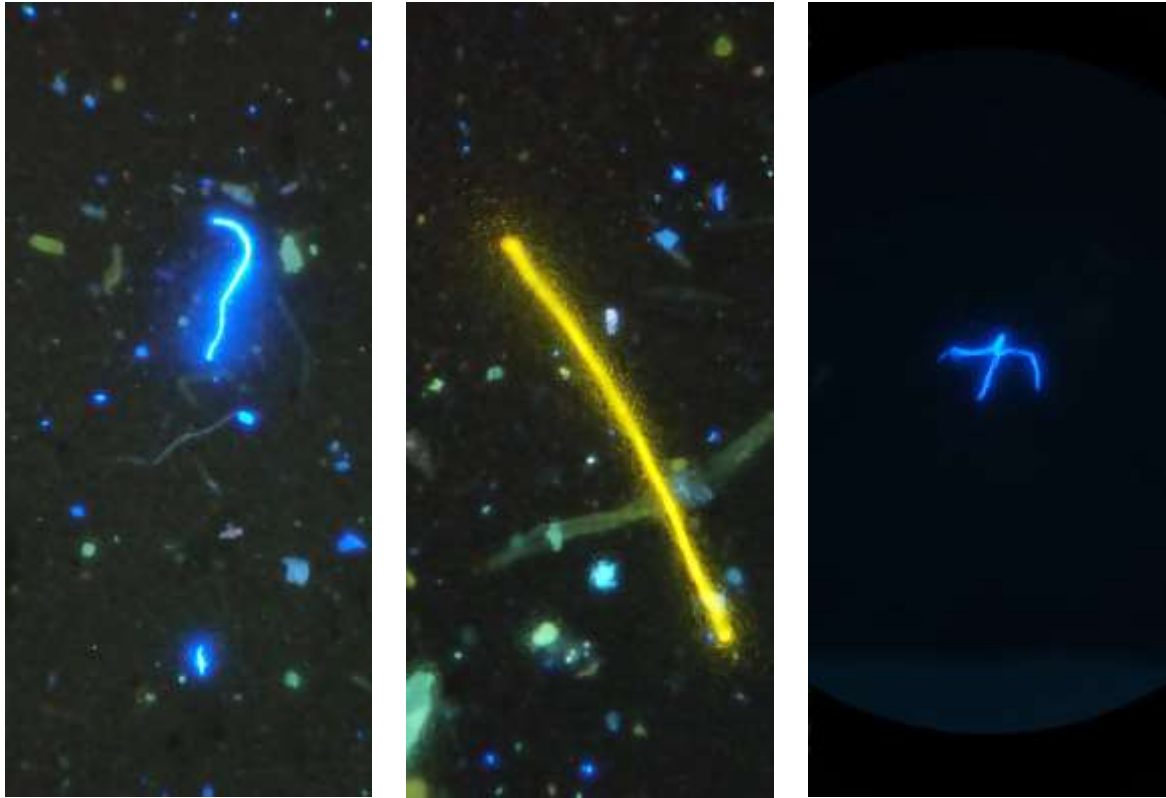


Synthèse sur les microplastiques dans les bassins versant d'Arbu et Bernadouze.



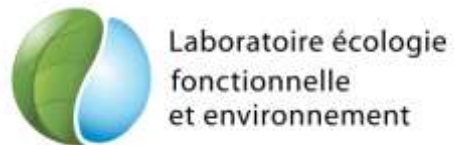
© Oskar Hagelskjaer



Project co-funded by the European Regional Development Fund (ERDF)

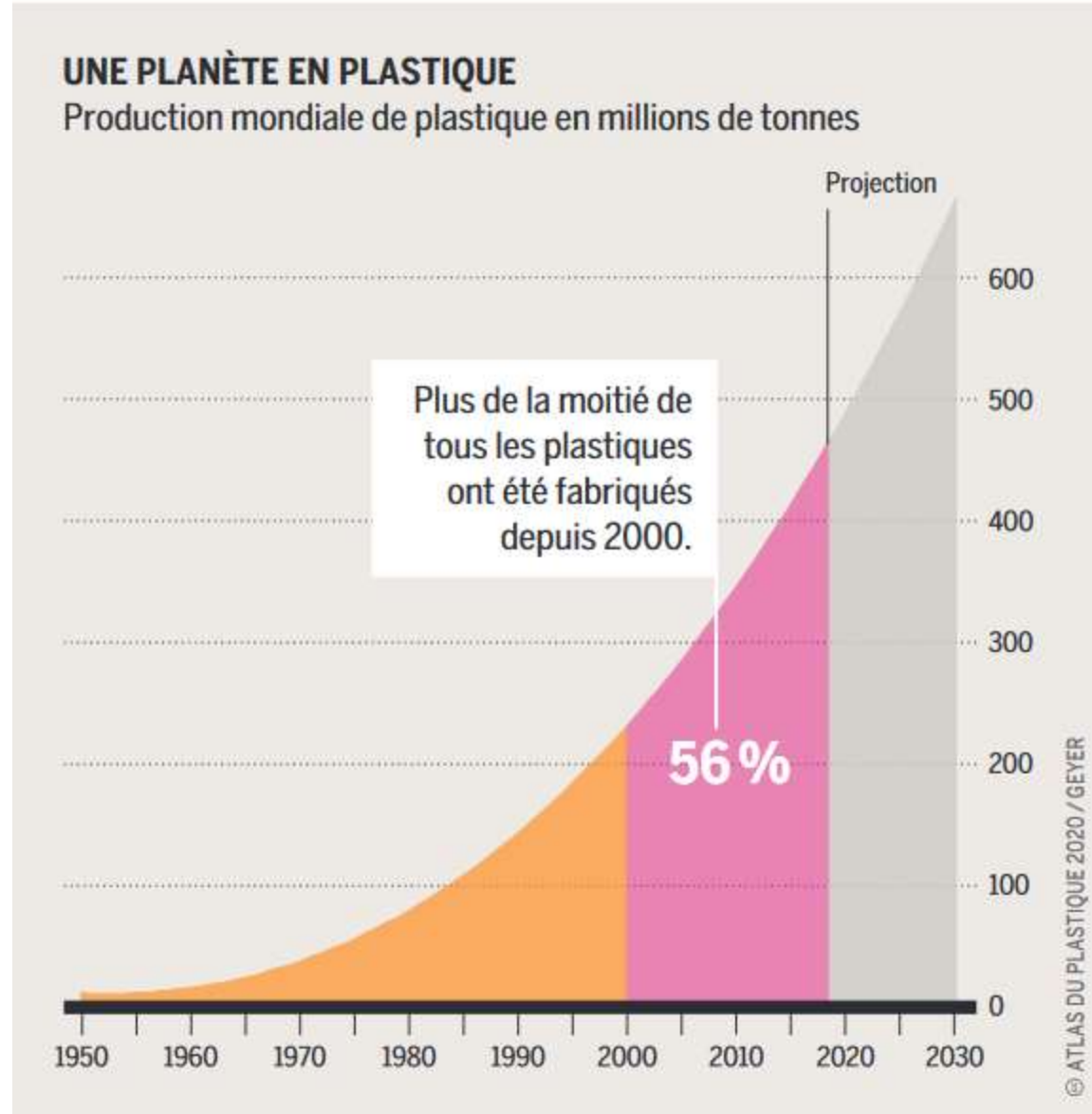
CNRS MITI 4D μ Plast

Le Roux G., Hagelskjaer O., Margenat H., Gandois L., Hansson S., Sonke J. & OHM 2019 PVC team, Plasticopyr team, Atmo-Plastic team



