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# Estimating flood damage potentials by linking paleoflood records and empirical loss data

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According to EM-DAT (The OFDA/CRED International Disaster Database; www.emdat.be) floods are the leading cause of economic damages from natural disasters in Austria, accounting for 70 % of total damages from natural disasters in the period 1990 to 2016. Due to the comparatively high threat of damages from flood events, information on the damage potential is of great importance for sustainable flood risk management but also for public finance due to the mainly public Austrian risk transfer system (Catastrophe Fund).

We aim at providing improved estimations on the flood damage potential (of residential buildings) in Northern Austria by making use of and merging different kinds of data sets. These data sets include, amongst others, (i) direct damages to housing from surveys conducted by provinces and municipalities in the context of granting aid, (ii) data on the building stock, (iii) existing hazard maps, and (iv) 7000 years of paleoflood records derived from Lake Mondsee (Upper Austria) sediments.

Although damage data is in principle the kind of data most suitable to estimate flood damage potentials, it exhibits a crucial cutback: its availability is usually limited to rather short time horizons (i.e. a few decades in the best case), which causes high uncertainties in estimating the damage potential of especially low-probability high-impact events. Hence, the idea is to make use of paleoflood records derived from lake sediments to gain additional insights into the (past) distribution of flood events and thus improve estimations on (current) flood damage potentials. The starting point is formed by two different methods of modelling flood damages based on empirical damage/loss data, i.e. (i) extreme value analysis (EVA) and (ii) a method using building stock data and risk maps (HORA). We introduce a probabilistic procedure that is able to link sediment records to these stochastic damage models and hence allows making use of the distributional insights gained from lake sediment records when estimating flood damage potentials for the area surrounding the lake. Flood damage potentials estimated with and without considering information from lake sediment records are compared and limitations of the proposed procedure discussed.

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