Geophysical Research Abstracts
Vol. 17, EGU2015-7220, 2015
EGU General Assembly 2015

Confronting uncertainty in flood damage predictions

Kai Schröter (1), Heidi Kreibich (1), Kristin Vogel (2), and Bruno Merz (1)

(1) Helmholtz Centre Potsdam, GFZ German Research Centre for Geosciences, Section Hydrology, Potsdam, Germany (kai.schroeter@gfz-potsdam.de), (2) University of Potsdam, Institute of Earth and Environmental Science, Potsdam, Germany

Reliable flood damage models are a prerequisite for the practical usefulness of the model results. Oftentimes, traditional uni-variate damage models as for instance depth-damage curves fail to reproduce the variability of observed flood damage. Innovative multi-variate probabilistic modelling approaches are promising to capture and quantify the uncertainty involved and thus to improve the basis for decision making.
In this study we compare the predictive capability of two probabilistic modelling approaches, namely Bagging Decision Trees and Bayesian Networks. For model evaluation we use empirical damage data which are available from computer aided telephone interviews that were respectively compiled after the floods in 2002, 2005 and 2006, in the Elbe and Danube catchments in Germany. We carry out a split sample test by sub-setting the damage records. One sub-set is used to derive the models and the remaining records are used to evaluate the predictive performance of the model. Further we stratify the sample according to catchments which allows studying model performance in a spatial transfer context. Flood damage estimation is carried out on the scale of the individual buildings in terms of relative damage. The predictive performance of the models is assessed in terms of systematic deviations (mean bias), precision (mean absolute error) as well as in terms of reliability which is represented by the proportion of the number of observations that fall within the 95-quantile and 5-quantile predictive interval.
The reliability of the probabilistic predictions within validation runs decreases only slightly and achieves a very good coverage of observations within the predictive interval. Probabilistic models provide quantitative information about prediction uncertainty which is crucial to assess the reliability of model predictions and improves the usefulness of model results.