Pollution plastique

9.2 milliards de Tonnes
Produits depuis 1950



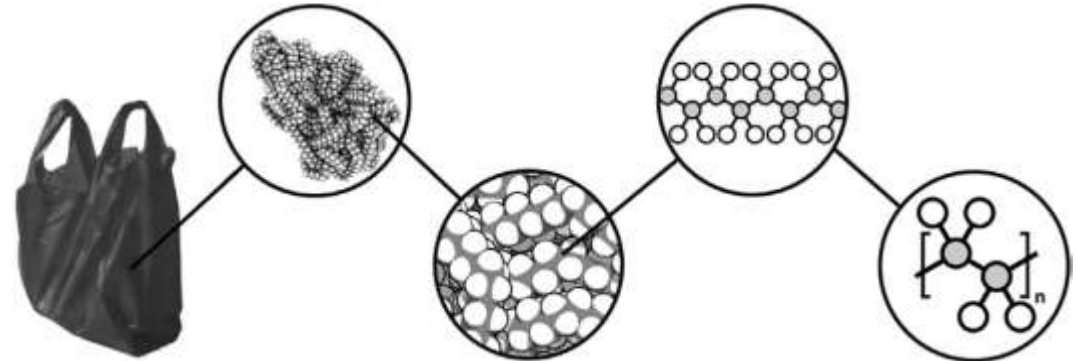
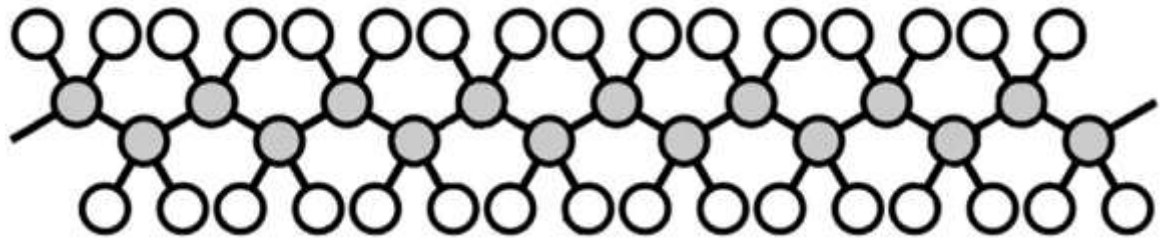
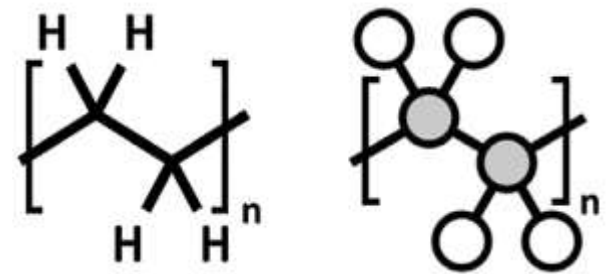
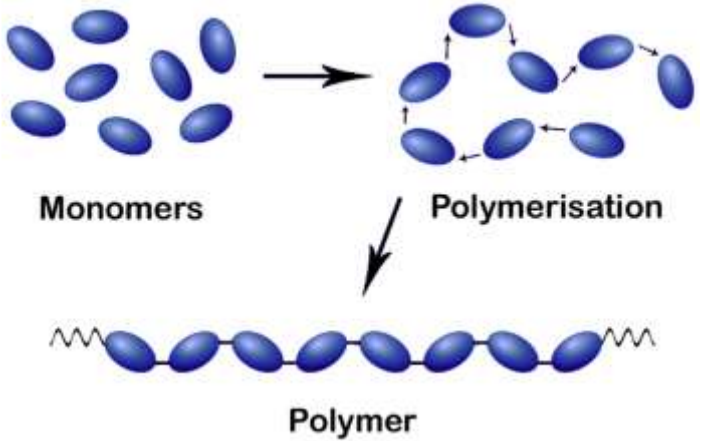
Recyclé: 16 %








Incinéré: 8.5%

Déchets: 55%

Toujours en utilisation: 20%

Qu'est-ce qu'un plastique?



 PET	 PE-HD	 PVC	 PE-LD	 PP	 PS	 0
Polyethylene terephthalate	Polyethylene (high density)	Polyvinyl chloride	Polyethylene (low density)	Polypropylene	Polystyrene	Bisphenol A and others

PET is commonly used in commercially sold water bottles, soft drink bottles, sports drink bottles, and condiment bottles.

HDPE is commonly used in milk and juice bottles, detergent bottles, shampoo bottles, grocery bags, and cereal box liners.

PVC can be flexible or rigid, and is used for plumbing pipes, clear food packaging, shrink wrap, plastic children's toys, tablecloths, vinyl flooring, children's play mats, and blister packs (such as for medicines).

LDPE is used for dry cleaning bags, bread bags, newspaper bags, produce bags, and garbage bags, as well as "paper" milk cartons and hot/cold beverage cups.

PP is used to make yogurt containers, deli food containers, furniture, luggage and winter clothing insulation.

PS, also popularly known as Styrofoam, is used for cups, plates, take-out containers, supermarket meat trays, and packing peanuts.

Any plastic item not made from the above six plastics is lumped together as a #7 plastic. things like CD's baby bottles and headlight lens



Who is who?

A journey through plastic debris in mountain and river ecosystems



Micro-plastics

0,1 μm - 5 mm

Where do they come from?	Effects on humans	Effects on the environment
<ul style="list-style-type: none"> -Directly manufactured (cosmetics) -Breakdown of macro and meso-plastics 	<ul style="list-style-type: none"> -They can enter our body by ingestion or inhalation. -Degradation into nano-plastics (potential adverse effects at cellular level) -More research needed! 	<ul style="list-style-type: none"> - Found in rivers, atmosphere and soil. -Potential threat towards biota in terrestrial and aquatic ecosystems. -More research needed!

Meso-plastics

5 mm - 5 cm

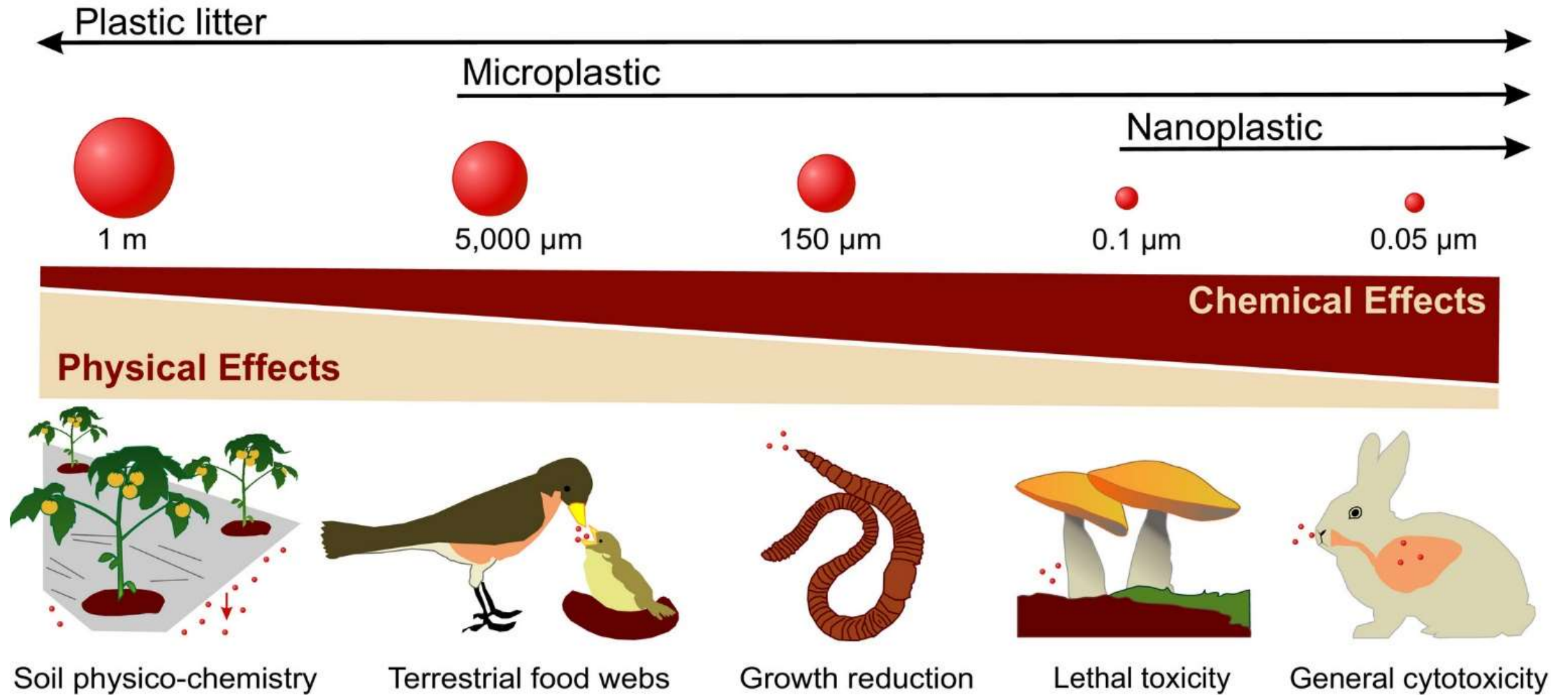
Where do they come from?	Effects on humans	Effects on the environment
<ul style="list-style-type: none"> -Plastic objects left on the mountain -Breakdown of macro-plastics 	<ul style="list-style-type: none"> -New source of pathogens 	<ul style="list-style-type: none"> -Extra source of carbon -Degradation into micro-plastics -Modification of pristine ecosystems -New habitat -Home to invading species

