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Extensive loss scenarios for flood risk modelling

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Flood prevention requires solid flood risk assessments. Sound recommendations for different aspects of flood prevention (regional planning, insurance cover, building regulations, etc.) can only be derived if possible loss events and their occurrence probability are known with high reliability. The estimation of flood losses as well as the derivation of plausible loss scenarios and their occurrence probability are of special importance for the insurance industry in order to balance and reinsure their portfolios.

To model extensive flood losses that might occur in a certain insurance portfolio, the following components are necessary: - (several) extensive inundation scenarios, - spatial distribution of the insured values for each class of business, e.g. residential buildings, commercial risks or industrial risks, and - a loss model for each class of business that estimates a loss ratio in dependence of the flood impact, e.g. the water levels at the structure under study.

At the moment, the GeoForschungsZentrum Potsdam is developing a model for the quantification of economic flood loss for extensive flood scenarios for Germany - initiated and funded by AON Re, Hamburg. The aim is to provide a selection of typical flood scenarios that might occur in Germany with emphasis on the Rhine, Danube and Elbe catchments. Special attention is given to the fact that the return periods of flood discharges of one particular flood event may extremely vary between the affected areas, e.g. along the course of a river. In addition, a new meso-scale procedure for the quantification of building and contents losses in private households as well as in commercial and industrial establishments is being developed which goes beyond the currently available loss models.

The inundation scenarios will be linked to the loss model by means of a GIS-Tool, which allows to calculate losses for different insurance portfolios. When intersecting

insured assets and inundation areas it has to be considered that insured values are commonly only available per zip code area or CRESTA zone. Thus, to get realistic damage estimates the insured values have to be further disaggregated, which is done with the help of land use and statistical data.

The whole analysis delivers a risk assessment of insurance portfolios which allows insurance companies to better arrange reserves and reinsurances. The paper presents the modelling concept and first results.