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Early warning system for forest fires in Greece: developments and upgrades in the frame of Climpact project

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The METEO unit of the National Observatory of Athens has developed and applies a set of operational services that employ state-of-the-art observational and modeling techniques with the aim to assist both the citizens and the authorities in better preventing, addressing, and ultimately mitigating the adverse impacts of forest fires. The early warning system platform, which has been initially developed in the frame of DISARM project, had been upgraded with improved functionalities in the frame of the **CLIMPACT project**, a flagship initiative on climate change to coordinate a Pan-Hellenic network of institutions.

The presentation focuses on the description of the system that encompasses the following pillars:

(a) Forecasting of forest fire danger: four widely used indices (Canadian Fire Weather Index - CFWI, Modified Nesterov, Fosberg and Haines) are operationally calculated for the next 3 days at 6kmx6km and 2kmx2km spatial resolution based on 3 state-of-the-art numerical weather prediction models (WRF, Bolam, Moloch). Especially for CFWI the fire danger thresholds have been adapted to the fire environment of Greece;

(b) Real time monitoring of the fire weather conditions: The monitoring is based on the online network of meteorological stations operated by the METEO Unit of NOA that includes ~450 stations across Greece. Fire weather monitoring also includes the daily estimation of landscape flammability using as a proxy the dead fuel moisture content (DFMC). DFMC is calculated using a physically based fuel moisture model and weather station data.

(c) IRIS a rapid response system for fire spread forecasting: WRF-ARW NWP model and FIRE two-dimensional fire spread model are applied, along with a prototype high-resolution geospatial dataset for the representation of fuels, in a fully-coupled mode in order to account for the two-way interaction between fire and the atmosphere. Major upgrades of the IRIS system achieved in the frame of CLIMPACT include the online calculation of dead fuel moisture, the increase of spatial resolution (40mx40m pixels) of the prototype fuel model for Greece, and the delivery of a forecast guidance which includes the categorization (using a 7-level scale) of forest fires based on the forecasted behavioral characteristics.