

Investigating parameter transferability across models and events for an application in a semi-arid Mediterranean catchment

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The Mediterranean region is very sensitive to climate variability and can be significantly impacted by hydrologic extremes. In this work we compare the responses of three hydrologic models implemented for a medium-sized Mediterranean catchment characterized by a semi-arid climate. The models, TIN-based Real time Integrated Basin Simulator (tRIBS), TOPographic Kinematic APproximation and Integration eXtended (TOPKAPI-X), and CATchment HYdrology (CATHY), are physically based but nonetheless differ greatly in their representations of processes and terrain features. Starting from a previously implemented configuration of the tRIBS model calibrated for a very wet year (1930) and validated for an extremely dry period (1931-1932), we adopted a comparable parameterization for the other two models in order to investigate issues of parameter transferability both across the different models and across the different hydroclimatic events. The three models responded similarly during the calibration year, but significant differences were found for the validation period. In particular, to obtain satisfactory results during the 1931-1932 dry period, for the CATHY model an hypothesis of soil crusting was formulated and tested.