



Impact of drought on wildfires in Iberia

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Southern European countries, and the Iberian Peninsula (IP) in particular, have been vastly affected by summer wildfires (Trigo et al., 2013). This condition is hampered by the frequent warm and dry meteorological conditions found in summer which play a significant role in the triggering and spreading of wildfires. These meteorological conditions are also particularly important for the onset and end of drought periods, a phenomenon that has recurrently affected the IP (Gouveia et al., 2012). Moreover, the IP corresponds to one of the most sensitive areas to current and future climate change, and recent and future trends towards a dryer and warmer Mediterranean climate (Sousa et al., 2014) will tend to exacerbate these problems.

The main scope of this study was to investigate the impact of drought on wildfires' burned areas in the IP. The objective was to examine the correlation between drought, as expressed by both the Standardized Precipitation Index (SPI) and the Standardized Precipitation Evapotranspiration Index (SPEI) (Vicente-Serrano et al., 2010), and wildfire burned areas.

The SPI and SPEI were both calculated for 4 large regions (Northwestern, Northern, Southwestern and Eastern) whose spatial patterns and seasonal fire regimes were shown to be related with constraining factors such as topography, vegetation cover and climate conditions (Trigo et al., 2013). In this study, the drought indices were determined for the time scales of 3 and 6 months for August and for 12 months in September, thus representing the summer and annual drought.

The correlation between drought and burned areas during July and August was particularly significant for the 3 months SPEI and SPI relatively to the 6 and 12 time scales, which indicates that drought and fires relation is a small-size scale process. Moreover, the correlation between drought and burned areas during July and August was particularly significant for the Northern and Southwestern regions both for SPEI for 3 and 6 months in August. In the Eastern and Northwestern regions the correlation was most significant for the SPI for 3 and 6 months. Thus, the relation between wildfires and drought is better explained in the Northern and Southwestern regions by the temperature influence and on the Northwestern and Eastern by the precipitation influence.

Gouveia C.M., Bastos A., Trigo R.M., DaCamara C.C. (2012) "Drought impacts on vegetation in the pre and post-fire events over Iberian Peninsula". *Natural Hazards and Earth System Sciences*, 12, 3123-3137, 2012.

Vicente-Serrano S.M., Santiago Beguería, Juan I. López-Moreno (2010) "A Multi-scalar drought index sensitive to global warming: The Standardized Precipitation Evapotranspiration Index – SPEI". *Journal of Climate* 23: 1696-1718.

Trigo R.M., Sousa P., Pereira M., Rasilla D., Gouveia C.M. (2013) "Modelling wildfire activity in Iberia with different Atmospheric Circulation Weather Types". *International Journal of Climatology*, DOI: 10.1002/joc.3749

Sousa PM, Trigo RM, Pereira MG, Bedia J, Gutiérrez JM, 2014. Different approaches to model future burnt area in the Iberian Peninsula. *Agricultural and Forest Meteorology* 202, 11-25. doi:10.1016/j.agrformet.2014.11.018

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