



## Probabilistic flood damage modelling at the meso-scale

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Decisions on flood risk management and adaptation are usually based on risk analyses. Such analyses are associated with significant uncertainty, even more if changes in risk due to global change are expected. Although uncertainty analysis and probabilistic approaches have received increased attention during the last years, they are still not standard practice for flood risk assessments. Most damage models have in common that complex damaging processes are described by simple, deterministic approaches like stage-damage functions.

Novel probabilistic, multi-variate flood damage models have been developed and validated on the micro-scale using a data-mining approach, namely bagging decision trees (Merz et al. 2013). In this presentation we show how the model BT-FLEMO (Bagging decision Tree based Flood Loss Estimation MOdel) can be applied on the meso-scale, namely on the basis of ATKIS land-use units. The model is applied in 19 municipalities which were affected during the 2002 flood by the River Mulde in Saxony, Germany. The application of BT-FLEMO provides a probability distribution of estimated damage to residential buildings per municipality. Validation is undertaken on the one hand via a comparison with eight other damage models including stage-damage functions as well as multi-variate models. On the other hand the results are compared with official damage data provided by the Saxon Relief Bank (SAB).

The results show, that uncertainties of damage estimation remain high. Thus, the significant advantage of this probabilistic flood loss estimation model BT-FLEMO is that it inherently provides quantitative information about the uncertainty of the prediction.

### Reference:

Merz, B.; Kreibich, H.; Lall, U. (2013): Multi-variate flood damage assessment: a tree-based data-mining approach. NHESS, 13(1), 53-64.