



Calibration, sensitivity and uncertainty analyses of the spatially distributed hydrological model SWAT for a small Mediterranean watershed

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The Soil and Water Assessment Tool (SWAT, 2009 version) was evaluated for a small Mediterranean watershed, called the Pallas, located on the French Mediterranean coast (Languedoc region, France). The Pallas basin was discretized into 94 sub-basins using an automated delineation routine. The multiple hydrologic response unit (HRU) approach was used and the basin was discretized into 1008 HRUs. SWAT runs were conducted for the period 1990 – 1999 using a daily time step. Three warming up years were considered, before assessing the model performance. Prior to model calibration, the number of HRU was changed by varying the threshold area in order to check the impact of the HRU number on the model output. Subsequently, the model was calibrated for the period 1994 – 1995 using automated calibration. The model performance was evaluated using several statistical parameters, such as the Nash–Sutcliffe coefficient. The sensitivity of the parameters that strongly affect the predicted flow discharge as well as the uncertainty in the modeling predictions were assessed with the automatic sensitivity and uncertainty propagation analyses tools in SWAT. The model was finally used to test the effect of land use change and crop management scenarios on total runoff.