



## **METEOROLOGICAL-HYDROLOGICAL CONDITIONS OF THE ELBE FLOOD IN AUGUST 2002 IN RELATION TO THOSE OF THE MAIN FLOOD IN JULY 1342**

G. Tetzlaff, M. Börngen, A. Raabe and **M. Mudelsee**

Institute of Meteorology, University of Leipzig, FRG (Email: tetzlaff@uni-leipzig.de, Fax:  
+49-(0)341-9732-899)

Precipitation-runoff balances for the Elbe at Dresden were estimated for the August 2002 flood by means of (1) precipitation measurements in the catchment area (53096 km<sup>2</sup>) at rather high spatial resolution, (2) modelled precipitation using a conceptual atmospheric model and (3) runoff measurements at daily resolution. Various sources of estimation uncertainties were taken into account using a sensitivity analysis.

The results indicate a ratio runoff/precipitation around 50 %. Average precipitation values over the catchment area need not be exceptionally high, rather, a stationary and spatially extended precipitation process is required.

A Generalized Extreme Value distribution was fitted using a maximum likelihood criterion to summer (May to October) bimonthly maximum runoff time series from Dresden, 1850 to September 2002. This yielded a 100-year return period runoff value of 3900 m<sup>3</sup>/s and rendered the August 2002 flood (5000 m<sup>3</sup>/s) with a return period of approximately 170 years.

The meteorological-hydrological conditions of the Elbe flood in August 2002 were contrasted with those of the Main flood in July 1342. Information on the latter flood is contained in historical climate records, compiled, for example, in the Weikinn sources. Derived uncertainties in modelled precipitation and estimated runoff at Main station Kleinheubach (catchment area 21500 km<sup>2</sup>) are considerably larger than in case of the Elbe flood in August 2002. Despite that, applying the runoff/precipitation value from the Elbe 2002 flood to the Main 1342 flood yielded a precipitation for the Main flood that is clearly larger than what occurred before the Elbe flood.