



Evaluating the performances of an ecohydrological model in semi-arid river basins

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The EHSM (EcoHydrological Streamflow Model) is a conceptual lumped model aimed to daily streamflow simulation. The model, processing daily rainfall and reference evapotranspiration at the basin scale, reproduces surface and subsurface runoff, soil moisture dynamics and actual evapotranspiration fluxes. The key elements of this numerical model are the soil bucket, where rainfall, evapotranspiration and leakage drive soil moisture dynamics, and two linear reservoirs working in parallel with different characteristic response times. The surface reservoir, able to simulate the fast response of the basin, is fed by rain falling on impervious area and by runoff generated with excess of saturation mechanism while the deep reservoir, which simulates the slow response, is fed by instantaneous leakage pulses coming from the soil bucket. The model has seven parameters, which summarize soil, vegetation and hydrological catchment properties. Parameters can be assessed using simple basic ecohydrological knowledge or Monte Carlo simulations as well.

The model has been here calibrated for three semi-arid river basins located in Sicily, Italy with area ranging from 10 up to 1780 Km² with the aim of investigating how the spatial scale may influence model performances. At the same time, the link between knowledge driven parameters and the calibrated ones is explored, investigating the suitability of a lumped framework for the model as the basin size increases.