Macro-plastics

+ 5 cm

Where do they come from?	Effects on humans	Effects on the environment
<ul style="list-style-type: none"> -Plastic objects left in the mountains, mainly by touristic pressure 	<ul style="list-style-type: none"> -Visible pollution, which degrades the landscape beauty and the related ecosystem services -Impact on tourism and economy 	<ul style="list-style-type: none"> -Extra source of carbon -Main source of meso and micro-plastics -Modification of pristine ecosystems -New habitat -Home to invading species

References Shaoliang Zhang et al. "Microplastics in the environment: A review of analytical methods, distribution and biological effects". Trends in Analytical Chemistry, vol.111, 2019, pp 62-72; Dick Vethaak, A. et al. "Microplastics and human health". Science, vol 371, no. 6530, 2021, pp 672-674; Icons by Flatiron and Carva

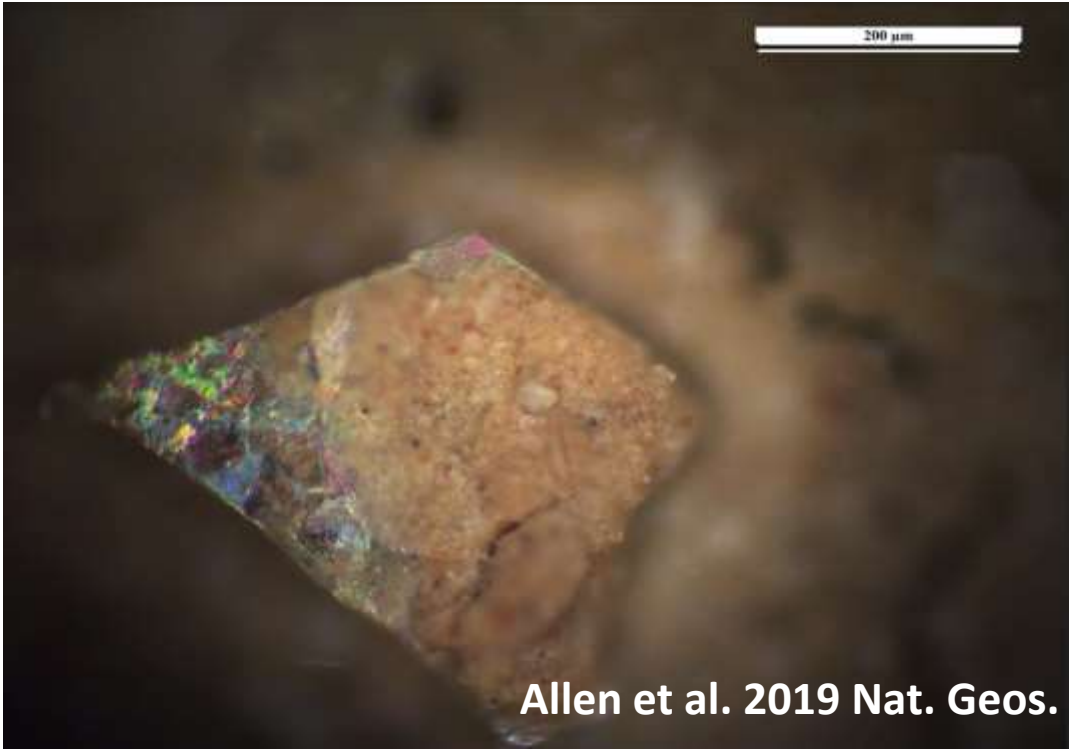


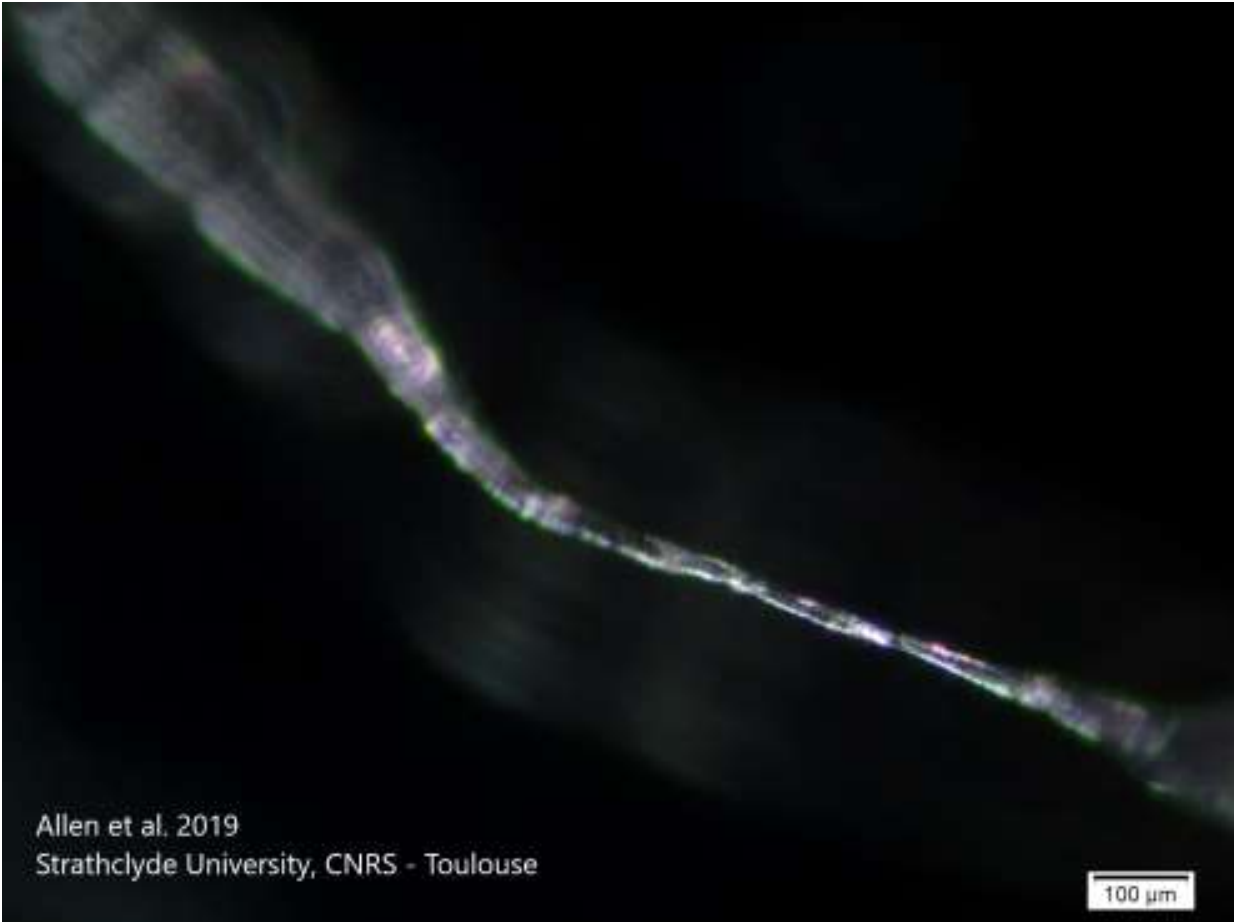


Pneu à Bernadouze, 25/05/2021 L. Gandois

Comment trouver les microplastiques
(vidéo O. Hagelskjaer).



