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Crowd-based observations of riverine macroplastic pollution

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Plastic debris in aquatic environments is an emerging environmental hazard. Macroplastic pollution (>5 cm) negatively impacts aquatic life and threatens human livelihood, on land, in oceans and within river systems. Reliable information of the origin, fate and pathways of plastic through river systems are required to optimize prevention, mitigation and reduction strategies. Yet, accurate and long-term data on plastic transport are still lacking. Current macroplastic monitoring strategies involve labor intensive sampling methods, require investment in infrastructure. As a result, these measurements have a low temporal resolution and are available for only a few locations. Crowd-based observations of riverine macroplastic pollution may offer a way for more frequent cost-effective data collection over an extensive geographical range. In this presentation we demonstrate the potential of crowd-based observations of floating plastic and plastic on riverbanks. We extended the existing CrowdWater smartphone app for hydrological observations with a module for plastic observations in rivers. We analyzed data from two cases: (1) floating plastic in the River Klang, Malaysia, and (2) plastic the banks of the River Rhine in The Netherlands. Crowd-based observations of floating plastic yield similar estimates of plastic transport, distribution of plastic across the river width, and polymer composition as reference observations. The riverbank observations provided the first data of plastic pollution on the most downstream stretches of the Rhine, revealing peaks close to urban areas and an increasing plastic density towards the river mouth. With this presentation we aim to highlight the important role that crowd-based observations of macroplastic pollution in river systems can play in future monitoring strategies to provide complementing data of plastic transport composition at a higher spatial and temporal resolution than is possible with standard methods.