



Hydrological characterization of Guadalquivir River Basin for the period 1980-2010 using VIC model

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This study analyzes the changes of soil moisture and real evapotranspiration (ETR), during the last 30 years, in the Guadalquivir River Basin, located in the south of the Iberian Peninsula. Soil moisture content is related with the different components of the real evaporation, it is a relevant factor when analyzing the intensity of droughts and heat waves, and particularly, for the impact study of the climate change.

The soil moisture and real evapotranspiration data consist of simulations obtained by using the Variable Infiltration Capacity (VIC) hydrological model. This is a large-scale hydrologic model and allows the estimations of different variables in the hydrological system of a basin. Land surface is modeled as a grid of large and uniform cells with sub-grid heterogeneity (e.g. land cover), while water influx is local, only depending from the interaction between grid cell and local atmosphere environment.

Observational data of temperature and precipitation from Spain02 dataset have been used as input variables for VIC model. Additionally, estimates of actual evapotranspiration and soil moisture are also analyzed using temperature, precipitation, wind, humidity and radiation as input variables for VIC. These variables are obtained from a dynamical downscaling from ERA-Interim data by the Weather Research and Forecasting (WRF) model. The simulations have a spatial resolution about 9 km and the analysis is done on a seasonal time-scale.

Preliminary results show that ETR presents very low values for autumn from WRF simulations compared with VIC simulations. Only significant positive trends are found during autumn for the western part of the basin for the ETR obtained with VIC model, meanwhile no significant trends are found for the ETR WRF simulations.

Keywords: Soil moisture, Real evapotranspiration, Guadalquivir Basin, trends, VIC, WRF.

Acknowledgements: This work has been financed by the projects P11-RNM-7941 (Junta de Andalucía-Spain) and CGL2013-48539-R (MINECO-Spain, FEDER).