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A priori parameter estimates for distribution of soil moisture storage capacity in Hymod model using information extracted from GLEAM root-zone soil moisture data

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Previous studies have demonstrated that utilization of satellite-based data can improve hydrological simulation by data assimilation and/or parameters estimation. However, for hydrological forecasting, the real-time satellite-based data are usually unavailable. This study aims to provide a new method that estimates the structure of soil moisture accounting module in Hymod model using the information extracted from the historical GLEAM root-zone data. In Hymod model, it is hypothesized that the soil moisture storage capacity varies across the catchment and the parameter beta represents the degree of spatial variability. A semi-distributed implementation of the Hymod model is employed using daily data from the Qujiang River basin. Based on 37-year GLEAM root-zone data, we can estimate the parameter beta in each sub-catchment. Simulation results indicate that the modified model presented a similar simulation during the calibration period compare with the original Hymod with higher degrees of freedom and a more consistent improvement was achieved during the validation period. These results highlight that accurate representation of the spatial distribution of soil moisture over the catchment will increase model consistency.