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Assessment of Future Drought Conditions over the Iberian Peninsula using the WRF model

Matilde García-Valdecasas Ojeda, César Quishpe-Vásquez, Sonia Raquel Gámiz-Fortis, Yolanda Castro-Díez, and María Jesús Esteban-Parra

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

Severe drought events have a strong impact on the society producing significant economic losses. Therefore, it is important a suitable exploration and detection of these extreme events under future climate changes scenarios, especially in vulnerable areas such as the Iberian Peninsula. In this study, the projection of future drought episodes were analyzed using two drought indices: the Standardized Precipitation Index (SPI) and the Standardized Precipitation Evapotranspiration Index (SPEI), at different time scales. For that, the Weather Research and Forecasting (WRF) model has been used to obtain current (1980-2010) and future (2071-2100) regional climate fields over a domain that spans the Iberian Peninsula, with a spatial resolution of 0.088º, and nested in the coarser 0.44º EURO-CORDEX domain. The WRF simulations were carried out using as initial and boundary conditions the outputs of two different global bias-corrected climate models: the version 1 of NCAR's Community Earth System Model (CESM1) and the Max Planck Institute's Earth System Model (MPI-ESM-LR), and using two different Representative Concentration Pathway (RCP) scenarios: RCP 4.5 and RCP 8.5. The results of this study suggest an increase in the severity and duration of drought, being greater when the SPEI index is used to define drought events, and more significant for the RCP 8.5 scenario.

Keywords: Drought, SPEI, SPI, Climatic change, Regional projections, WRF.

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