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Climate variability and wildfire risk and occurrence in northern Spain

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In spite of their reputation of wetness, wildfires are a frequent event in Cantabria (Northern Spain), but their seasonality does not match the typical warm season maximum generalized in most of the Iberian Peninsula. They occur at the end of the winter and the beginning of the spring (January to March), being mostly anthropogenically triggered due to the necessity of preparing pastures in the uplands.

However, catastrophic episodes of generalized burning are controlled by different atmospheric mechanisms, namely the occurrence of “Suradas”, a downslope windstorms which combines high winds speeds and low humidities, and long periods of drought in late fall and winter.

This contribution analyzes long term trends (1961 onwards) of several climatic variables during the highest wildfire risk period in order to assess to what extent the occurrence of wildfires may be linked to the recent climatic variability. Raw meteorological values of temperature, humidity, wind speed and precipitation are transformed into a well-known meteorological fire weather index, the Canadian Forest Fire Index (FWI). Besides, monthly values of the Palmer Drought Severity Index we used to assess the spatial and temporal magnitude and intensity of droughts.

Our results show that the regional climate has become warmer and drier, due to the combined effects of increases in temperatures, sunshine duration, and the decrease in relative humidity and precipitation, variables that are likely to play an important role in drought. Unknown in the 60s, 70s and most of the 80s, drought has become a relatively frequent phenomenon during the last two decades, and, in fact, the two most extreme episodes of drought at century scale, during 1989-1990 and 1993, occur in the 90. However, both the frequency and the intensity of “Suradas” have reduced, and consequently, the high fire risk episodes are now less frequent, but their absolute maximum values remain unchanged.

Those regional climate trends are strongly linked to the recent evolution of atmospheric circulation at hemispheric scale. The higher frequency of anticyclonic cells over the Iberian Peninsula, and conversely, the reduction of the number of Atlantic baroclinic disturbances are consistent with the temporal and spatial evolution of the North Atlantic Oscillation and the Mediterranean Oscillation.