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Reconstruction of the extreme flood in the Neckar catchment (SW-Germany) in October 1824

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The project "Analysis of Historical Floods for a Preventive Risk Management of Extreme Flood Events" (Xfloods) incorporates historical climatic aspects causing extreme flood events into flood risk management. First results of this project are aimed at the analysis of the extreme flood in October 1824 in the Neckar Catchment and at the application into a recent flood risk management in the Federal State of Baden-Württemberg, Southwest Germany. The flood event of October 1824 was the most extreme in the Neckar Catchment for the last 300 years caused by strong precipitation. Therefore it was taken as a basis for calculating and modelling possible extreme flood events and will be consulted as extreme design flood for the flood hazard maps of the Neckar Catchment. The course of this flood and the weather situation leading to this event were reconstructed by consulting various historical sources such as meteorological and hydrological observations. These contain parameters such as temperature, precipitation, air pressure, humidity, cloudiness, wind direction, discharge and water-levels. With the help of these observations, it was possible to reconstruct the local weather situation before and during the 1824 flood event Further historical data on the flood event were obtained from weather descriptions, chronicles, newspapers, local books, official advisories, damage reports, cross-sectional profiles and historical maps. Historical flood marks and the recordings of water levels in different written sources also improve our understanding of this flood. The large-scale atmospheric circulation pattern which caused the flood event in October 1824 was reconstructed by evaluating several historical air pressure measurements all across Europe.

The atmospheric circulation pattern and the weather situation in October 1824 were then compared with a recent weather analogue. Thus, the spatial rainfall pattern in the Neckar Catchment for the flood in 1824 could be modelled. The obtained data set can then be used as input for run off models to simulate the discharge of this extreme flood event. In such a way, this knowledge of the past can be integrated in the flood protection for tomorrow and contribute towards improved risk assessment and safer handling of floods in the future.