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Uncertainty in mapping and assessing flood risk at the macro-catchment scale

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A modelling system is being developed to quantify risk of extreme flooding in large river basins. In the system, computer models are coupled together to simulate the functional chain: hydrology - river hydrodynamics - dyke failure - flood inundation. One outcome of the modelling system is to provide damage risk maps, which can be used as an orientation to suggest provision management strategies. However, large uncertainties exist in the risk assessments, especially for extreme floods. These uncertainties and their sources are discussed in this talk.

In addition to the uncertainties, the methodology for mapping flood risk of very large river basins is still in its infancy. Such methods can provide a rough orientation of where “hot spots” occur in terms of flood risk on very large (regional) scales and have their justification for high-level strategic planning. The downside of these methods is that the spatial resolution is generally too coarse and the results not differentiated enough to be applicable for the development of mitigation concepts. A second object of this talk is to refine approached for risk mapping to provide the most information for risk assessment at the macro-scale.

To achieve these two objectives, a method is introduced for calculating damage risk as a function of both hazard and vulnerability on the macro-scale. Uncertainties exist in both and it is one purpose of this paper to determine which, hazard or vulnerability, contributes more to the overall uncertainty in the risk assessment. Hazard, defined in probabilistic terms of flood depth and extend, is determined from either: i) modelling simulations or ii) linear interpolation of water levels between gages. Vulnerability is based on both damage functions and either i) CORINE or ii) ATKIS land-use maps.