Vertical distribution of microplastics in a river water column using an innovative sampling method

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Abstract

The microplastics (MPs) pollution has been widely documented in all type of aquatic environment. However, most of the studies focus on the MPs contamination in the surface water and there is a lack of knowledge about contamination in the water column. In the present study, we adapted an aquatic drone to sample MPs both in the water surface (0 – 25 cm) and subsurface (25-50 cm). In a previous study, the aquatic drone has been shown to be more accurate for sampling MPs than the Manta net.

The samples of surface and subsurface water were collected in a river with the aquatic drone, while an in-situ pump was used to sample water near the bottom (2 to 3 m depth) of the river. MPs concentrations (n.L-1) and their characteristics (size, morphology, color, shape and polymer nature) were determined and compared between the three sampling compartments.

All of the water compartments sampled were contaminated. Our results showed that subsurface water could be as contaminated as the surface water. In terms of shape, fibers and film were a majority on the water surface while fragments were found in greater proportion in subsurface water.

This study demonstrates that sampling only the water surface could result in bias for assessing the MPs contamination in aquatic environment.

Keywords: Microplastics, aquatic drone, sampling, water column

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