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Calibration of a semi-distributed hydrological model adding constrains from remotely sensed snow cover and soil moisture products

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Remote sensing products have been widely applied in hydrological modeling for more realistic representations of hydrological processes. In this study, in addition to gauged discharge, the combined MODIS snow cover maps and ERS scatterometer based soil moisture products were added to constrain a semi-distributed conceptual hydrological model. The latest version of MODIS snow cover images provides a daily Normalized Difference Snow Index (NDSI) in a 500-meter resolution. We derived the snow cover maps by using a new NDSI thresholding method from the MODIS Aqua (MYD10A1) and Terra (MOD10A1) daily snow cover products. Furthermore, the newest ERS soil moisture product also provided a finer spatial resolution of 500-meter over Austria. The semi-distributed TUW-model was tested in 213 catchments using both single and multiple object calibration methods. We found that the semi-distributed TUW-model performed well in discharge modeling. Moreover, applying the MODIS snow cover maps improved the accuracy in the snow-melt season, while the soil moisture product helped the discharge simulation in the no-snow period.