



Storm damage risk of Germany

P. Heneka (1), T. Hofherr (2), B. Ruck (1), C. Kottmeier (2)

(1) Laboratory of Building and Environmental Aerodynamics, Institute for Hydromechanics, University of Karlsruhe (heneka@ifh.uka.de), (2) Institute of Meteorology and Climate Research, University of Karlsruhe / Research Centre Karlsruhe

In this contribution, a new approach of assessing storm damage risk is presented and applied to residential buildings in Germany. The approach consists of two main parts, the determination of storm hazard and the modelling of vulnerability of the existing building stock.

A highly resolved hazard map is calculated by investigation of major storm events of the past 30 years. Therefore, the fields of maximum wind speeds (foot prints) of every storm events in a resolution of 1km x 1km are modelled with the Karlsruhe Atmospheric Mesoscale Model (KAMM). Extreme value extrapolation enables the calculation of wind speed return periods and their uncertainties. For the vulnerability assessment, a loss model was developed. 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. In contrast to most other storm loss models where loss functions were exclusively obtained by statistical regression methods, this model is based on logical assumptions and calibrated to historical loss data. Finally, storm damage risk is calculated for every community combining hazard, vulnerability and an estimation of the asset value, represented by the actual replacement costs of residential buildings. Maps of different risk numbers (Annual risk, maximum risk) of Southwest Germany are presented and compared to available risks of other natural hazards.

This project is part of the risk map project of the Centre for Disaster Management and Risk Reduction Technology (CEDIM) initiated by the University of Karlsruhe and the Geoforschungszentrum Potsdam.