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What are the important flood damage-influencing parameters? A data mining approach

B. Merz (1), H. Kreibich (1), and U. Lall (2)

(1) Helmholtz Centre Potsdam GFZ German Research Centre for Geosciences, Section 5.4 Hydrology, Potsdam, Germany (bmerz@gfz-potsdam.de), (2) Department of Earth and Environmental Engineering, Columbia University, New York

Today's approaches for assessing and modeling direct flood damages are not very advanced. The usual approach consists of stage-damage functions which relate the relative or absolute damage for a certain class of objects to the inundation depth. Other characteristics of the flooding situation and of the flooded object are rarely taken into account, although flood damage is influenced by a variety of factors. In this contribution we apply a group of data-mining techniques, known as tree-structured models, to flood damage assessment. Tree-structured models are attractive candidates for identifying important damage-influencing parameters in large damage data sets and for describing quantitatively the non-linear interactions between damage and damage-influencing parameters. A very comprehensive data set of more than 2000 damage records of private households in Germany is used. Each record contains details about a variety of potential damage-influencing characteristics, such as hydrological and hydraulic aspects of the flooding situation, state of precaution of the household, early warning and emergency measures undertaken, socio-economic status of the household. Tree-structured models are used to derive the dominating damage-influencing variables and their (non-linear) interactions. We show that they are a flexible and powerful alternative to traditional damage assessment approaches.