Geophysical Research Abstracts
Vol. 19, EGU2017-15168-1, 2017
EGU General Assembly 2017

Study of drought processes in Spain by means of offline Land-Surface Model simulations. Evaluation of model sensitivity to the meteorological forcing dataset.

Pere Quintana-Seguí (1), Gonzalo Míguez-Macho (2), Anaïs Barella-Ortiz (1,3)

(1) Observatori de l'Ebre (Universitat Ramon Llull - CSIC), Roquetes, Spain (pquintana@obsebre.es), (2) Universidade de Santiago de Compostela, Santiago de Compostela, Spain, (3) Universidad de Castilla-La Mancha, Toledo, Spain

Drought affects different aspects of the continental water cycle, from precipitation (meteorological drought), to soil moisture (agricultural drought), streamflow, lake volume and piezometric levels (hydrological drought). The spatial and temporal scales of drought, together with its propagation through the system must be well understood. Drought is a hazard impacting all climates and regions of the world; but in some areas, such as Spain, its societal impacts may be especially severe, creating water resources related tensions between regions and sectors.

Indices are often used to characterize different aspects of drought. Similar indices can be built for precipitation (SPI), soil moisture (SSMI), and streamflow (SSI), allowing to analyse the temporal scales of drought and its spatial patterns. Precipitation and streamflow data are abundant in Spain; however soil moisture data is scarce. Land-Surface Models (LSM) physically simulate the continental water cycle and, thus, are appropriate tools to quantify soil moisture and other relevant variables and processes. These models can be run offline, forced by a gridded dataset of meteorological variables, usually a re-analysis. The quality of the forcing dataset affects the quality of the subsequent modeling results and is, thus, crucial.

The objective of this study is to investigate how sensitive LSM simulations are to the forcing dataset, with a focus on drought. A global and a local dataset are used at different resolutions. The global dataset is the eartH_2Observe dataset, which is based on ERA-Interim. The local dataset is the SAFRAN meteorological analysis system. The LSMs used are SURFEX and LEAFHYDRO. Standardized indices of the relevant variables are produced for all the simulations performed. Then, we analyze how differently drought propagates through the system in the different simulations and how similar are spatial and temporal scales of drought. The results of this study will be useful to understand the applicability of global datasets for local studies on drought and to better understand the related uncertainties.