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Meteorological variables from satellite images as input to a hydrological model

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An improved knowledge of the land surface hydrologic states and fluxes and of their spatial and temporal variability across different scales is an important goal in many hydrologic studies. To this end, sophisticated physically based distributed hydrologic models including complex land surface sub-models have been developed also for application to large poorly-gauged river basins.
In this context, the use of meteorological observations coming from satellites sensors coupled to traditional ground observations may play a crucial role in the definition of spatial distribution of meteorological forcings.
Purpose of this work is to drive a distributed hydrological model, which solves the water and energy balance equations at soil-vegetation-atmosphere interface, with observations from different sources to produce reliable meteorological fields.
The hydrological model FEST-EWB (Flash–flood Event–based Spatially–distributed rainfall–runoff Transformation- Energy Water Balance) will be tested under different situations in the Upper Po river basin (Italy). In particular, precipitation data will be retrieved from AMSR-E sensor, while air temperature, incoming shortwave radiation and land surface temperature will be analysed from MODIS and SEVIRI at different spatial and temporal resolution. Air humidity will be calculated from MODIS.
Satellite data will be compared to observed ground measurements and improvement in the simulation of hydrological processes will be evaluated in comparison to measured discharges and to distributed and integrated energy and mass fluxes simulated with FEST-EWB model using in input observed ground data.