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# Application of operational seasonal prediction systems for seasonal prediction of fire danger : a case study of the extreme wildfire events in California, Spain and Portugal of 2017

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The extreme wildfire events in California, Portugal and Spain during the fire seasons of 2017 caused considerable economic, environmental and human life losses and gathered much media attention. These events highlighted the need for both short and medium-term forecasts of wildfire danger, the latter useful for raising awareness and preparing for wildfire prevention and suppression strategies. The European countries most affected by wildfires are in the Mediterranean basin, with summer fires occurring during periods of drought. While countries such as the United States, Canada and Australia have developed extensive and reliable short-term and seasonal wildfire forecasting systems, similar systems in Europe are comparatively less well established.

For example, the European Forest Fire Information System (EFFIS) produces short-term (1-10 days) fire danger forecasts, but does not provide seasonal forecasts. These short-term forecasts rely on Canadian Fire Weather Index (FWI) values computed from the operational weather predictions from ECMWF. The McArthur Forest Fire Danger Index (FFDI) is a similar system originating from Australia. FWI and FDDI are computed from daily values of temperature, precipitation, relative humidity and wind data, accounting for factors that are important for fire severity and spread. These daily meteorological variables can be obtained from observations, climate predictions or climate projections.

Our approach to seasonal prediction of fire risk is to use operational forecasts such as those from ECMWF's System 5 forecast system to issue predictions of the fire danger indices FWI and FFDI. As operational forecasts produce ensemble predictions of daily values of the relevant meteorological variables, we are able to compute ensemble daily predictions of fire danger indices at a global scale, which can be used to formulate probabilistic predictions. Global observations of burned area from the MCD64 global burned area product and the Global Fire Emissions Database version 4 (GFED4) are used to evaluate the skill of the predictions. We will show the skill of the predictions for the Iberian Peninsula and California, with a focus on the extreme wildfire seasons such as that of 2017.