



Analyzing the future megadrought risk in the Iberian Peninsula

Matilde García-Valdecasas Ojeda, Patricio Yeste Donaire, Trinidad Manuel Góngora García, Emilio Romero Jiménez, Sonia R. Gámiz-Fortis, Yolanda Castro-Díez, and María Jesús Esteban-Parra

Universidad de Granada, Física Aplicada, Granada, Spain (mgvaldecasas@ugr.es)

Water scarcity has been considered as one of the major threats for the Earth for the 21st century, especially in specific areas such as the Mediterranean region. In this framework, this study investigates changes in drought events in a vulnerable region, the Iberian Peninsula (IP), by using a combined indicator based on three different drought indices, the standardized precipitation index (SPI), the standardized precipitation evapotranspiration index (SPEI) and the standardized wetness index (SWI).

To this end, current (1980-2014) and future (2021-2100) climate simulations were carried out using the Weather Research & Forecasting (WRF) Model over a domain centered in the IP with 0.088° of spatial resolution (~10km), and nested in the 0.44 EURO-CORDEX region. The WRF simulations were driven by the MPI-ESM-LR Global Bias-Corrected outputs under two different representative concentration pathways: the moderate emission scenario (RCP4.5) and the most severe emission scenario (RCP8.5).

Drought indices were computed at 3- and 12-month time scales, in order to analyze trends in seasonal and annual frequency, severity and duration of drought events. Additionally, the potential risk of megadrought occurrences, which are prolonged drought lasting decades or longer, was also examined.

The results of this study could provide a valuable contribution to the understanding of the effect of global warming in the water availability, which is necessary for a suitable decision making in the future.

Keywords: Megadrought, Climate Change, Drought indices, WRF, Regional Climate Models.

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