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Microplastics and urban water

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Microplastics and urban water


Rachid Dris, Johnny Gasperi, Vincent Rocher, Mohamed Saad, Bruno Tassin

FRS SIAAP
Paris Seine Aval


Introduction


Macroplastics (>5mm)

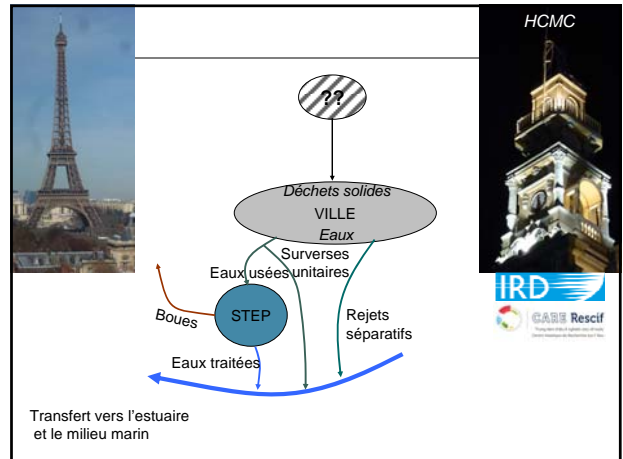
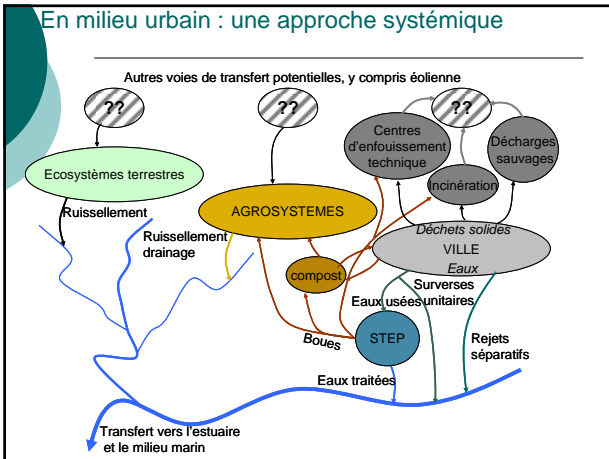
In oceans 

In rivers 

Microplastics (<5mm)

Fragments/Spheres 

Fibers 



Materials and methods

5

Materials and methods

6

Materials and methods

Sampling	Atmospheric fallout	Rainwater	Washing machine	WWTP effluents	Surface water
Samples treatment	Remove natural organic fraction SDS → H ₂ O ₂ Lipase, Protéase, Amylase		Remove mineral fraction ZnCl ₂ Density = 1.6 g/cm ³		
Observation					
Characterization					

7

Materials and methods

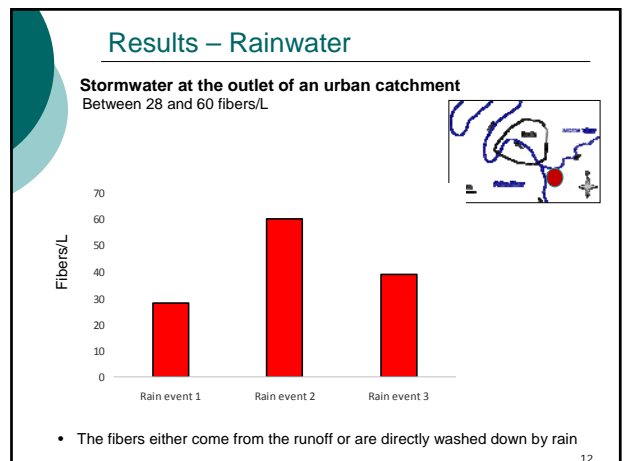
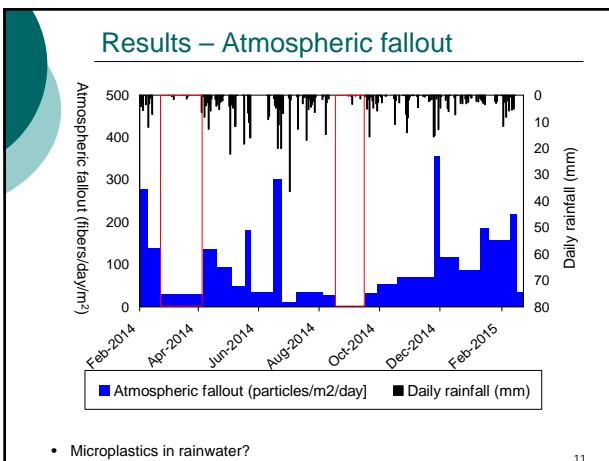
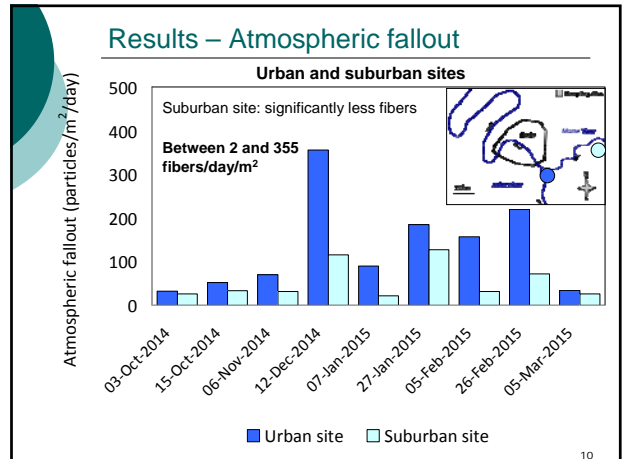
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Observation					
Characterization					

