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Drivers of future flood risk change for residential buildings in Europe

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Floods have caused annual economic losses of 12.5 billion Euro on average in the past decade in European Union member states (*https://www.eea.europa.eu/data-and-maps/indicators/direct-losses-from-weather-disasters-4/assessment*). With global change flood risk is expected to increase significantly, imposing great challenges for risk management and adaptation. A better understanding of the major drivers of future flood risk at the continental scale is required for a forward-looking flood risk management by legislative and commercial actors.

Our contribution aims to examine the changes and driving forces in flood risk for residential buildings in Europe under future climate scenarios and socio-economic development. To observe the influence of climate change on flood risk our study builds on flood hazard data for two climate scenarios under RCP4.5 and RCP8.5 in three future periods centered around the years 2025, 2055 and 2085 (*Mentaschi et al., 2020*). Future changes in the value of exposed residential buildings are based on population growth, economic growth and changes in the wealth-to-income ratio (*Paprotny et al. 2020*). Three scenarios describe a “realistic”, “optimistic” and “pessimistic” view on exposure development. We use the probabilistic multi-variable flood loss model BN-FLEMOps to estimate flood loss (*Lüdtke et al. 2019*). This model accounts for multiple hazard and resistance variables connected in a Bayesian network to describe flood vulnerability and provides information about modeling uncertainties. Further, it allows to quantify the effect of private precaution. Scenarios for different levels of private precautionary measures and large technical flood protection infrastructure provide insight into the effects of adaptation strategies. Comparing the flood loss estimations for the future scenarios in 2025, 2055 and 2085 to a baseline for the historic period around the year 1995 reveals the impact of different drivers of future flood risk change for residential buildings in Europe