



Soil properties maps in hydrological modelling with SWAT

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Simulation of flow processes in hyperregulated Mediterranean watersheds is critical to attend general water demand and established ecological flows of River Basin Management Plans. Soil and Water Assessment Tool (SWAT) is a widespread tool that involves complex processes of water cycle at basin scale, providing information about water dynamics related with land use as a fundamental characteristic for water balance calculation. Therefore, soil properties map constitute an important aspect to take into account and in many cases the available data is incomplete and sparse.

The objective of this study is to assess watershed outlet flow with SWAT model including detailed soil properties, land uses and management practices to quantify agricultural water demand in the Cega-Eresma-Adaja (CEA) watershed, an area of 8.000 km², for the period (2004-2014).

Based on 407 soil samples of the area, an optimized process through self-organizing maps (SOM) were applied to create soil units. As a result, 16 clusters were identified as the most suitable number of clusters including the standard deviation for each soil property as a measure of the variability. The SWAT model was calibrated and run using a soil map derived from SOM using the soil sample data rasterized in the whole area and optimized to reduce the number of clusters.

The study reveals that aspects as crop rotation, soil management and their associated measures in Mediterranean basins are a key fact for water resources management facing climate change.

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