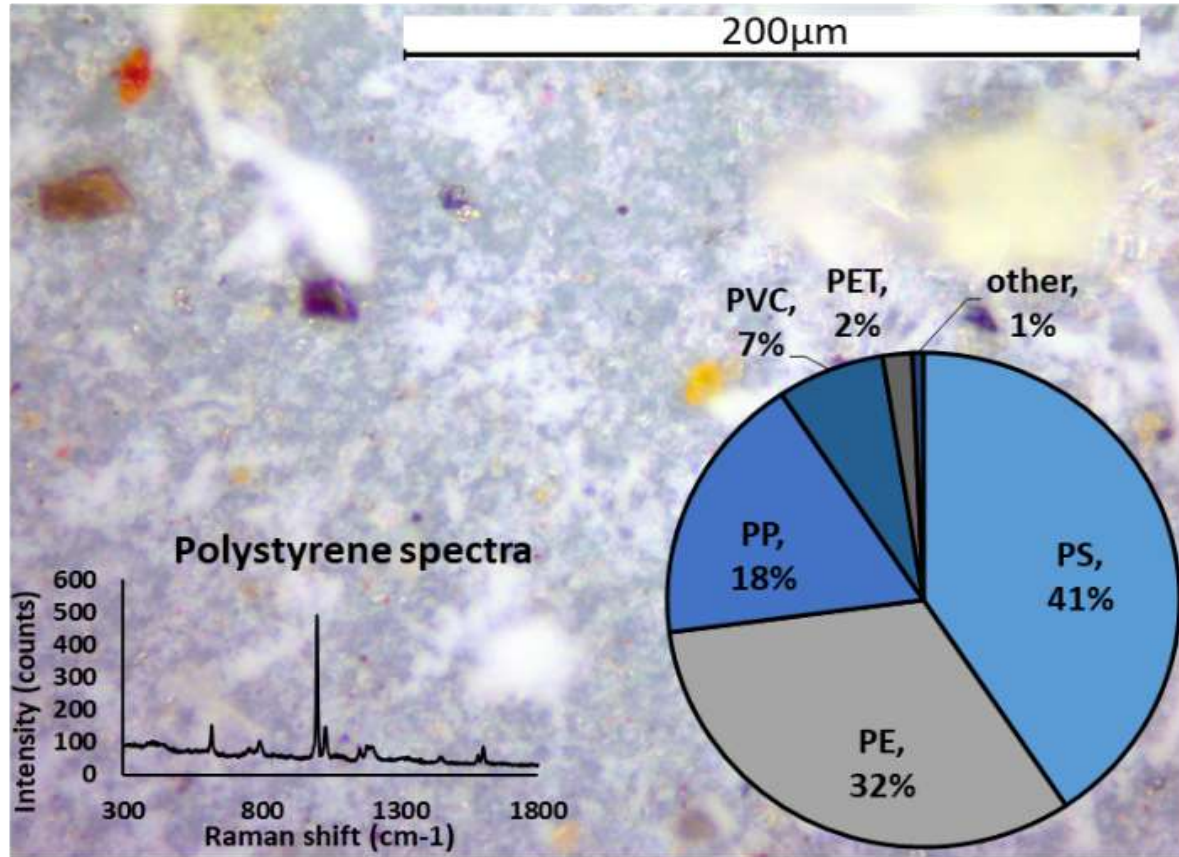




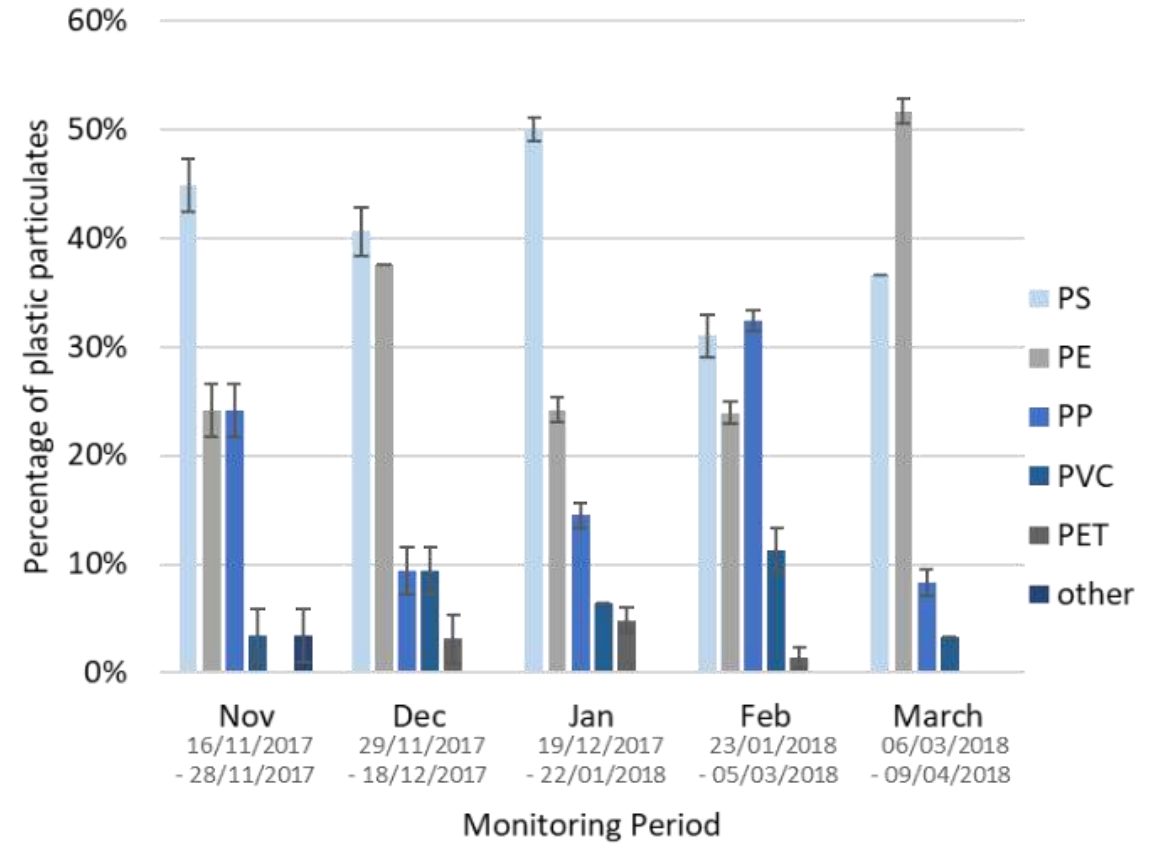
Allen et al. 2019
Strathclyde University, CNRS - Toulouse

