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Macro and microplastics in stormwater and combined sewer overflows in Paris megacity

Macro et microplastiques dans les eaux pluviales et dans les rejets urbains de temps de pluie de l'agglomération parisienne

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Introduction

Plastic fluxes issued from stormwater and combined sewer overflows (CSOs) are poorly documented. To add more data on this topic, macro and microplastic concentrations are estimated (i) in runoff waters at the outlet of a 200 ha catchment, situated in Sucy-en-Brie (Paris suburb) and (ii) in CSO discharges at the SIAAP Clichy outfall.

Sampling sites and methods

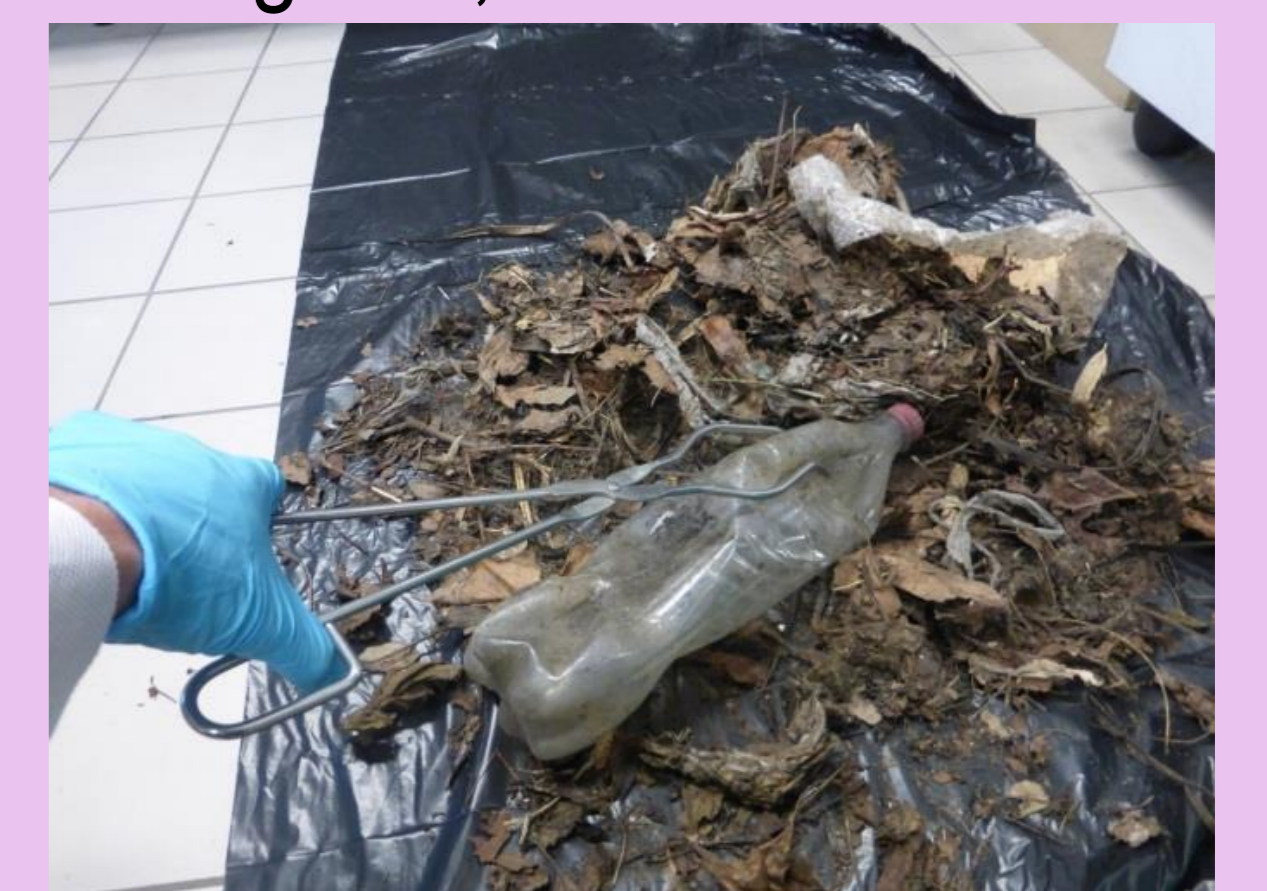
Combined sewer overflows at Clichy outfall (SIAAP)

