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# Sediment and microplastic particles settling process in freshwater: experimental settling tubes

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## Abstract

Microplastic pollution is an environmental problem facing rivers, oceans, and coastlines. Estimations suggest that around 1.15 to 12.7 million tonnes of plastic waste enter to oceans every year from the global riverine system. Plastic pollution measurements in rivers and coast have shown that a significant volume of microplastics are formed buoyant, non-buoyant and neutral microplastics. These plastic particles have been found deposited and stored in the sediments, causing lethal effects to animals. Vertical distribution of microplastic particles in sedimentary deposits shows that the amount of plastic deposit decreases in deeper layers, with any specific pattern related to the plastic density. This means that all the types of plastics are found on similar percentages all over the layers without any physics explanation. For this reason, this research aims to understand what are the physical parameters that control the stratigraphy of the vertical distribution of microplastic pollution in sedimentary deposits. Therefore, a set of 52 experimental settling tubes were designed using different volumes of microplastic particles and sediment. The experimental results highlight the relative importance of microplastic-sediment concentrations controlling the distribution of plastic material within the deposits, which have a range of implications for concentrations in the fields as well as the spatial distribution of microplastic deposits in natural environments.

**Keywords:** microplastics and sediment settling, fall velocity, particle interaction

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