100 μm

Bernadouze, Ariège – type de plastiques

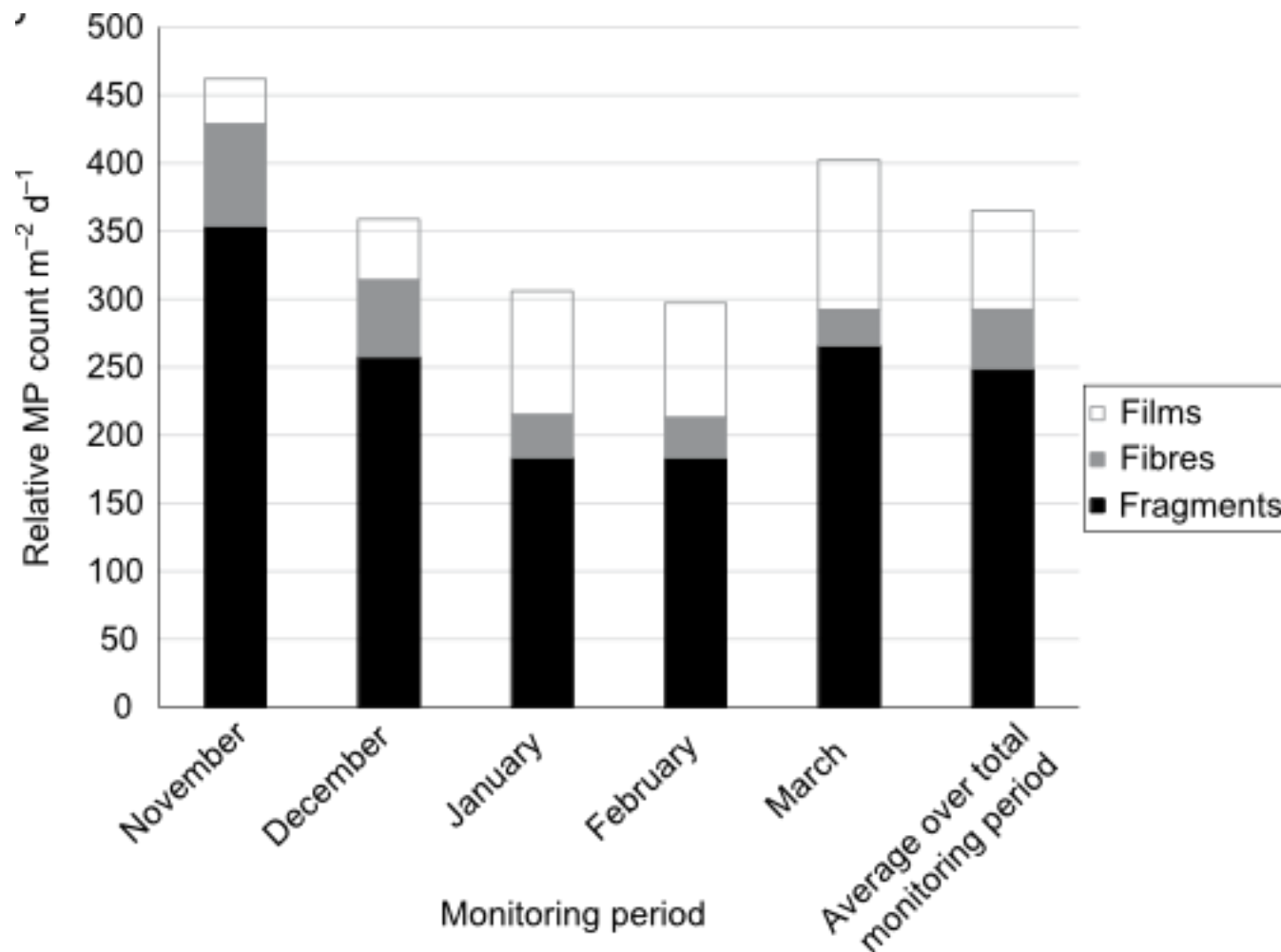


Monthly disaggregation of plastic types identified



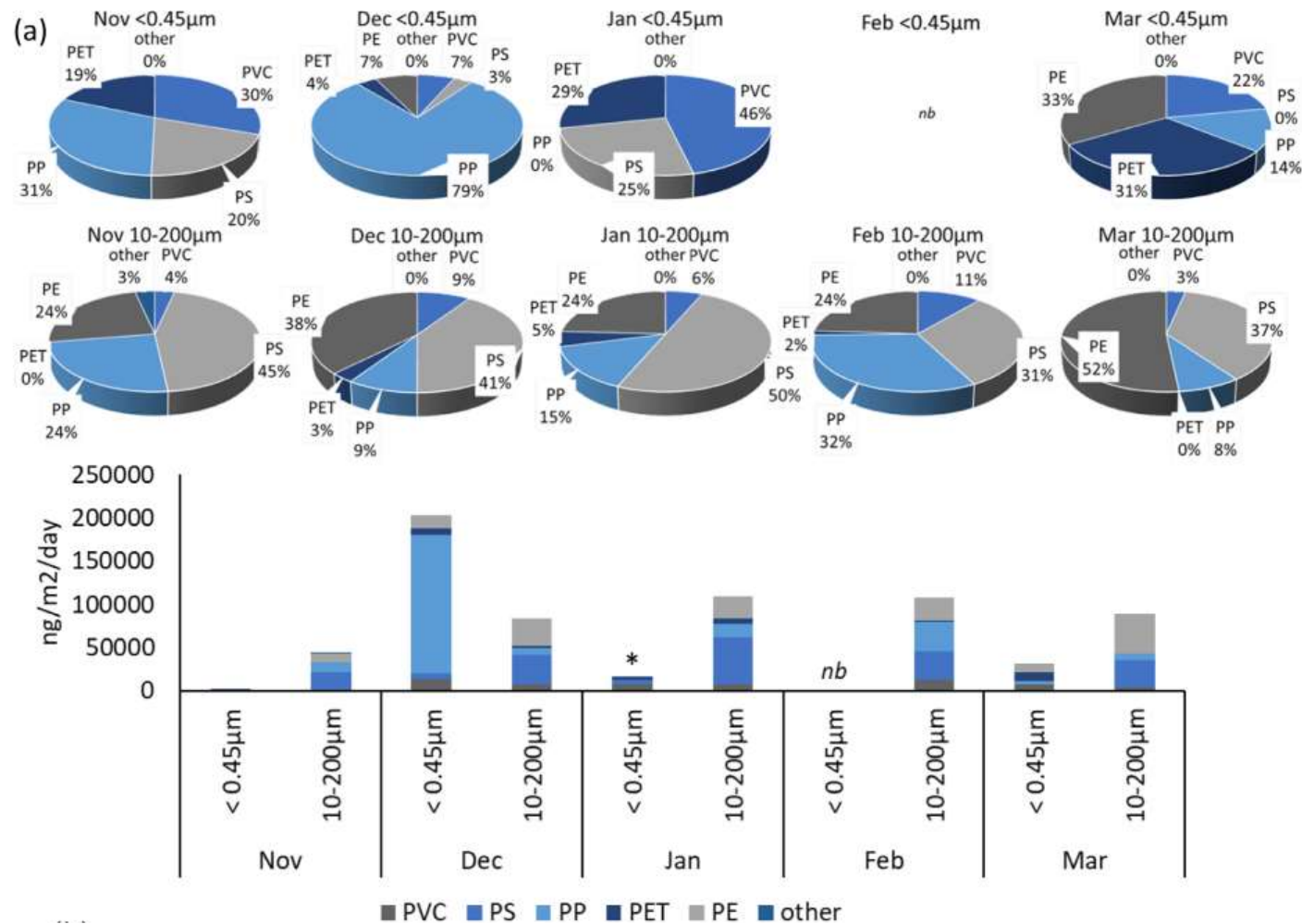
Allen et al. 2019 Nat. Geos.