Macro and microplastics are sampled using nets with different mesh sizes (1 cm, 300 μ m, 80 μ m)



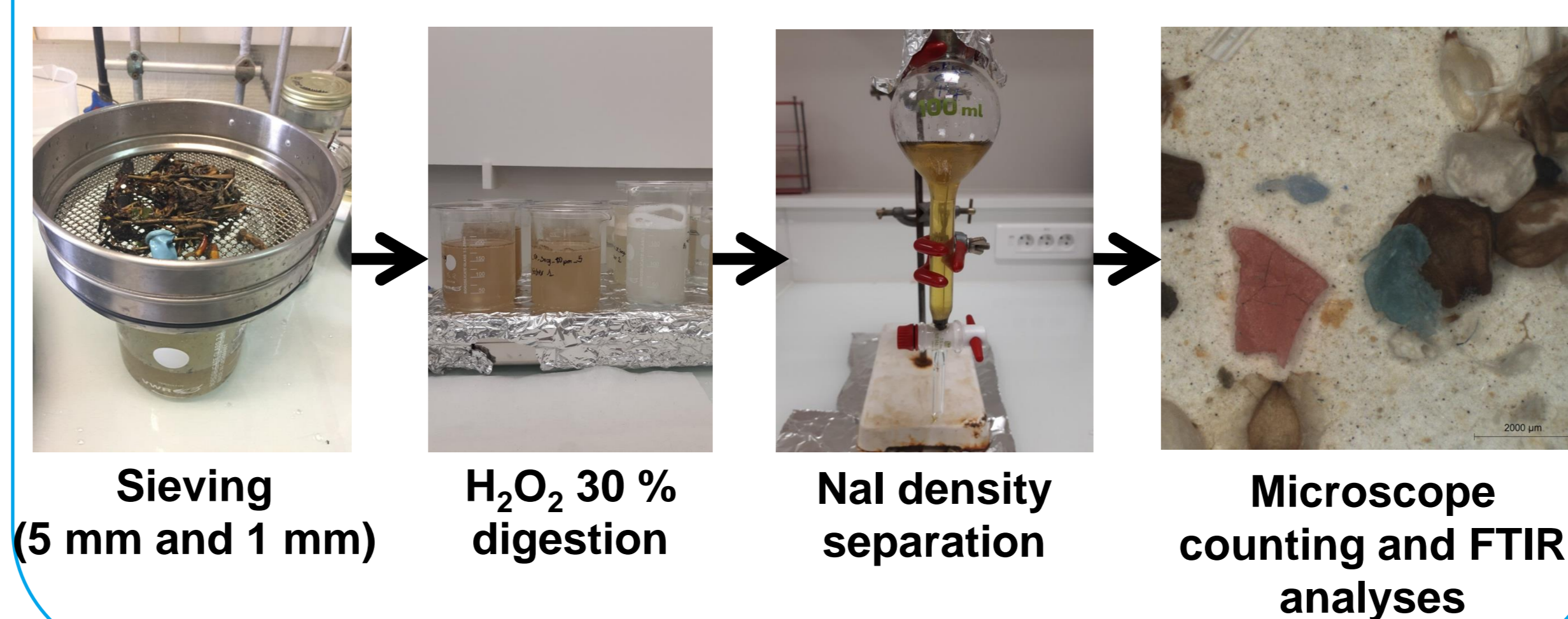
Runoff water at the Sucy-en-Brie catchment outflow (DSEA Val de Marne)

Debris are collected from two grid refusals (6 and 1 cm). They are weighted, dried and sorted.



