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## Flood recurrence under climate change: a probabilistic flood risk assessment of critical infrastructure in the Danube basin

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Consistent information on fluvial flood risks in large river basins is typically sparse. This is especially true for the Danube River basin covering up to 14 countries and creating a patchwork of flood risk information across a populous and flood-prone region. As climatic changes have shown to increase flooding in the future, consistent basin-scale assessments prove vital to the insurance industry as well as municipal and infrastructural planning. The Future Danube Model (FDM) was designed to fill this gap complying to both insurance industry and climate science standards. That is, allowing for a reasonably detailed model scale (based on a 25m digital elevation model), stochastic sampling to create a large number of extreme events and flood event footprints (10k years), a thorough calibration and validation as well as the use of an ensemble of climate model output to drive the model under scenario conditions. The model is here used to assess the impact on critical infrastructure across the basin. Results indicate a marked increase in flood risk has already occurred when comparing the current climate period (2006-2035) to the reference period (1970-1999). Further increases are projected under a moderate and a business as usual scenario for the next climate period (2020-2049) and the end of the century (2070-2099). In large parts of the basin, the historical 100-year flood level, often used as a critical protection level for infrastructure, is projected to be equalled or exceeded every 50–10 years, while areas with a 100-year flood risk are projected to increase by 6–19%.