



Projected climatic changes on drought conditions over Spain

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In a context of global warming, the evapotranspiration processes will have a strong influence on drought severity. For this reason, the Standardized Precipitation Evapotranspiration Index (SPEI) was computed at different timescales in order to explore the projected drought changes for the main watersheds in Spain.

For that, the Weather Research and Forecasting (WRF) model has been used in order to obtain current (1980-2010) and future (2021-2050 and 2071-2100) climate output fields. WRF model was used over a domain that spans the Iberian Peninsula with a spatial resolution of 0.088°, and nested in the coarser 0.44° EURO-CORDEX domain, and driving by the global bias-corrected climate model output data from version 1 of NCAR's Community Earth System Model (CESM1), using two different Representative Concentration Pathway (RCP) scenarios: RCP 4.5 and RCP 8.5.

Besides, to examine the behavior of this drought index, a comparison with the Standardized Precipitation Index (SPI), which does not consider the evapotranspiration effects, was also performed. Additionally the relationship between the SPEI index and the soil moisture has also been analyzed.

The results of this study suggest an increase in the severity and duration of drought, being larger when the SPEI index is used to define drought events. This fact confirms the relevance of taking into account the evapotranspiration processes to detect future drought events. The results also show a noticeable relationship between the SPEI and the simulated soil moisture content, which is more significant at higher timescales.

Keywords: Drought, SPEI, SPI, Climatic change, Projections, WRF.

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