

Characterization of microplastics accumulated in sediments of stormwater detention basins, in relation to the land use patterns in the contributing catchment.

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Issues related to microplastics (MP), defined by particle size between 1 μm and 5 mm, have emerged late compared to macroplastics. According to Rochman and al. (2018), 80% of MP found at sea originate from continental surfaces. In 2012, only 1% of publications focused on land-based plastic pollution, while in 2020, publications had risen to 15%. Knowledge of the pollution sources, such as urban environments, remains limited (Blot and al., 2022), although pollution caused by MP is globally widespread in freshwater (Li and al., 2019). The main objective of this study is to assess MP pollution in a large urban area by focusing on the sediments of ten detention basins, selected according to the typology of the urban basins they drain. The basins have a unique function of accumulating rainwater from the urban area and releasing it into either the natural environment or the sewage system. The land use in the selected basins was categorized to establish possible links between MP levels and types with different activities (industrial and commercial, urban or agricultural). The measured concentrations range from 1833 MP kg^{-1} dry weight (dw) to 612000 MP kg^{-1} dw, which is much higher than other similar studies because detention basins collect direct sources of MP. These concentrations are significantly different between several basin categories in relation to land use. Indeed, industrial and commercial areas contain samples with the highest MP content, while agricultural areas have samples with the lowest MP content. Depending on the typology of the basins, between three and ten types of polymers are identified, with a majority of polypropylene (PP), polyethylene (PE) and polystyrene (PS). In addition, several correlations show a statistical relationship between MP concentrations and land use types and/or sediment characteristics.

Blot D., Tramoy R., Gasperi J., et Tassin B. (2022). Le continent oublié. Lumières et zones d'ombre des recherches sur la dissémination des plastiques. *Natures Sciences Sociétés*. <https://doi.org/10.1051/nss/2022002>

Li C., Busquets R., Camps L. (2020). Assessment of microplastics in freshwater: A review. *Science of the Total Environment* 707, 135578. <https://doi.org/10.1016/j.scitotenv.2019.135578>

Rochman M-C. (2018). Microplastics Research—from Sink to