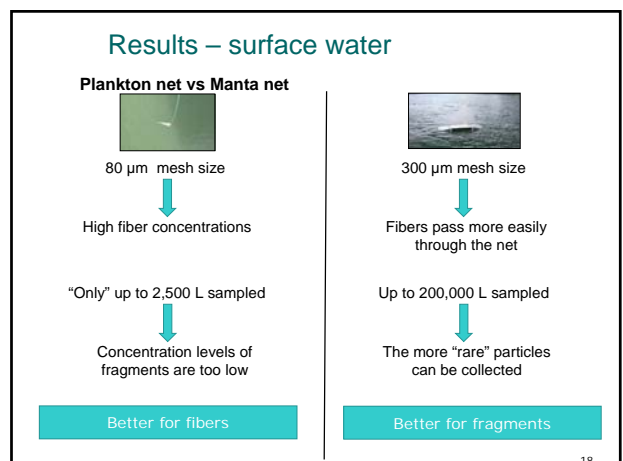
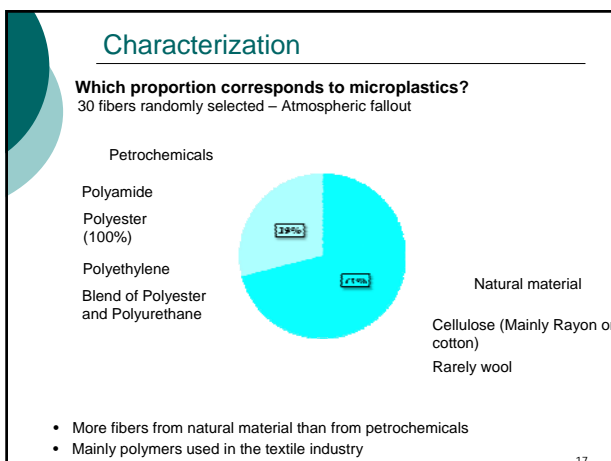
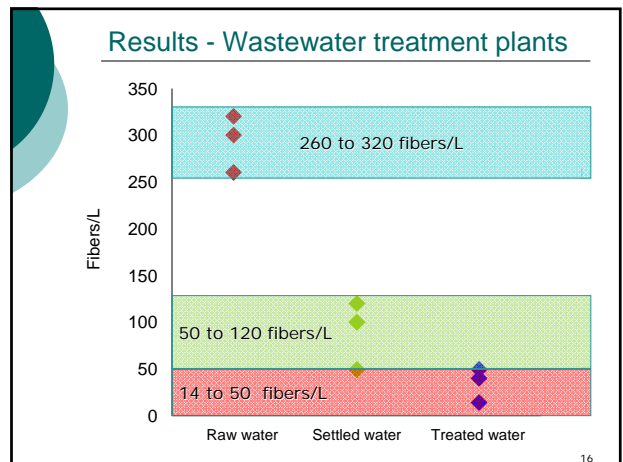
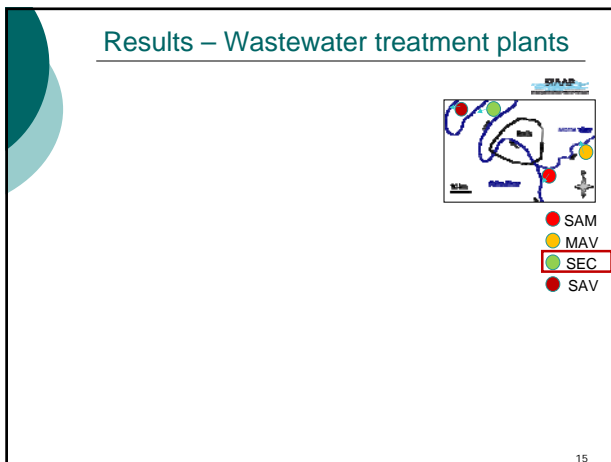
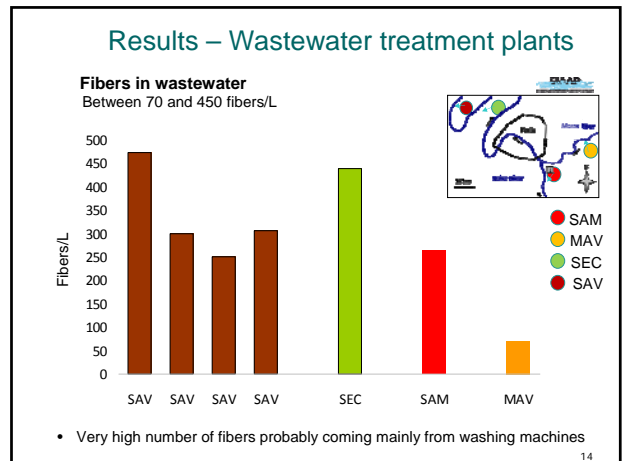
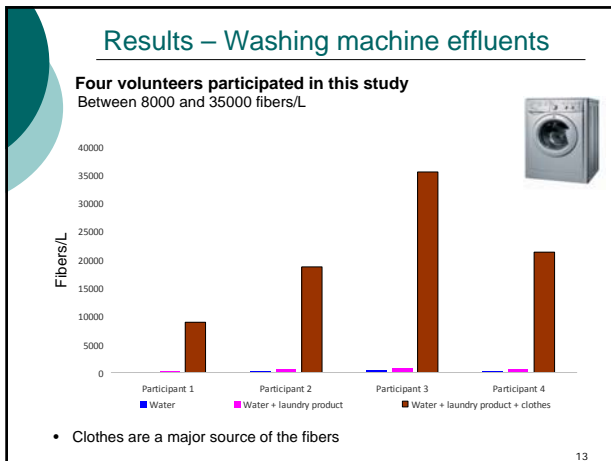
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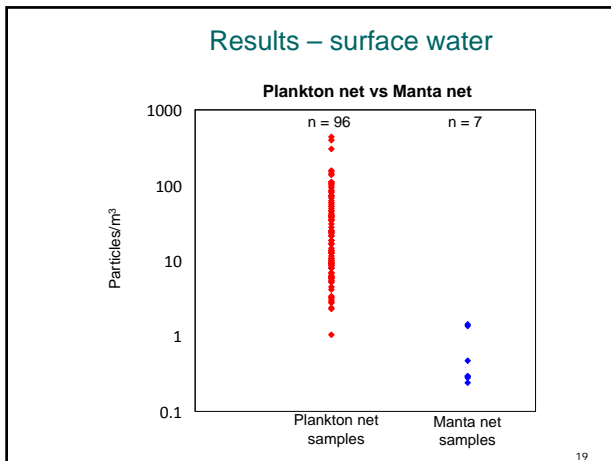
Materials and methods

