

Service-based Processing of MODIS Global Terrestrial Evapotranspiration Data for Modelling Catchment Hydrology

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Current challenges of understanding and assessing the impacts of climate and land use changes on ecosystems worldwide demand for an ever increasing integration of data and process knowledge in environmental simulation models. While the growing performance of multi-processor computer environments and the availability of well-tested data products with global coverage provide the basis to address this demand, the seamless and automated pre-processing of existing information and their integration into environmental models often remains a crucial point. Here, Web Processing Services (WPS) can be used for an easily usable, standardized geo-information processing that links data with models. This work presents a WPS that allows to prepare MODIS global terrestrial evapotranspiration data for application in hydrological models using a two-step approach. In a first step, a mapping between MODIS raster cells and a set of target geometry features is created. Based on this mapping, the second step generates time series of interpolated MODIS data for each target geometry. The use of parallel processing in both steps of the procedure and its service-based implementation ensures high runtime performance and flexible operation. The suitability of the overall procedure will be shown in an application of a spatially distributed model which takes MODIS evapotranspiration data as input to simulate hydrological process dynamics in a mesoscale river basin in south-eastern Brazil.