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# Derivation of hydrological parameters from remote sensing data at regional scale: Results from the InFerno+ project

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Methods to accurately assess and forecast flood discharge are a fundamental requirement in practical hydrology. However, existing rainfall-runoff models, seldom consider the spatial characterisation of the land surface, which is essential for an accurate description of processes relevant for runoff formation. Especially land surface conditions of high temporal variability, like soil moisture and snow properties, determine the extent of a flood event and are hence prerequisite boundary conditions and state variables prior to and during a storm.

The DLR-funded project InFerno (Integration of remote sensing data in operational water balance and flood prediction modelling) has been established to demonstrate the potential and applicability of remote sensing data from ENVISAT imagery for improving operational flood forecasting by retrieving information for model parameterization and data assimilation.

The ENVISAT sensors firstly provide the opportunity to synergistically use multisensoral imagery at a sufficient spatial and temporal resolution for mesoscale catchment applications. Existing algorithms, based on former satellite data have been adapted and extended to ENVISAT data. The focus has been given to the quantitative retrieval of soil moisture, spatial snow distribution and snow properties, all being major flood supporting forces in the test areas of the Neckar ($\sim$14.000km$^2$) and the Mosel ($\sim$28.000km$^2$) river basins.

The paper presents the developed algorithms to derive near real time spatially dis-

tributed soil moisture and snow cover information from ENVISAT data at regional scale. The results are validated against in situ measurements and data from complementary sensor systems as e.g. NOAA-AVHRR. It is shown that the accuracy of the inverted soil moisture values is within 6 vol.%.