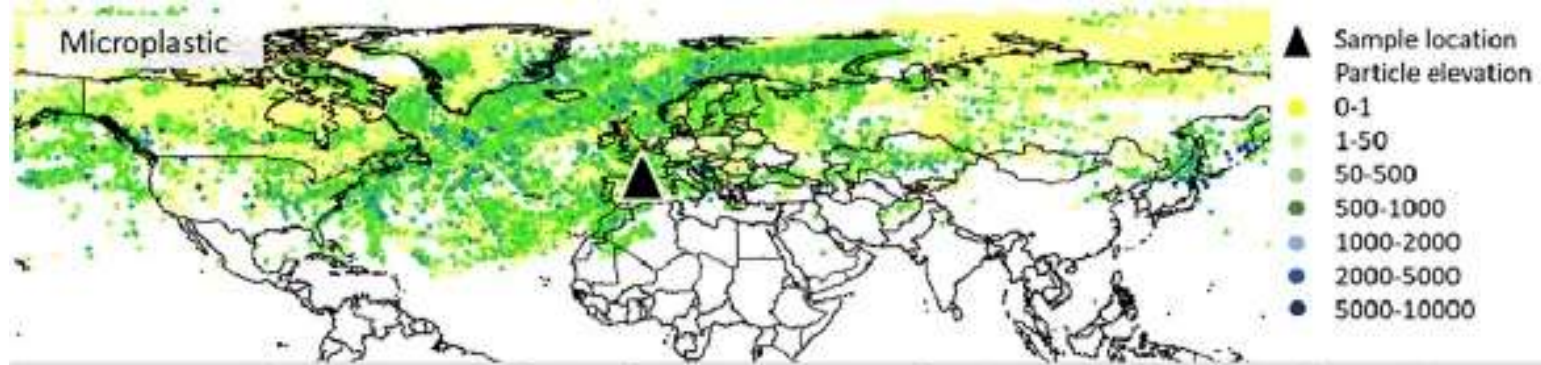
Bernadouze, Ariège: intensité du dépôt



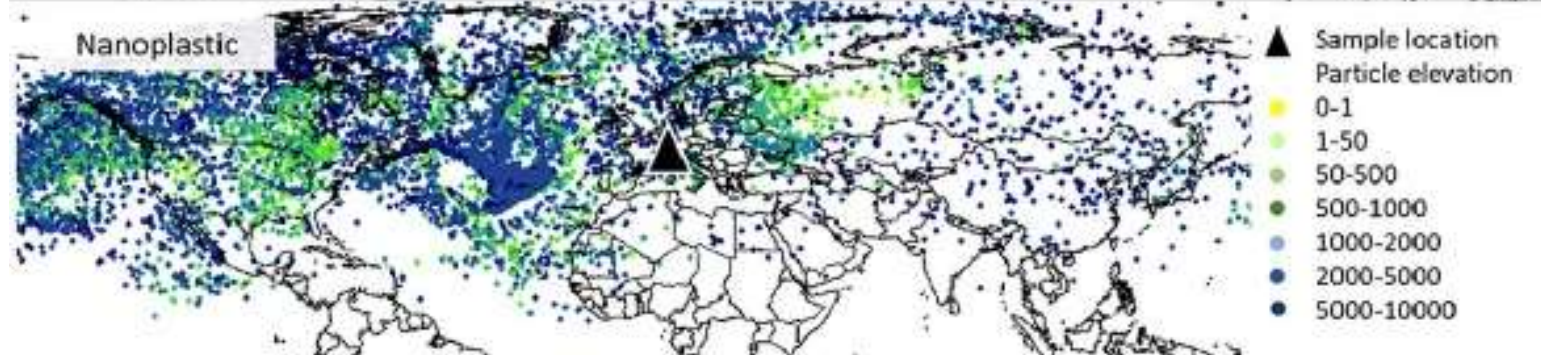
Allen et al., Nature Geoscience 2019

Prochaines étapes: nanoplastiques



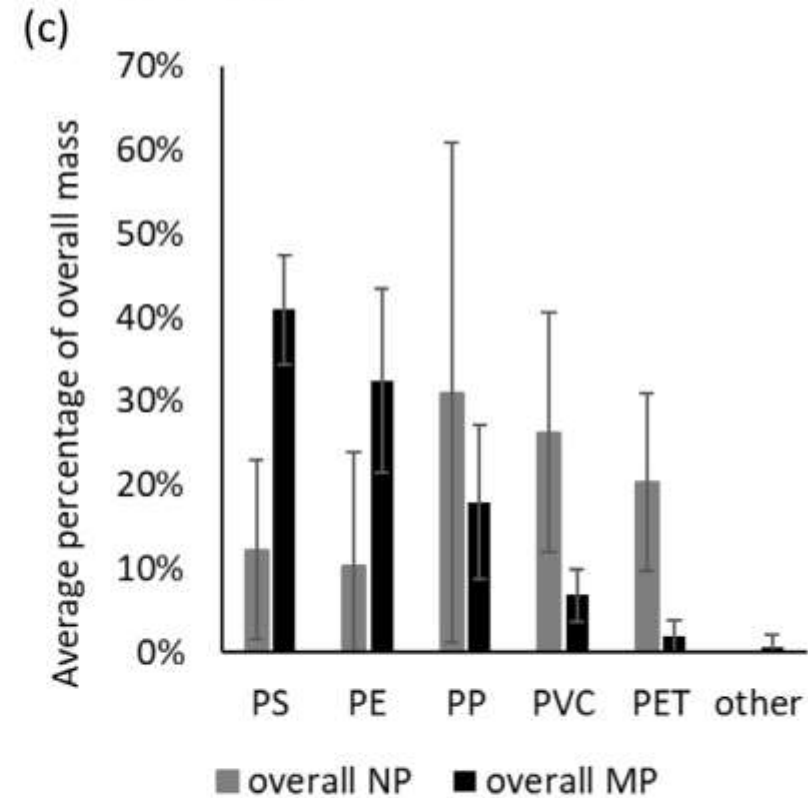
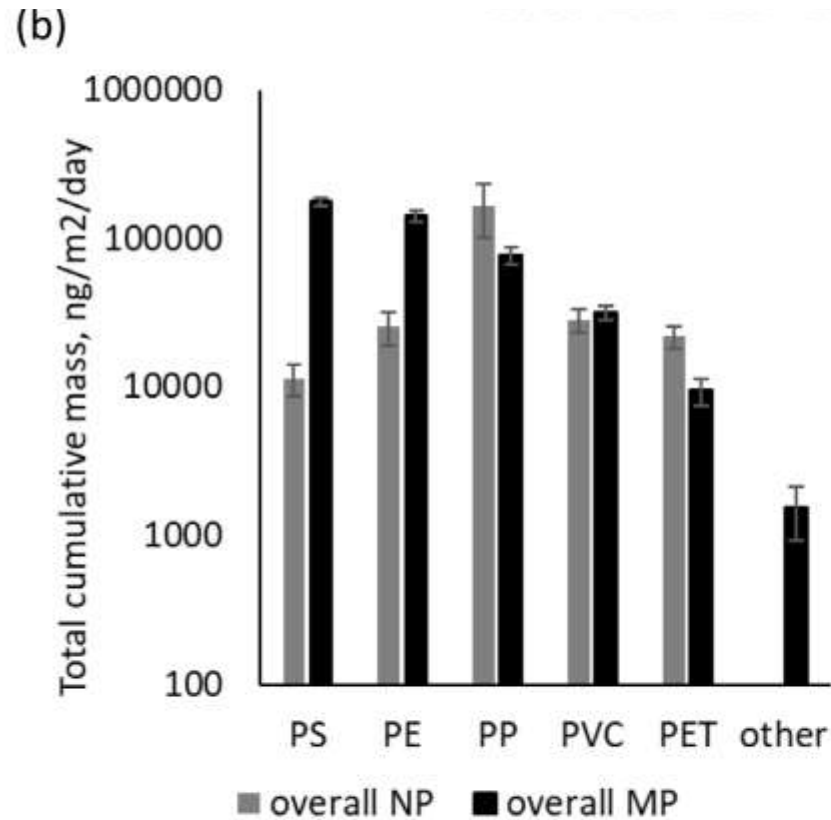


Source and transport analysis of nano and microplastics in atmospheric deposition considering long-distance transport



