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Drought variability and change across the Iberian Peninsula

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Drought variability and change is assessed in this study across the Iberian Peninsula along the 20th century and the first decade of the 21st century using state of the art drought indices: the Sc-PDSI, the SPI and the SPEI. Daily temperature and precipitation data from 24 time-series regularly spread over Iberian Peninsula are quality controlled and also homogenized in a monthly scale to create the Monthly Iberian Temperature and Precipitation Series (MITPS) for the period 1906-2010. The Sc-PDSI, the 12-month SPI and 12-month SPEI are computed on a monthly basis using the newly MITPS dataset to identify dry and wet conditions across time. Precipitation data is only required to compute SPI, but potential evapotranspiration (PET) is also needed to perform the Sc-PDSI and SPEI, which is estimated using the Tornthwaite's method.

The analysis conducted in this study confirms that drought conditions are worsening for most of the Iberian Peninsula across time strongly induced by global warming especially during the last three decades. All drought indices have found a drying trend in the Pyrenees, Ebro basin, central Iberia and in the south and south-eastern area while a wetting trend is identified in the western and in the north-western region. Future projections also indicate a clear increase in hydrological drought conditions along the 21st century, thus, water saving and the application of effective water management strategies will be crucial to minimize the impact of hydrological droughts over the Iberian Peninsula into the near future.

KEY WORDS: Drought, climate change, Iberian Peninsula, drought indices.