

Calibrating a large-scale groundwater model using spaceborne remote sensing products: a test-case for the Rhine-Meuse basin

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Abstract The European Remote Sensing Soil Water Index (ERS SWI) fields, providing spatio-temporal soil moisture expressions, should be able to infer groundwater dynamics. In this study, we explore the possibility of using them to calibrate a coupled groundwater–land surface model. We apply a brute force calibration procedure by running several scenarios with varying parameter values of aquifer and upper soil properties. Results indicate that ERS SWI time series can be used in the calibration of such groundwater models by indirectly tuning groundwater recharge through changing the upper soil saturated hydraulic conductivities. It is shown that the scenarios showing good soil moisture dynamic performances also show good performances of their resulting groundwater head time series. However, the discharge performance is sensitive to the aquifer transmissivity. Discharge observations are thus also required for a more accurate model calibration.

Key words ERS Soil Water Index; soil moisture; remote sensing; groundwater head; discharge