Geophysical Research Abstracts,
Vol. 10, EGU2008-A-02048, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-02048
EGU General Assembly 2008

Impacts of climate change to storm events and losses over West Germany

J.G. Pinto(1), M. Kerschgens(1), G.C. Leckebusch(2), C.P. Neuhaus(1), M. Reyers(1), P. Speth(1)

(1) Institut für Geophysik und Meteorologie, Universität zu Köln. Kerpener Str. 13, 50923 Köln, Germany (2) Institut für Meteorologie, Freie Universität Berlin. Carl-Heinrich-Becker-Weg 6-10, 12165 Berlin, Germany

Possible changes in the frequency and intensity of winter storms affecting Northrhine-Westphalia (NRW, West Germany) due to anthropogenic climate change are investigated in order to infer potential changes of the associated insured losses. The methodology is based on a statistical-dynamical regionalisation method: Typical weather developments (over 3 days) within the reanalysis period are first classified via K-means cluster. Four classes are defined as 'storm-classes' as they include most of the historical storms. For each class, simulations are run with the mesoscale model FOOT3DK for representative elements within the reanalysis period in order to obtain a regional wind climatology. Additionally, 28 historical storms which affected West Germany since 1990 are simulated with FOOT3DK featuring a gust parameterisation. The resulting wind gust fields are then used to establish a functional relationship with the insured loss values available for NRW. Results based on the climate simulations with the ECHAM5/MPI-OM1 GCM show an enhanced frequency of the four 'storm-classes'. These changes are related with a downstream stretching of the North Atlantic storm track into Western Europe, resulting enhanced wind gusts over Western and Central Europe. This leads to changes in associated storm losses, with total annual averages increasing by +8% (A1B-scenario) and +19% (A2-scenario) for NRW. However, the regional pattern is heterogeneous: changes over eastern parts of NRW are larger than for western parts. If only losses associated with large and infrequent storms are considered (return period $>$ 20 years), total losses may increase by a factor of 2.