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Microplastic input in to alluvial meadows of the Rhine river in Cologne, Germany

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River systems are major pathways for the transport of microplastic (MP). The Rhine is among the biggest river systems in regard to catchment size and discharge in northwestern Europe. Studies have documented the presence of MP in the Rhine and its tributaries along its course through Germany. The region of Cologne is densely populated, with a variety of land use forms occurring. Thus, an understanding of the presence and entry pathways of MP into alluvial meadows of the Rhine is important for risk assessments.

This study aims to quantitatively analyse transport pathways and sedimentation of MP into the alluvial meadows of the Rhine. We expect that the main entrance pathway of MP into these alluvial meadow soils is via fluvial transport. Two study sites were chosen in Cologne, one in the southern part of the central city (Poller Wiesen) and one in northern rural areas of the city (Merkenich-Langel). These sites were chosen as there are no agricultural fields in the direct vicinity, which could account for major MP input through surface runoff. The sites were flooded intermittently in the past with records of the water level during flooding and extent of flooded areas. For each site, sampling transects were chosen increasing in elevation and distance relative to the river water level. Samples were investigated for their MP concentrations via FTIR-spectroscopy. A digital elevation model supports the understanding of the water flow during flood events. Differences in MP concentrations with increasing elevation and distance to the river are thought to be caused by differences in intensity and frequency of flooding.