

EGU2020-19448

<https://doi.org/10.5194/egusphere-egu2020-19448>

EGU General Assembly 2020

© Author(s) 2021. This work is distributed under the Creative Commons Attribution 4.0 License.



Impact of river confluences on return periods of large floods

Björn Guse¹, Luzie Wietzke¹, Sophie Ullrich¹, Bruno Merz^{1,2}, and Sergiy Vorogushyn¹

¹GFZ German Research Centre for Geosciences, Section Hydrology, Potsdam, Germany (bjoern.guse@gfz-potsdam.de)

²University of Potsdam, Institute of Environmental Science and Geography, Potsdam, Germany

The severity of floods is not only affected by the physiogeographic characteristics and the meteorological conditions of the catchment, but also by the river network. If a flood occurs at the same time in tributary and main river, the tributary flood wave can amplify the flood wave in the main river. To investigate the impact of flood wave superposition, the 6-10 largest floods in the four main German river basins (Danube, Elbe, Rhine, Weser) are analyzed. The flood waves are tracked along the river course. Flood magnitude and flood timing are analyzed at each triple point. A triple point consists of the hydrological stations in the tributary and in the main river (upstream and downstream of the confluence). The return periods are calculated separately at each triple point for all three hydrological stations. In addition, changes in the return periods along a river course are analyzed for each flood event. The flood magnitudes and their return periods are compared with the spatiotemporal precipitation distributions and other influencing factors. The results show that the contribution of the different confluences to the flood severity at the main river is event-specific. Partly, the return period is only high at the lower parts of the river basin, partly a high return period in the upper parts of the river basin does not lead to a high return period downstream.