WetSpa model application with and without calibration

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Abstract:
The fully distributed hydrological WetSpa model has been applied to different watersheds without calibration. The Wetspa is a process based model with a mainly physics based structure and formulation. The distributed parameters of the model are derived from the basic maps, i.e. topography, landuse and soil type maps, and are kept constant (they are not subjected to any change as the model routine). The global model parameters (11 parameters) were first allocated according to logic, catchment characteristics, observation analysis and the model previous works in other regions. The model was run for daily hydrograph simulation. The results of first run with parameter allocation approach (no calibration) shows the ability of the model to reproduce the flow hydrograph and water balance components. Then the model parameters were manually adjusted and the results were improved. The calibrated parameters acquired by the manual calibration (done after the parameter allocation) are still reasonable, while an auto-calibrated parameter set estimated by PEST is a set with unjustifiable values for some parameters. This study tries to highlight the importance of logic based specification of parameters in hydrological modeling. The paper advocates process modeling and discourages the over focus on parameter estimation and auto calibration.
Key words: parameter allocation, calibration, auto-calibration, process modeling, WetSpa model.