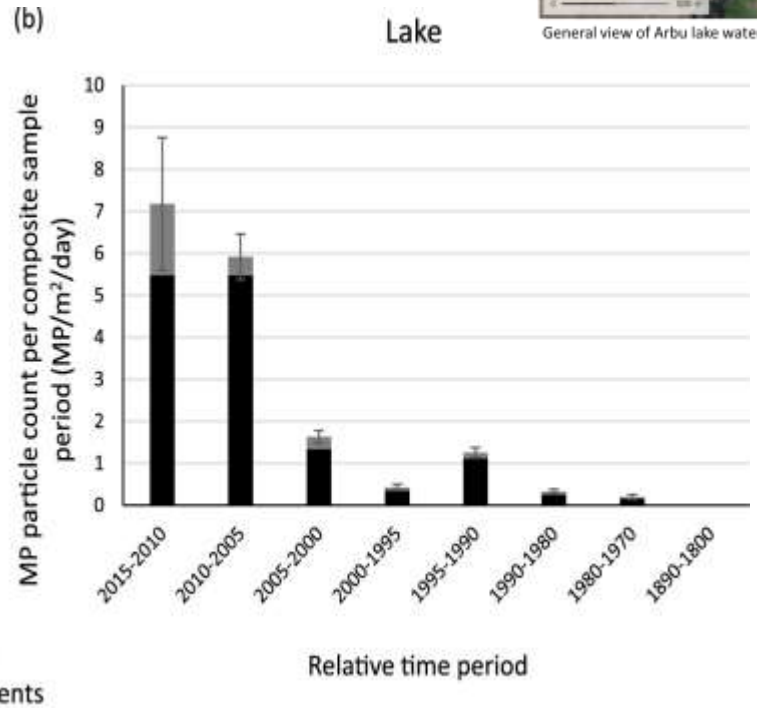
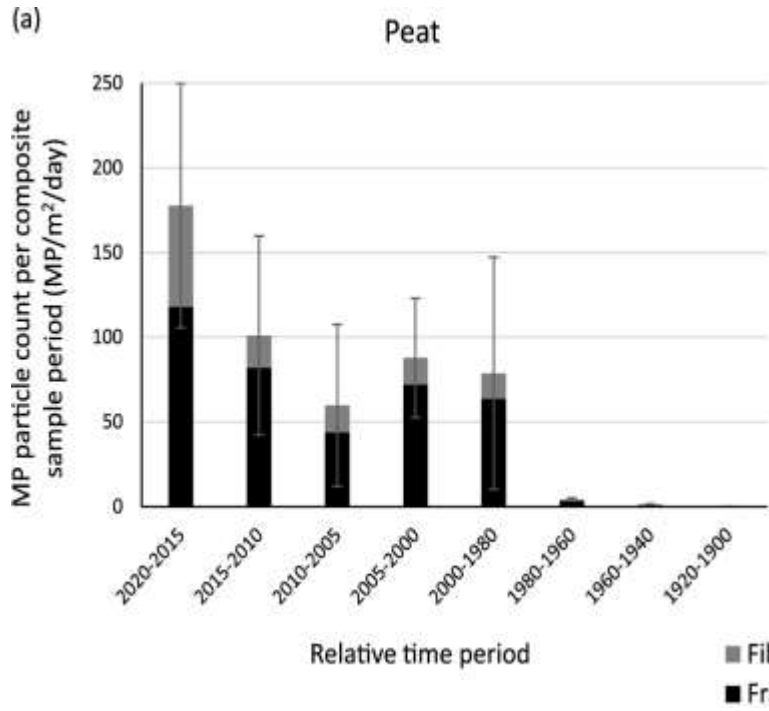
Allen et al. 2022

Prochaines étapes



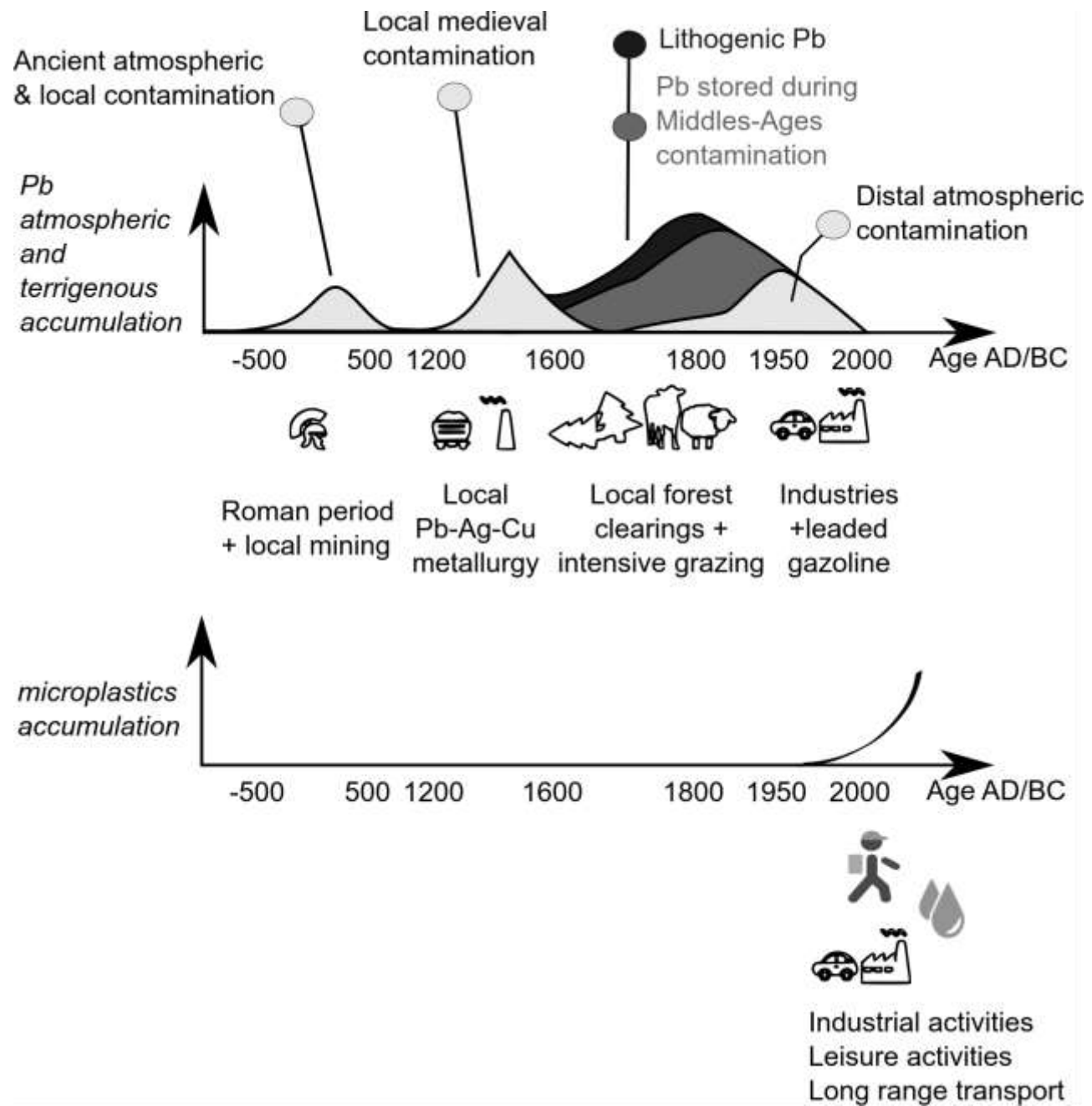


General view of Arbu lake watershed (aerial photo 2019- Geoportail IGN)



Allen et al 2021

DOI: (10.1021/acs.estlett.1c00697)



