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Effect of different retrieval algorithms on the optimization of hydraulic model parameters using spatially distributed soil moisture values

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The estimation of land surface biogeophysical parameters through remote sensing has received significant attention during the last decades. However, a relatively unexplored item is the retrieval of soil hydraulic parameters. Hence, this paper focuses on the estimation of these parameters through a combination of soil moisture remote sensing and hydrologic modeling. More specifically, the impact of the soil moisture retrieval algorithm on the resulting parameter values is assessed. Therefore, three different algorithms are used for this purpose, one based on the use of a priori information, and of which one provides not only the soil moisture values, but also the associated uncertainty. It has been found that the use of a priori information leads to parameter estimates that can be related to the original soil texture class. On the contrary, the other algorithms lead to parameter values clustered according to the different fields, even though no field specific information was used in the soil moisture retrieval. Of the estimated parameters, the saturated hydraulic conductivity shows the highest spatial variability. Since for a spatial analysis the use of relatively variable parameters is beneficial, it is thus recommended to use the hydraulic conductivity for a further processing of the parameter maps.