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Integrating earth observation data into hydrological modeling and water management

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One of the most important aspects of hydrological modeling in water management is uncertainties. It covers input, model structure, parameters and state variables. Therefore, it is very important to reduce uncertainty in model development, hence the decision makers have higher confidence in taking their decision.

The use of Earth Observation (EO) data is increasing significantly during these years. These were driven by many advantages, such as: it covers almost all space, in specific time-steps, and cost effective. Also the amount and reliability of earth observation data has reached a high degree. The EU FP7 project MyWater (www.mywater-fp7.eu, coordinated by GMV) aims to utilize and evaluate the value of EO data in water management by analyzing EO data such as Land use changes, Eta, LAI and Soil moisture. The project aims at developing a water management system that integrates EO data, meteorological data, catchment models and ground based data to improve the forecasting capabilities.

An innovative hydrological modelling approache is needed to utilize the increasing amount of EO data and reliability. Especially if the approach is able to reduce uncertainties of the data itself as well as the model output. The approach must be able to integrate EO data into recent hydrological modelling advances, and improve result and/or modelling development.

Although the EO data availability and reliability has reached quite a high level, the value of using these data in a hydrological model needs to be evaluated. More data and a wider coverage does not necessarily mean it will give a better result, and different model structures react in different ways. A spatially distributed model is possibly the most benefiting from EO data, however, a lumped model could also benefit greatly. The value can be gained through calibration, validation, data assimilation and feedback loops throughout the modeling process.

The approach is tested and compared in wider usage of hydrological modeling, such as different model structure from lumped to spatially distributed, well gauged catchment to un-gauged one and various catchment characteristics. With this approach it is expected to have an understanding how to maximize the utilization of EO data in hydrological modeling and water management.