

Impact of Climate Change on Water Availability over the Iberian Peninsula

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Climate change will lead to an increase of the temperature and a decrease of the precipitation specially in areas such as the Mediterranean region. This fact could have as consequence the increase of the potential evapotranspiration (PET) and the decrease of the actual evapotranspiration (AET), and therefore a decrease of the water availability for agriculture in the future.

This study analyzes the validation of water availability estimations and their projected changes on in a vulnerable area such as the Iberian Peninsula. To explore the water availability, the denominated water stress (WS) ratio, which is calculated as the difference between PET and AET regarding to PET, has been obtained. Current (1980-2014) and future (2071-2100) PET and AET data were obtained by using the outputs from the Weather Research and Forecasting (WRF) model. For that, WRF simulations were carried out over a domain that spans the Iberian Peninsula with 0.088° of spatial resolution, and nested in the coarser 0.44° EURO-CORDEX region. The WRF model was forced by the bias-corrected outputs of two different global 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 under two different Representative Concentration Pathway (RCP) scenarios: RCP 4.5 and RCP 8.5.

The analysis is focused on the ability of WRF to capture PET and AET mean behaviours, and subsequently to characterize the water availability, as well as the analysis of the mean projected changes in these variables for the end of the century. In addition, due to the strong relationship between water availability for plants with agriculture drought, the correlation of this parameter with drought indices such as the SPI and SPEI will be explored.

Keywords: PET, AET, Climatic change, Regional projections, WRF.

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