



## **The potential predictability of fire danger provided by ECMWF forecast**

Francesca Di Giuseppe

ECMWF, Reading, (nen@ecmwf.int)

The European Forest Fire Information System (EFFIS), is currently being developed in the framework of the Copernicus Emergency Management Services to monitor and forecast fire danger in Europe. The system provides timely information to civil protection authorities in 38 nations across Europe and mostly concentrates on flagging regions which might be at high danger of spontaneous ignition due to persistent drought. The daily predictions of fire danger conditions are based on the US Forest Service National Fire Danger Rating System (NFDRS), the Canadian forest service Fire Weather Index Rating System (FWI) and the Australian McArthur (MARK-5) rating systems. Weather forcings are provided in real time by the European Centre for Medium range Weather Forecasts (ECMWF) forecasting system.

The global system's potential predictability is assessed using re-analysis fields as weather forcings. The Global Fire Emissions Database (GFED4) provides 11 years of observed burned areas from satellite measurements and is used as a validation dataset. The fire indices implemented are good predictors to highlight dangerous conditions. High values are correlated with observed fire and low values correspond to non observed events. A more quantitative skill evaluation was performed using the Extremal Dependency Index which is a skill score specifically designed for rare events. It revealed that the three indices were more skilful on a global scale than the random forecast to detect large fires. The performance peaks in the boreal forests, in the Mediterranean, the Amazon rain-forests and southeast Asia. The skill-scores were then aggregated at country level to reveal which nations could potentially benefit from the system information in aid of decision making and fire control support. Overall we found that fire danger modelling based on weather forecasts, can provide reasonable predictability over large parts of the global landmass.