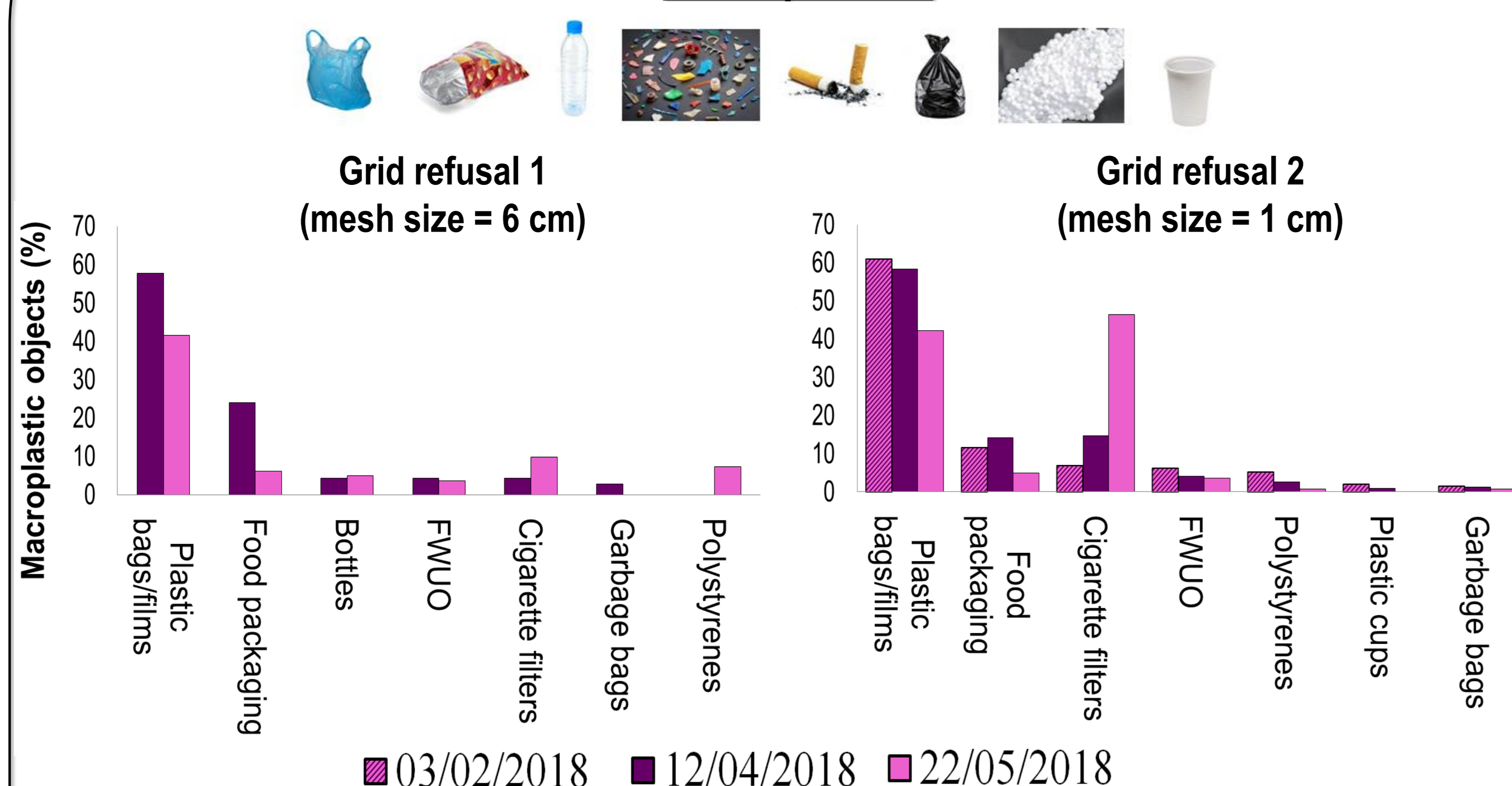
100L of runoff water are collected upstream of the grid refusals during rain events for microplastic analysis. This water is then filtered with a 80 μ m net and microplastics are analyzed.

How to extract and analyse microplastics ?



