Geophysical Research Abstracts,
Vol. 10, EGU2008-A-03947, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-03947
EGU General Assembly 2008

A national set of coherent large scale flood events in Germany.

S. Uhlemann, A.H. Thieken, B. Merz

GeoForschungsZentrum Potsdam, Germany (uhlemann@gfz-potsdam.de / Fax: +49-331-2881570 / Phone: +49-331-2881521)

Numerous studies have focused on comprising data on historic flood events in a particular catchment. Up to now, only little attention has been paid to the analysis of flood events occurring on a larger scale and across catchment boundaries. Such analyses are, however, necessary for the (re-)insurance industry, disaster prevention as well as large scale strategic flood planning. Further they bear the potential of coupling flooding with the governing hydro-meteorological processes and foster the understanding of flood genesis.

Hence, the aim of this study is to identify large scale flood events in Germany. The procedure is to be completely data driven to ensure its applicability to other regions or further data.

For a period of 51 years (1952-2002) time series of daily mean discharge at 152 gauges in Germany were analysed. To capture only real flood events, partial duration series were extracted containing only discharges exceeding the threshold of the 10 year flood at the respective gauge. The 10-year flood was determined on the basis of the annual maximum series at each gauge to which the generalized extreme value distribution was fitted. Each of these events was analysed regarding its temporally coherent appearance at the other gauges. It is assumed that high flow at a multitude of spatially distributed locations is mainly a function of the circulation pattern which operates on the continental scale. Hence, to check for temporal coherence of events over large distances a time window of 15 days (7 days before and 7 days after an event) was applied.

An event was considered large scale if, statistically, the discharge at at least two thirds of all gauges exceeded the mean flood discharge. As a result an event set containing the 50 largest flood events in Germany during the investigation period has been developed. The cumulative normalized discharge of all gauges in the time interval of the event is used as an indicator for the magnitude of the event. Using this indicator the flood event in March 1988 was the most severe one, followed by floods in 1981.

The majority of events, i.e. 85%, were recorded in the hydrological winter. Summer events occurred less often and are mostly less severe on the large scale; nonetheless they can be of an extreme nature on the local scale.

The next step in the analysis will be to quantify the spatio-temporal correlations of the events which will be used for the generation of synthetic flood events. From this an estimation of the return period of large scale flood events will be undertaken.