



Drought in the Iberian Peninsula under future climate scenarios

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In Southern Europe, droughts are one of the most relevant extreme weather events [1], causing severe socio-economic losses and human health impacts. With recent global and regional warming [1,2], droughts in the Iberian Peninsula (IP) have become more frequent and severe [3,4], revealing significant vulnerability and exposure of ecosystems and humans [2]. Changes in the frequency and/or intensity of extreme weather and climate events are bound to impinge profound environmental and socio-economic impacts in the next decades [1].

In this work, the regional climate change in the IP for time periods when the global mean temperature increased 1.5° and 2°C when compared to pre-industrial conditions was assessed in terms of drought evaluation. To achieve the proposed goal drought changes have been investigated using two of the most widely used drought indicators, the Standardized Precipitation Index (SPI) and the Standardized Precipitation and Evapotranspiration Index (SPEI). Both indices were calculated for the IP territory at 0.11° resolution during 2006-2100, considering the RCP8.5 and RCP4.5 scenarios obtained through EURO-CORDEX [5]. Both drought indices were computed monthly at multiple time-scales, using the accumulation periods of 1-, 3-, 6-, 9-, 12-, 18- and 24-months. The temporal multi-scalar character of both indices constitutes a significant advantage, allowing the characterization of the phenomenon with different response times of different ecosystems to drought conditions.

Based on EURO-CORDEX simulations we addressed the following questions in this study: (1) to what extent could the occurring risk of droughts be avoided if global warming is limited, and (2) are there new areas with higher risk of population exposure to droughts in the IP. The obtained results enable the responsible authorities to take action, allowing society to timely prevent, adapt and mitigate to a range of different climate scenarios.

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Acknowledgements: This work was partially supported by national funds through FCT (Fundação para a Ciência e a Tecnologia, Portugal) under projects IMDROFLOOD (WaterJPI/0004/2014) and IMPECAF (PTDC/CTA-CLI/28902/2017). Ana Russo and Andreia Ribeiro thank FCT for grants SFRH/BPD/99757/2014 and PD/BD/114481/2016, respectively.