



Development of a novel Pan-European Windstorm Model

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Winter storms are the main natural hazard affecting Europe, and may cause very high insurance losses. In order to quantify the risk of windstorm related losses for Europe, a novel Pan-European windstorm model is developed in collaboration between research and insurance institutions, namely the University of Cologne and Aon Benfield Impact Forecasting. A valuable risk assessment both in terms of large-scale storm frequency and regional (local) scale storm (gust) intensity is a precondition for the construction of loss estimation tools. The storms are identified first on historical (reanalysis) data and second on present day climate simulations in order to extend the basis of extreme events to a number exceeding 10000 storms. For historical storms, dynamical downscaling is performed with the regional climate model COSMO-CLM, with a two-step nesting approach reaching 0.0625° resolution (7km) with ERA-40 / ERA-Interim boundary conditions. Since dynamical downscaling is not feasible for over 10000 events, a statistical downscaling tool is trained with the dynamical simulations of historical storms and used to produce a synthetic event set based on GCM data. The statistical downscaling is combined with a MOS technique to enhance the estimation of gust speeds. A refined calibration of the GCM event set is performed to enable a smooth combination of both the historical and synthetic event sets within the Pan-European windstorm model. The methodical procedure is presented along with results quality checks for both cases study and climatology.