High-resolution refinement of a storm loss model and its application to climate scenario simulations

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An accurate estimation of the risk of storm losses and its potential future changes is of high relevance for many fields of the society, including institutions involved in infrastructural planning, (re-)insurance or security sectors.
On the basis of high-resolution insurance loss data, a regression model for calculating storm losses from meteorological (reanalysis and climate model) data is refined by adapting the loss transfer functions to regionally resolved loss information. Validating the loss model by comparing observed and simulated losses accumulated for the area of Germany, increased accuracy arising from the regional differentiated loss regressions is documented. Further, also regarding the spatial distribution of simulated losses for individual storms, a good agreement with insurance data is obtained.
Potential future loss changes due to anthropogenic induced climate change are estimated from future scenario simulations with a global climate model (ECHAM5-OM1), showing about 30% increased loss potentials for Germany at the end of the 21st century. The impact of using the regionally refined loss transfer functions for future loss calculations is estimated in comparison to recent results based on a loss model neglecting regional loss information.