Geophysical Research Abstracts
Vol. 13, EGU2011-5141, 2011
EGU General Assembly 2011

Estimating the risk of losses caused by winter storms in Germany

Markus Donat (1), Tobias Pardowitz (2), Gregor C. Leckebusch (2), and Uwe Ulbrich (2)

(1) Climate Change Research Centre, UNSW, Sydney, Australia (m.donat@unsw.edu.au), (2) Freie Universität Berlin, Institute of Meteorology, Berlin, Germany

Winter storms are the major source of natural hazard related losses in Central Europe. This study examines the risk of loss under today's and future climate conditions. Making use of daily insurance loss records available on the spatial level of administrative districts in Germany, regional wind-loss transfer functions are calibrated to calculate storm losses from reanalysis and climate model simulated wind speeds.

For a more robust estimation of today's risk of loss, the insurance loss data set (available only for the relatively short period 1997-2007) was extended backwards by applying the loss transfer functions to NCEP and ERA-Interim reanalyses, providing loss estimates for severe storms back to 1948. Extreme value analysis is used to estimate the risk of losses, fitting a Generalised Pareto Distribution (GPD) to the loss data. The GPD fits agree well for the different loss catalogues, suggesting some robustness of the risk estimations. Based on the different fits, the return period of recent storm 'Kyrill' (the most loss-intensive event in the insurance records used), for example, is estimated to be between 15 and 21 years.

For information about potential future changes of storm losses, the loss model is applied to climate model ensemble simulations of recent and future (scenario SRES A1B) climate conditions. Towards the end of the 21st century, mean annual losses are enhanced by about 80% in comparison to recent climate. This mean increase is mainly caused by a small number of extraordinarily strong events under future climate conditions, producing unprecedented loss amounts under future climate conditions. This leads to a significant reduction in loss return periods, a 50 (20) year event in recent climate is found to occur each 9 (7) years under future climate conditions.