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Fire weather spatial and temporal patterns in Iberian Peninsula

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Weather conditions, especially the spatial and temporal variability of temperature and precipitation, have a very strong influence on fuel availability and flammability, and therefore play an important role on wildfire activity. In regions of transitions between wet and dry climate, the patterns of this risk can have high variability. This work aims to answer the following questions for one such region, the Iberian Peninsula: 1) How do the seasonal patterns of fire weather risk and burnt areas vary inside the Peninsula? 2) Were there changes to these patterns in recent decades?

Fire regimes in the Iberian Peninsula were studied for 1980-2014 using national fire datasets of Portugal and Spain. Their spatial variability for sub regions (Portuguese districts and Spanish provinces) was compared with the regional fire clusters developed in previous studies. Several Fire Weather Indices of the Canadian Wildland Fire Information System (DSR, BUI, ISI and DC) were computed and analysed for 1979-2017, using daily ERA-Interim reanalysis data for air temperature, relative humidity, wind speed and 24h-precipitation, registered at noon. A definition of extreme fire weather day was developed, based on days with DSR above the 90th percentile computed for the summer fire season, here defined between July and September, of the 1981 – 2010 period, to characterize the fire weather within the pyro regions and to analyse the occurrence of large fires occurred in the last decades.

The results show that the regional fire clusters have not changed between 1980-2004 and 1990-2014, but there were changes in some border regions that may alter the clusters in the future. Different DSR characteristics were found to explain the differences between the seasonal behaviour in these clusters, and recent changes in border provinces were related with recent changes of climate and DSR. Finally, an analysis of very large fires concluded that these are clearly driven by days with extreme DSR. These results highlight the link between climate and fire regime and can therefore help predict the impacts of climate change.

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