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Development of a loss model for winter storms in Germany

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Catastrophe risk modelling consist of two parts, the determination of hazard and the modelling of vulnerability. In this contribution, we will focus on the vulnerability of private housing to storm damage. The project's aim is an assessment of the probable loss caused by severe winter storms in Germany. First, the results of a detailed analysis of the relationship between storm damage and meteorological as well as topographical parameters will be presented and second, the development of a statistical storm loss model which was calibrated with the available data will be shown.

For the analysis, damage data of an insurance for five large winter storm events in the state of Baden-Württemberg, Germany, within the years 1983 to 1999 were available. The necessary meteorological information were obtained from numerical simulations of the storm wind fields in high spatial resolution. As expected, high correlation between storm damage and wind speed could be found. Additionally, the relationship between damage and orographic exposure of buildings as well as surrounding land use were investigated and will be presented in the talk.

In order to assess damage for higher wind speeds, a storm loss model was developed. In contrast to most other storm loss models where loss functions were exclusively obtained by statistical regression methods, this model is based on few logical assumptions and calibrated to historical loss data.

Finally, a storm damage risk map of Baden-Württemberg developed for CEDIM will be presented and an outlook of the possibilities for further practical use of such storm loss models will be given.