Use of High Resolution Remotely Sensed Evapotranspiration Retrievals for Calibration of a Process Based Hydrologic Model in Data Poor Basins

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Calibration of Process-based hydrologic models is a challenging task in data poor basins, where monitored hydrologic data are scarce. In this study, we present a novel approach that benefits from remotely sensed evapotranspiration (ET) data, to calibrate a complex watershed model, namely the Soil and Water Assessment Tool (SWAT) for flow predictions at daily scale. The ET retrievals come from the disaggregated Atmosphere Land Exchange Inverse model (DisALEXI), which provides ET estimates daily at 30m resolution by fusing satellite information from several platforms. In this method, an efficient optimization algorithm is implemented to find an optimal combination of SWAT parameter values that leads to convergence between SWAT and DisALEXI ET estimates. The proposed method was applied to a 290 km2 watershed located on the Delmarva Peninsula, USA. Results show that when SWAT was calibrated under the proposed method, daily flow predictions improved significantly in comparison to the uncalibrated model.