Sampling	Atmospheric fallout	Rainwater	Washing machine	WWTP effluents	Surface water
Samples treatment	Remove natural organic fraction SDS → H ₂ O ₂ Lipase, Protéase, Amylase		Remove mineral fraction ZnCl ₂ Density = 1.6 g/cm ³		
Observation					
Characterization	Transform infrared (FT-IR) micro spectroscopy (Microscope LUMOS FT-IR – Bruker)				

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Results – surface water

80 µm net samples

Chemical characterization in progress

So far:

- 2 Rayon fibers (among 19 particles)
- Polyester mainly
- Polyamide and Polypropylene

Only fibers

20

Results – surface water

300 µm net samples

Chemical characterization in progress

So far:

- Only plastic particles
- Only Polyethylene and Polypropylene

Fragments, films and spheres

21

Synthèse

Retombées atmosphériques	10 ² /m ² /jour
Eaux de ruissellement	10 ¹ /L
Lave linge	10 ⁴ /L
Station d'épuration (entrée)	10 ² /L
Station d'épuration (sortie)	10 ¹ /L
Rivière	10 ⁻² – 10 ⁰ /L

- ### Conclusions et perspectives
- Présence ubiquiste en milieu urbain
 - Bilans encore très lacunaires
 - Méthodes d'analyse non stabilisées
 - Cas des fibres
 - Difficiles à caractériser
 - Très présentes, (contamination)
 - Question de l'impact écologique

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Microplastics in various compartments of the urban water cycle

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©Dris, R., Gasperi, J., Saad, M., Mirande, C., Tassin, B., 2016. **Synthetic fibers in atmospheric fallout: A source of microplastics in the environment?** Mar. Pollut. Bull. doi:10.1016/j.marpolbul.2016.01.006

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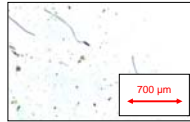
©Gasperi, J., Dris, R., Bonin, T., Rocher, V., Tassin, B., 2014 **Assessment of floating plastic debris in surface water along the Seine River.** Environ. Poll. 195, 163–166.

Introduction

Previous investigations in the Seine River



Less than 2 fragments/m³



Up to 400 fibers/m³