Geophysical Research Abstracts,
Vol. 10, EGU2008-A-03456, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-03456
EGU General Assembly 2008

Analysis of the atmospheric circulation and cyclone tracks concerning the occurrence of wind storm events in Central Europe

M. Donat (1), G.C. Leckebusch (1), J. Pinto (2), U. Ulbrich (1)

(1) Freie Universität Berlin, Institut für Meteorologie, (2) Universität zu Köln, Institut für Geophysik und Meteorologie (markus.donat@met.fu-berlin.de, phone: +49 30 838 71147)

Windstorms are the most loss-intensive natural hazards in Central Europe. In this study, two different measures of storminess are used to identify the occurrence of windstorm events in Germany. One method is based on the analysis of large-scale flow characteristics; the second regards the occurrence of extreme wind speeds. Both approaches are applied to reanalysis data as well as a multi-model ensemble of global climate model simulations for recent and future climate. Storm days are classified into circulation weather types, depending on the characteristics of the daily large-scale atmospheric circulation. The associated cyclones are assigned to the weather types and their tracks are investigated.

Most models show a reasonable agreement between the present day simulations and reanalysis data. Following both approaches, all models agree with observations in showing that the majority of detected storm days are connected with westerly flow and the most frequent pathway of cyclone systems leading to storm in Central Europe is from North-Atlantic via the northern part of the British Isles, North Sea and southern Scandinavia to the Baltic Sea. The mean intensity of the systems reaches its maximum around the British Isles.

Under anthropogenic climate change conditions the number of detected windstorm events over Europe increases in almost all models, only one model reveals significantly less storm days. The increased number of storm days is again connected with a more frequent westerly flow. The track density of the related cyclone systems follows the

same pathway over the British Isles, North Sea and southern Scandinavia to the Baltic Sea. The mean intensity of storm cyclones increases by more than 10 per cent in the area of Eastern Atlantic, around British Isles and into the North Sea. However, the number of tracks is mainly increased only along this storm-cyclone-pathway. Over the Atlantic Ocean a slight decrease of systems is detected north and south of the zone of maximum track density.