



Assimilating soil moisture data in a hydrological model: a case study in Belgium using H-SAF products

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Precipitation is the main driving force for hydrological processes. There are however other physical variables, like soil moisture, that play an essential role in the hydrological cycle. In the present study, we focus on the use of a surface soil moisture (SSM) product in hydrological modelling. This product is generated using MetOp scatterometer (ASCAT) data at 25 km of horizontal resolution in the framework of the H-SAF project (EUMETSAT Satellite Application Facility on Support to Operational Hydrology and Water Management). The Royal Meteorological Institute of Belgium (RMI) is an active partner of H-SAF, involved in the validation of precipitation, soil moisture and snow products. In this work, we include in our hydrological simulations a soil moisture product through a data assimilation procedure. Our approach is based on the Ensemble Kalman Filter technique where observation and model uncertainties are taken into account. We first develop an assimilation scheme for surface soil moisture into the hydrological model of the RMI. In our implementation, bounded variables like SSM are handled with the aid of specially designed probability distributions so that the bounds are never exceeded. Subsequently, the impact of SSM assimilation on the simulated streamflow is assessed by using different sources of precipitation forcing. The ultimate goal is to provide new tools of hydrological validation and to investigate the possibilities of enhancing the quality of the simulated streamflow.