

# FUTURE FIRE RISK IN GREECE AND ITS SUB-REGIONS

**C. Giannakopoulos, A. Karali, A. Roussos**  
**National Observatory of Athens, Athens, Greece**



**Keywords:** Future fire risk, Climate change, RCMs, FWI, Interactive web tool

## Target groups                      Relevance to the case-study requirements

➤ Long-term fire planners and policy makers	Mediterranean Europe, and Greece in particular, is likely to suffer potentially increased fire risk due to changing climatic conditions. Forest fires are highly sensitive to climate change because fire behavior responds immediately to fuel moisture, which is affected by precipitation, relative humidity, air temperature and wind speed. Thus the projected increase in temperature will increase fuel dryness and reduce relative humidity and this effect will worsen in those regions where rainfall decreases. Accordingly, increases in climate extreme events are expected to have a great impact on forest fire vulnerability.
➤ Professional organisations and federations	
➤ Ministries and Regional authorities	

## The approach

In collaboration with the World Wide Fund for Nature (WWF) Greece, we have developed an interactive Google-maps based application for the estimation of future climate change indices of relevance to fire risk. The application is hosted in the WWF Greece website of 'Oikoskopio' <http://www.oikoskopio.gr/map/> and in the main websites of NOA [www.noa.gr](http://www.noa.gr) under the 'EcoScope' tab and IERSD/NOA at [www.meteo.noa.gr](http://www.meteo.noa.gr) under the 'web-platform for climate change impacts' tab.

Meteorological output from the regional climate model RACMO2 for the control period (1961-1990) as well as for the near (2021-2050) and distant future (2071-2100) was used to examine potential changes in selected climatic indices in Greece and its sub-regions. This model was developed within the framework of the EU project ENSEMBLES ([www.ensembles-eu.org](http://www.ensembles-eu.org)) in which the National Observatory of Athens participated. RACMO2 model data were provided by the Royal Netherlands Meteorological Institute (KNMI). The KNMI- RACMO2 regional climate model (Lenderink et al., 2003; van den Hurk et al., 2006) is forced with output from a transient run conducted with the ECHAM5 Global Climate Model. The model uses 40 vertical levels on a horizontal 95x85 (lat x lon) grid and has a horizontal resolution of 25km. The selection of this specific model was based on a model assessment exercise performed within the ENSEMBLES project. The ability of all models to simulate the present climate was assessed and KNMI-RACMO2 was considered to more reliably simulate climate and extremes for the Mediterranean region (see ENSEMBLES Deliverable D3.2.2).

### References:

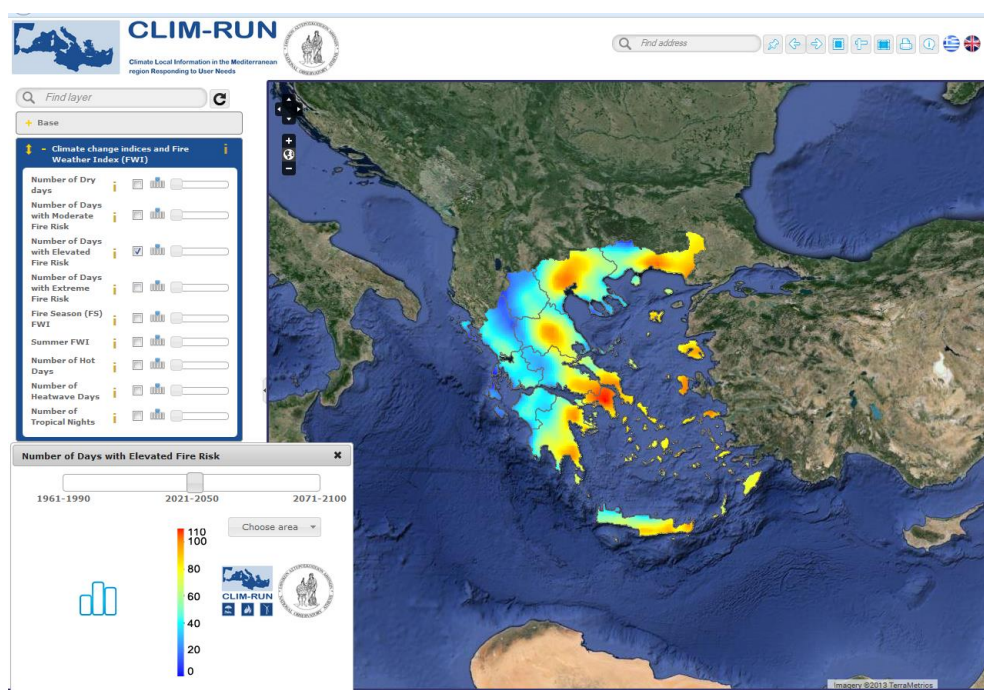
- ENSEMBLES Deliverable D3.2.2: RCM-specific weights based on their ability to simulate the present climate, calibrated for the ERA40-based simulations ([www.ensemble.eu](http://www.ensemble.eu)).
- Lenderink, G., van den Hurk, B., van Meijgaard, E., van Ulden A. P. and Cuijpers J. H., 2003. Simulation of present-day climate in RACMO2: first results and model developments, KNMI Technical Report 252, 24 pp.
- van den Hurk, B. J. J. M. and Co-Authors, 2006. KNMI Climate Change Scenarios 2006 for the Netherlands, KNMI-publication: WR-2006-01, pp. 82.

# FUTURE FIRE RISK IN GREECE AND ITS SUB-REGIONS

## The product

The user can focus on their chosen climate indicator and display its values on the map for the region of interest. A graph inset is also presented showing the variation of its selected climate indicator for the chosen region for the present (1961-1990), near future (2021-2050) and the distant future period (2071-2100). The indices one can choose include:

- Annual number of dry days ( $PP < 0.5\text{mm}$ )
- Annual number of days with moderate ( $FWI > 15$ ), elevated ( $FWI > 30$ ) or extreme ( $FWI > 45$ ) fire risk
- Mean annual Fire Weather Index (FWI) during fire season (May-October) and summer
- Annual number of “hot days” ( $T_{\text{max}} > 30^\circ\text{C}$ ) and “heatwave days” ( $T_{\text{max}} > 35^\circ\text{C}$ )
- Annual number of “tropical nights” ( $T_{\text{min}} > 20^\circ\text{C}$ )



The figure illustrates an example of a user generated map, depicting mean number of days with elevated fire risk for the near future period (2021-2050) for the whole Greek domain.

## Making the product usable

This interactive application will certainly be a useful tool in the hands of policy makers and local Government Officials who wish to have access to easy-to-get information about climate change parameters in their region of interest. However, these projections have been produced using output from a single regional climate model and hence they are subject to uncertainties. In the future, we plan to use output from a selection of regional climate models in order to reflect the uncertainty in our projections as well as to add more climatic indices of interest to stakeholders and policy decision makers.

*This information sheet was developed in the framework of the CLIM-RUN FP7 EU project. The product it describes should not be used without acknowledging the project and, particularly for any operational use, interaction with the authors is welcome and strongly encouraged.*