EMS Annual Meeting Abstracts
Vol. 11, EMS2014-554, 2014
14th EMS / 10th ECAC

The seasonality of flood and meteorological anomalies, case study of the upper Elbe basin

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The potential of heavy rains and the floods that result from them to endanger human life, cause property damage and damage the environment is an ever more frequent phenomenon. This has led to greater attention being paid to the occurrence of extreme rainfall-runoff events. A better understanding of the relationships between extreme weather and circulation might, for example, improve the forecasting of such extraordinary events.
The aims of this paper are to describe the annual distribution of extreme runoff events in the basin under consideration, to prove their connection to anomalies of meteorological factors and to explain the distribution of rainfall and runoff events.
The most significant rainfall-runoff events to have occurred along the Němčice profile of the upper Elbe basin in the Czech Republic in the second half of the 20th century are then analysed in more detail. The criterions for selecting these episodes were the extremity of the rainfall (maximum rainfall or weather extremity index) and the extremity of the flooding (maximum return periods or area-related definition of extreme floods). Methods that allow for a quantitative comparison are used to study extreme weather in respect to its frequency, spatial extent, seasonal distribution, temporal variability and the circulation conditions that accompany it. The seasonality of flood events and anomalies of meteorological factors are presented and their connections discussed. Features of the flood regime are also derived and the differences of spatial and temporal in the occurrence of extreme events identified.