

EGU22-12558

<https://doi.org/10.5194/egusphere-egu22-12558>

EGU General Assembly 2022

© Author(s) 2022. This work is distributed under the Creative Commons Attribution 4.0 License.



The 2021 Flood Disaster in Germany – Distribution, remobilization and accumulation of organic pollutants along the natural floodplains of the Rur river

Christina Schwanen¹, Piero Bellanova², and Jan Schwarzbauer¹

¹Laboratory for Organic-Geochemical Analysis, Institute of Geology and Geochemistry of Petroleum and Coal, RWTH Aachen University, Aachen, Germany (christina.schwanen@emr.rwth-aachen.de)

²Institute for Neotectonics and Natural Hazards, RWTH Aachen University, Aachen, Germany

Due to extreme precipitation and runoff, severe flooding occurred in Germany in the summer of 2021 (July 13th–16th). In the catchment area of the Rur river, especially along its tributaries Inde and Wurm, but also along the Rur itself, this flood caused severe destruction and impacts on modern and older floodplains and anthropogenic utilized areas. This led to the acute and unusual input of harmful organic pollutants, as well as the remobilization and relocation of old burdens.

Particularly floodplains are of central importance during such flood events as their natural functions include water, sediment, and nutrient retention, as well as the self-purification of water bodies. The focus of this investigation was therefore on the importance and relevance of natural floodplains during and after the 2021 summer flood. For this purpose, 16 different floodplains distributed throughout the Rur's course were sampled immediately after the flood. The objectives were to determine pollutant concentrations, distribution, and accumulation, as well as the identification of potential pollution sources. In this context, the results of previous floodplain sampling and regular monitoring of the river's sediments are also considered.

Preliminary results indicate elevated concentrations of several organic pollutant groups, including PAHs (polycyclic aromatic hydrocarbons), PCBs (polychlorinated biphenyls), and LABs (linear alkylbenzenes). These substances are indicators of petrogenic pollution, historical (old burdens) and current heavy industry in the catchment area, and, of wastewater and urban pollution, respectively.

By considering these indicators and identifying emission sources (e.g., wastewater treatment plants, destructed infrastructure and industry along the main river and its tributaries) and accumulation areas that are relevant for remobilization, statements can be obtained about the high dynamics of the flood event. Furthermore, the importance of natural floodplains for the accumulation and remobilization of organic pollutants, but also the self-purification of water bodies is thus investigated and emphasized. This is of great importance for the holistic assessment of the fate and behaviour of organic pollutants as well as for the estimation of short- and long-term environmental risks and hazards related to (extreme) flood events.

