

Plastic input from the Seine River into the oceans: first results from the MacroPLAST project

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ABSTRACT

Most recent studies state between 0.4 and 4 Million t/yr of plastic enter the ocean each year, most of it being transported by rivers. Those global estimations are associated with great uncertainties due to methodological difficulties to accurately quantify fluxes of macroplastic from continent into oceans. In addition, only few studies at the basin scale exist and no standard methods are applied to quantify those plastic fluxes. In this context, the Ministry of the Ecological and Solidarity Transition of France, in response to European directives, has initiated the MacroPLAST project to quantify macroplastic input from the Seine River into the oceans. But, most importantly, the aim of this study is to develop a methodology replicable in other rivers. Different methods are investigated including modeling, field methods, cameras, nets, etc. In this presentation, modeling and field methods using statistical data, floating booms or data from association collecting plastic litter are presented. The modeling method is based on Jambeck's approach applied to the Seine basin. Statistical and field approaches give similar order of magnitude, i.e. 1 800 – 6 300 t/yr entering the oceans from the Seine River (Figure 1). But, they are associated with large uncertainties and rough extrapolations. To avoid such extrapolations and statistical weaknesses, a new methodology has been developed and is actually in progress. It focuses on a probabilistic approach combining the tracking of floating debris using GPS, tagged plastic litter and data from plastic litter collection along the riverbanks of the Seine estuary operated since 2008. First results at the mid of June 2018 lead to fluxes ~800 t/yr of plastic, an order of magnitude lower than the two other approaches. The results will be progressively improved as long as new data will be available and by investigating the potential hiding plastic flux within the water column, below the surface.

	Main interest	Main disadvantage	Plastic input (t.yr ⁻¹)
Modeling Approach	Easy application	Disconnected from the field	2 360 - 6 300
Field Approach	Connected to the field	Low space/time integration	1 800 - 5 400
Probabilistic Approach	Spatial and time integration	Time and cost consuming	~ 800

Figure 1: Plastic input from the Seine River into the oceans according to the method of calculation