Reconstruction and Analysis of 19th century Floods in SW-Germany. Case Studies of the extreme Floods in 1824 and 1882

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Historical floods receive increasing attention in flood research and in applied flood protection. They have to be taken into account for the development of floodplain mapping (e.g. flood hazard maps), the improvement of recent series of measurements, statistical validation and the analysis of return period. The presented method is the analysis and reconstruction of flood triggering meteorological situations of past extreme events. This approach integrates the information from historical data, such as meteorological and hydrological measurements. The aim is to determine the hydrometeorological conditions and circumstances that caused an historical extreme flood event. The results can be used for flood risk management, modelling historical discharges and visualisation of the consequences of such an extreme meteorological event on today's environmental conditions. For the recontruction of flood events, sources like chronicles, official advisories, newspapers, weather descriptions as well as meteorological and hydrological measurements were gathered. With this data, the disposition of the river catchment, the regional atmospheric circulation pattern, the weather conditions and the precipitation distribution associated with extreme event can be reconstructed. A first case study is the extreme flood of 1824 in the Neckar River basin. For this event the and the hydrometeorological conditions before and during the flood event as well as the regional precipitation pattern which triggered this flood event could be reconstructed. The were used as input to simulate discharges with the waterbalance model LARSIM (Large Area Runoff Simulation Model), the operational flood forecasting model in the federal state of Baden-Württemberg. The flood event at the

end of December 1882 was caused by a weather change with increasing temperatures and heavy precipitation in the Upper Rhine area and had severe impacts in this region. For this event, the snow cover and course of the air temperatures at different altitudes were important factors for the development and course of the flood event. The developed methodology for these case studies shows potential for wider use in assessing extreme historical floods and for application to contemporary flood management.