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Hydro-meteorological causes of floods on the Upper and Central Danube River in the years 1895, 1897 and 1899

Marcel Garaj
Institute of Hydrology of Slovak Academy of Sciences, Bratislava, Slovakia (garaj@uh.savba.sk)

Historical climatology and hydrology are uprising scientific disciplines. They stay at the intersection of natural and socio-economic sciences. The main objective is to reconstruct the temporal and spatial aspects of the extreme situations which occurred in the past. It can improve hydro-meteorological modelling, predictions and future scenarios if historical data are included. This paper studies the hydro-meteorological causes of selected floods on the Upper and Central Danube River basin at the end of the 19th century. The main objective was to analyse the temperature conditions and precipitation amounts in the researched area based on data from meteorological and hydrological yearbooks from the Austro-Hungarian Monarchy. The analysis of the meteorological causes of a winter flood in 1895 is based on precipitation amount maps and mean monthly air temperature maps for winter 1894/1895. Graphs of the duration of the snow cover and snow depths for the Salzburg and Kremsmünster stations in March 1895 are also presented. Deviations in the mean daily air temperature from the long term averages (1881 – 1910, 1961 – 1990) are analysed at two selected stations, i.e. Kremsmünster and Höhenpeissenberg. The flood wave from 17 April 1895 had a peak discharge of 15 200 m3.s-1 at the Orsova – Turnu Severin station. The analysis of the summer floods in 1897 and 1899 is based on monthly precipitation maps for the specific months with particular rainfall episodes. There are also graphs of deviations in the cumulative precipitation from the long term averages at the Kremsmünster station in July 1897 and September 1899. In Bratislava, the peak discharge of the July 1897 flood wave reached 10 140 m3.s-1 and the September 1899 flood exceeded that with a peak discharge of 10 870 m3.s-1 and a water stage of 970 cm.