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Modeling flood damages under climate change – a case study for Germany

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The study presents and discusses possible trends in flood generation in Germany and related damages and impacts on the German insurance sector under climate change conditions. The study makes use of future climate scenarios regionalized for the main river basins in Germany. A hydrological model was applied to transform the regional climate scenarios into river runoff for more than 5000 river reaches. Previously, the model has been calibrated and validated for the main gauges within the German river basins. Extreme Value Distributions have been fitted to the hydrographs of the river reaches to derive the basic flood statistics. The results for each river reach have been linked to related damage functions as provided by the German Insurance Association considering damages on buildings and small enterprises. The result is that under the specific scenario conditions a significant increase in flood losses can be expected in Germany. However, the results are associated with high uncertainty, and additional studies are recommended to improve the understanding of the underlying processes and possible trends.