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Internal calibration of a distributed hydrological model using satellite data of land surface temperature similarly to ground discharge measurements

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This study proposes a new methodology for the calibration of distributed hydrological models at basin scale through the constraints on an internal model variable using remote sensing data of land surface temperature. The model algorithm solves the system of energy and mass balances in term of the equilibrium pixel temperature or representative equilibrium temperature that governs the fluxes of energy and mass over the basin domain. This equilibrium surface temperature, which is a critical model state variable, is compared to land surface temperature from MODIS. So soil hydraulic parameters and vegetation variables will be calibrated according to the comparison between observed and simulated land surface temperature minimizing the errors. A similar procedure will also be applied performing the traditional calibration using only discharge measurements.
The distributed energy water balance model, Flash–flood Event–based Spatially–distributed rainfall–runoff Transformation - Energy Water Balance model (FEST-EWB), will be used to test this approach for the Upper Yangtze River basin (China). This work was supported in the framework of the Dragon 2 Programme between the European Space Agency (ESA) together with the National Remote Sensing Centre of China (NRSCC).