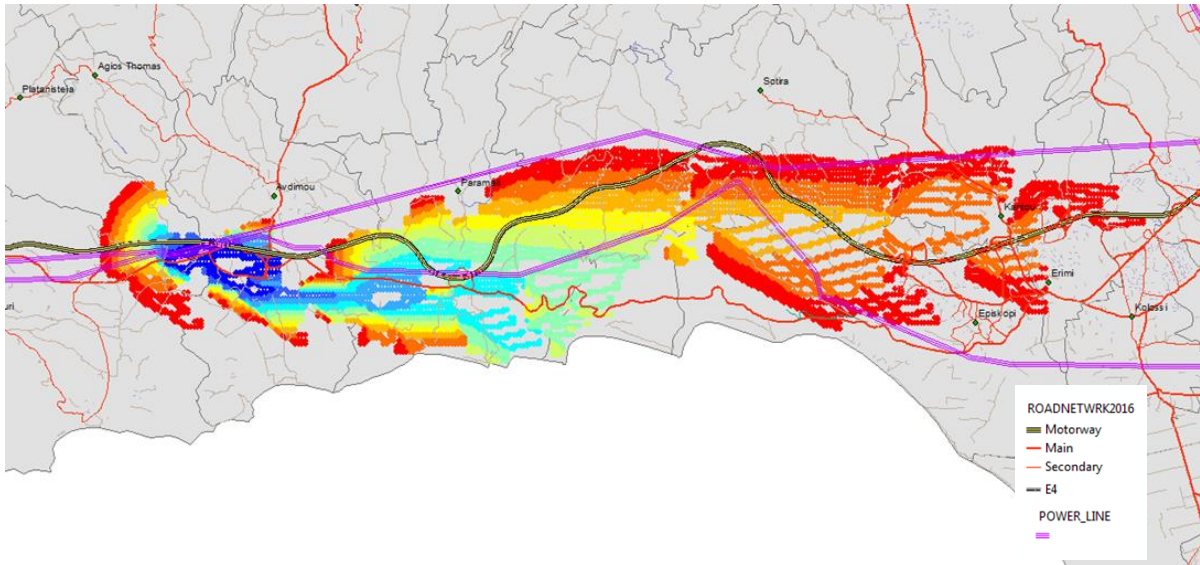


<sup>3</sup> <http://www.eu-circle.eu/documented-material/cyprus-workshop/>

<sup>4</sup> <http://www.eu-circle.eu/2017/04/06/discussing-the-impacts-of-a-wildfire-in-the-south-east-of-france-with-critical-infrastructures-operators-april-4th-2017-valabre/>



During the Cyprus workshop, stakeholders actively participated in discussions based around a simulated forest fire for future climate scenario, originating from the RCP8.5 scenario. The key outcomes of the discussion were that it is highly important to determine whether current response procedures are adequate future climate scenarios or they need to be adapted, and also whether CI interdependencies need to be further identified and understood during disasters as they may lead to domino effects. It has been identified that it is critically important to enhance cooperation between CI sectors and build upon the workshop organised by EU-CIRCLE.



Forest fire simulation under extreme conditions for the RCP8.5 scenario, in South Cyprus