



Integration of complex land surface data into a global hydrological discharge model

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Global hydrological models are dedicated to the simulation of world wide continental hydrological processes on the basis of a reduced set of global available input parameters.

The land surface discharge model (LSDM) is especially optimized for the representation of the global water mass cycle in a consistent combination with an ocean model and an atmospheric model. Such Earth system models are essential for the generation of global geodetic parameters like Earth rotation variations and gravity field changes. LSDM itself can principally be divided into two parts. One part is modelling the vertical water budget from the incoming precipitation up to the excess runoff and drainage within a grid cell. The other is the discharge part modelling the horizontal water transport from the surface runoff via the river network down to the freshwater flow into the ocean.

Designed as global model the flow processes in LSDM are based on a simplified representation using a two-parameter linear cascade approach which can be easily adapted world wide. Since water flow processes depend on a complex set of surface parameters the challenging task is to reduce the high quantity of available Earth observation data to the physically relevant parameters of the cascade model.

Surface data have been analyzed concerning their availability, their influence on flow retention and their integration into the parameterization of the global model LSDM.

At this the geoinformation part was generally realized using the open source geoinformation software GRASS.

The objective is to transfer relationships between surface parameters and the modelled flow process found in regional catchment analyses to the whole earth's surface.

The integration of complex land surface data into the global hydrological model LSDM improves the geodetic model results significantly and provides the opportunity to consider time varying influences of the land surface due to easily updatable parameters.