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Management of extreme floods in large river basins using a modelling system

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A modelling system is introduced for the provisionary management of extreme flood events in large river basins and whose methodology is easily transferable to larger basins.

The core of the system is composed of a hydrology, hydrodynamics and dyke breach/dispersion models, which are coupled with Typed Data Transfer (TDT) [1]. Database and Internet Map Server (IMS) functionality are included in the modelling system as well as modules for dyke breach prediction and flood damage estimation.

One aspect of the modeling system is a spatial regionalisation with different resolutions and varying degrees of complexity of the hydrological processes. The increase complexity is associated with decreasing error and increasing sensitivity. Ideally, the best model is one in which sensitivity and error are minimised. A utility function evaluates which complexity is best suited for the characteristics of the study site.

The modelling system is being developed and tested using the Mulde river basin ($\approx 6000 \text{ km}^2$) and the German part of the Elbe catchment ($\approx 80.000 \text{ km}^2$).

Under consideration of associated errors, the transfer and scaling functions will be developed for the application of the modeling system in different river basins.

[1] http://portal.pik-potsdam.de/research/topiks/topik7/simenv/modenv/tdt