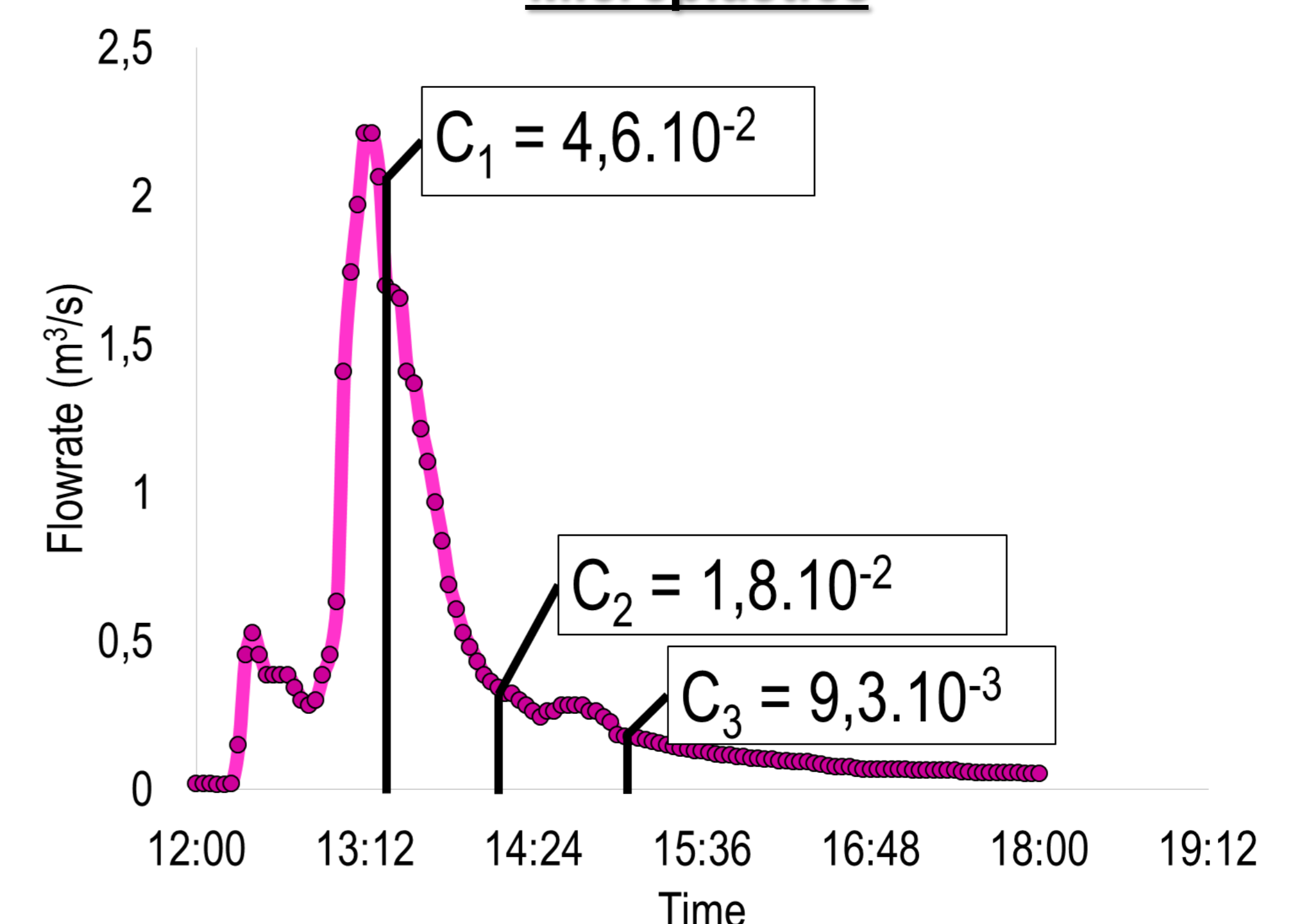
Results and discussions

Macroplastics



- Eight plastic waste categories correspond to 95 % of all the plastics of Sucy-en-Brie (FWUO : Fragments With Unknown Origin).
- Due to the different mesh sizes, a different waste repartition is observed depending on the grid refusal.
- Plastic waste in stormwater $\sim 3.10^{-5}$ kg/m³

Microplastics



- 1-5 mm microplastic concentrations (fragments/L) and flowrate as a function of time (06/11/18 rain event, Sucy-en-Brie).
- Previous works found microplastic concentrations between 2 and 29 fragments/L (Dris et al., 2018) for the same catchment.
- Lower values could be explained because smaller microplastics are not included up to now (1 μ m to 1 mm).