Microplastiques et poissons

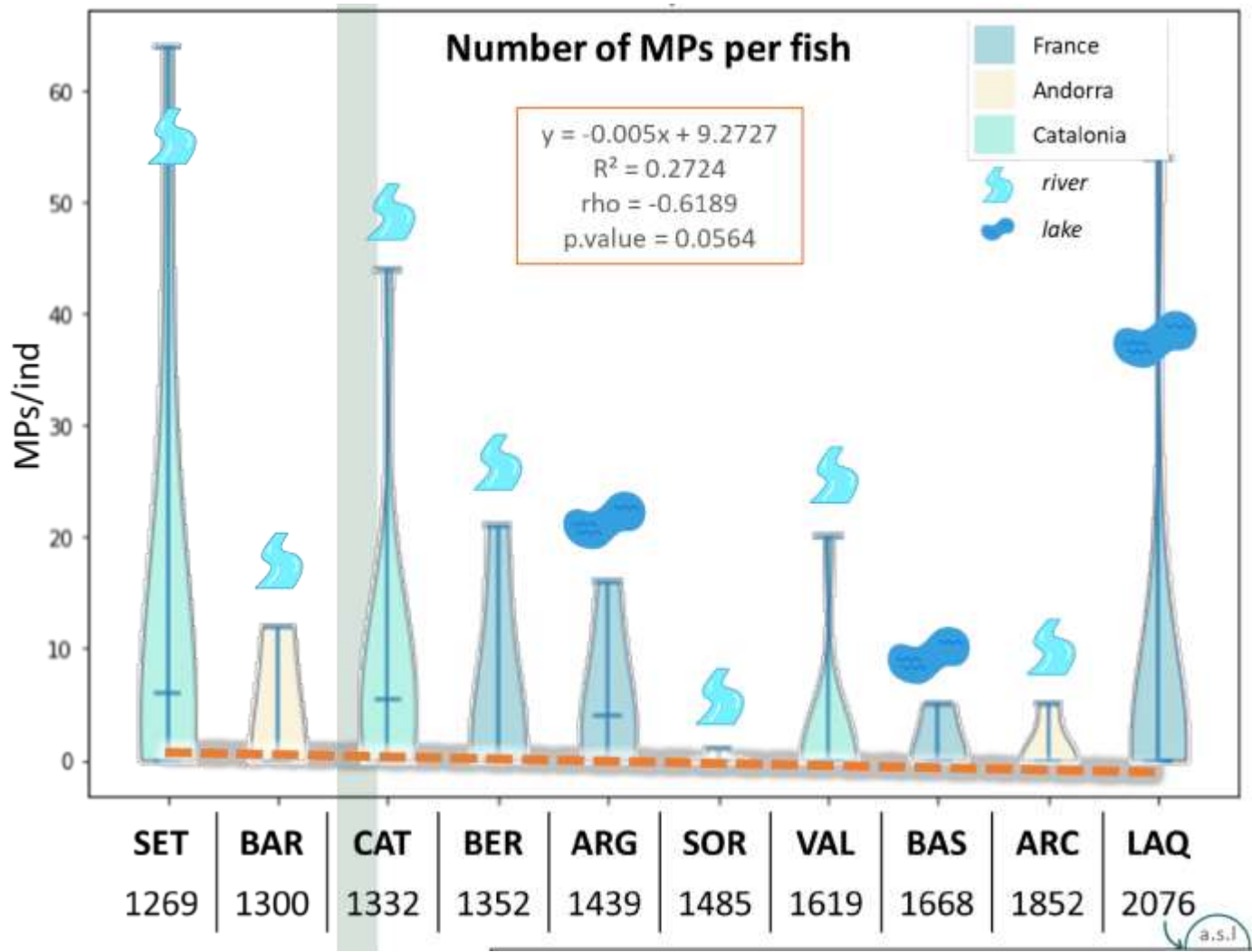
H. Margenat, L. Chouache, S. Hansson



*MP found in the digestive tract
of Andorran trout.*

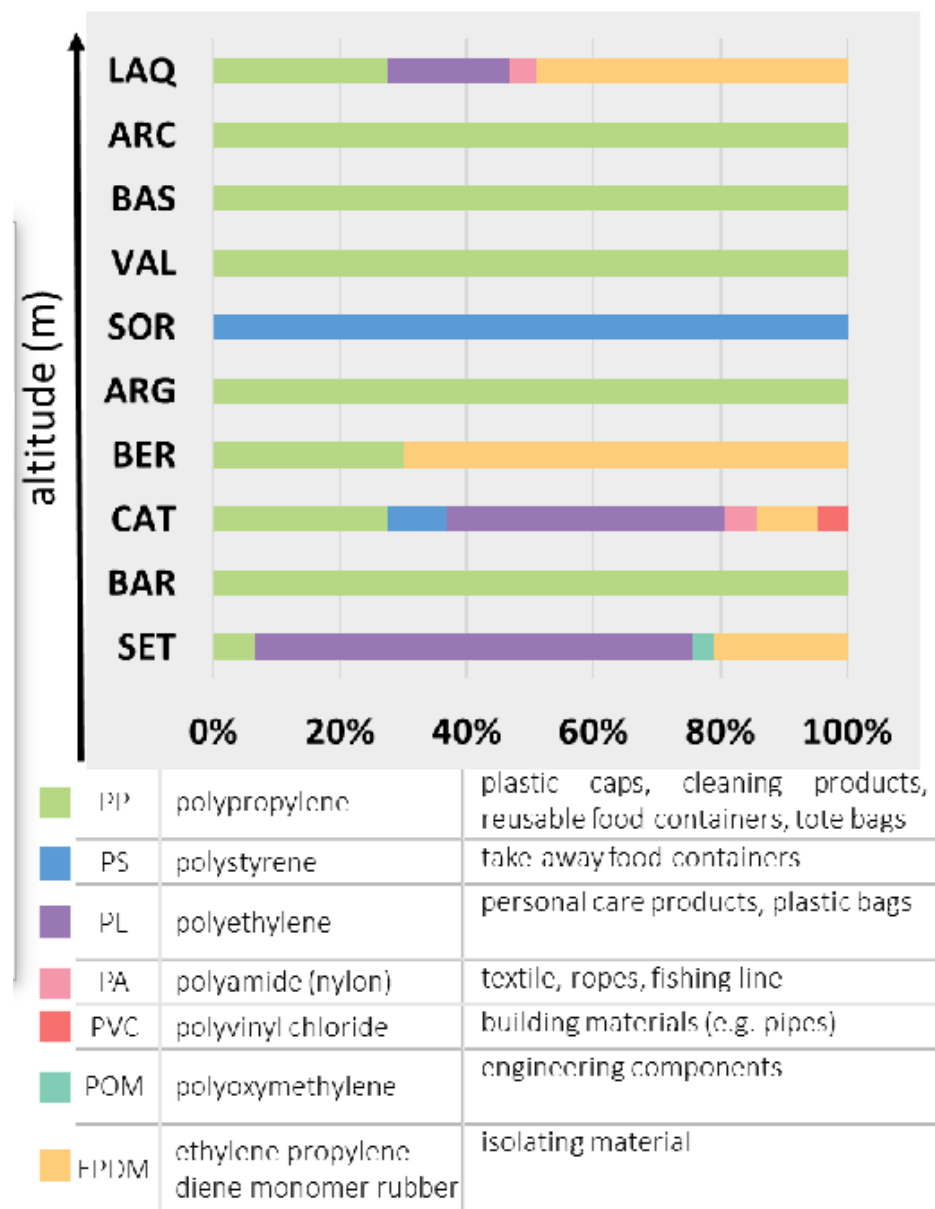
Source: M. Butler-Margalef

Microplastiques et poissons
H. Margenat, L. Chouache, S. Hansson



a.s.l

Prochaines étapes



Merci pour votre attention

Pour en savoir plus sur les plastiques en général:

LE PLASTIQUE EST COMME martine...



... IL VA PARTOUT:

M!



PLASTIC TAC TIC TAC

Une bande dessinée de Capucine Dupuy et Terreur Graphique
















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Volume 853, 20 December 2022, 158611



Review

Scientists' warning of threats to mountains

Dirk S. Schmeller ^a  , Davnah Urbach ^b , Kieran Bates ^{c, d, e} , Jordi Catalan ^{f, g} , Dan Cogălniceanu ^h, Matthew C. Fisher ^d , Jan Friesen ⁱ , Leopold Füreder ^j , Veronika Gaube ^k , Marilen Haver ^a , Dean Jacobsen ^l , Gael Le Roux ^a , Yu-Pin Lin ^m , Adeline Loyau ^a , Oliver Machate ⁱ, Andreas Mayer ^k , Ignacio Palomo ⁿ , Christoph Plutzer ^k 
... William J. Ripple ^p 