



Spatial and temporal patterns of the June 2013 flood in the Upper Danube Basin as compared to the 2002, 1954 and 1899 floods

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In this contribution, we analyse the four largest flood events in the Upper Danube basin in the last 150 years. The analysed events include the event in June 2013 with a maximum flood discharge of the Danube at Vienna of about 11000 m³/s and the 2002, 1954 and 1899 flood events with maximum flood discharges of 10300 m³/s, 9600 m³/s and 10500 m³/s, respectively.

In June 2013, two blocks of large scale precipitation at the northern fringe of the Alps separated by only a few hours were recorded with values exceeding 300 mm over four days, however, snowfall at high altitudes reduced the runoff volume produced. In combination with high antecedent soil moisture extreme runoff with return periods larger than 100 years was produced in a number of tributaries to the Salzach and Inn rivers and in the Bavarian lowlands. At the confluence of the Bavarian Danube and the Inn, the small time lag between the two flood waves exacerbated the downstream flood at the Danube.

Similarly, in 2002 and 1954, there were two blocks of precipitation separated by a few days. The first block of precipitation caused saturation of the soil moisture and a smaller flood wave, whereas the second precipitation block caused the main flood wave.

On the other hand, the flood in 1899 occurred after a long period with little precipitation indicating that the soils were dry. However, the maximum flood discharge was almost as high as in 2013 due to precipitation values exceeding 500 mm in 7 days in large parts of the Danube catchment.

The objectives of this contribution are (1) to better understand the evolution of regional floods in the Upper Danube catchment by elaborating spatial and temporal patterns of precipitation and flood wave propagation along the Danube for the four events and (2) to include historical precipitation and water level data in the analysis.