Microplastics in total atmospheric fallout: Monitoring in suburban and agricultural sites

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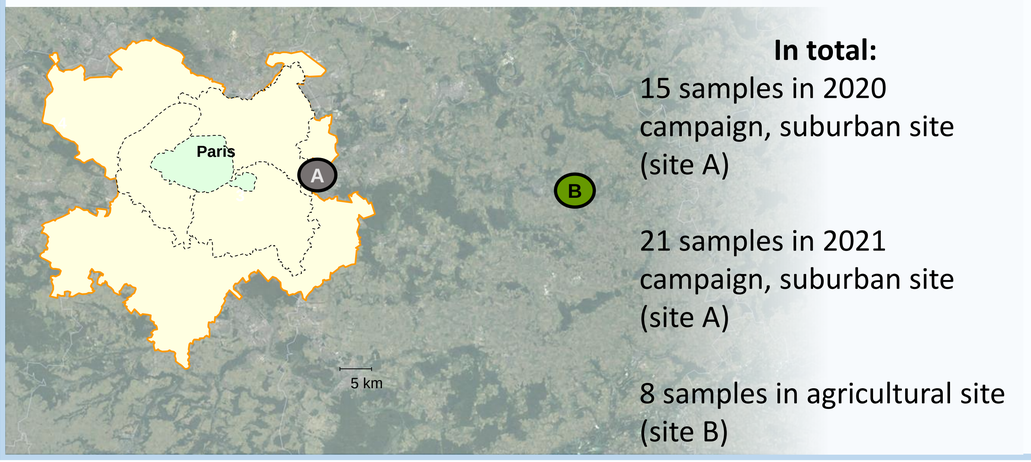
Context

- Microplastic pollution is the source of an increasing scientific interest since 2004 [1].
- Microplastics were first described in the atmospheric compartment in 2015 by Dris *et al.* [2].
- Human activity and rain events are suspected to affect atmospheric microplastic concentrations and depositions . However, no clear result was obtained on the subject [3].

Objectives

- Compare microplastic deposition in two different sites
- Assess the effect of 2020 lockdown on microplastic deposition in a single suburban site.
- Assess the effect of precipitation events on atmospheric deposition.

Sampling sites and campaigns

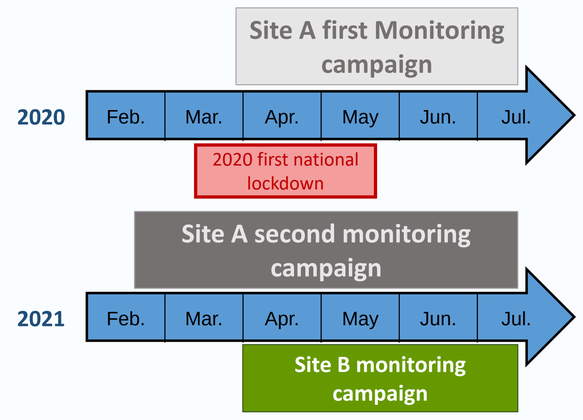


In total:

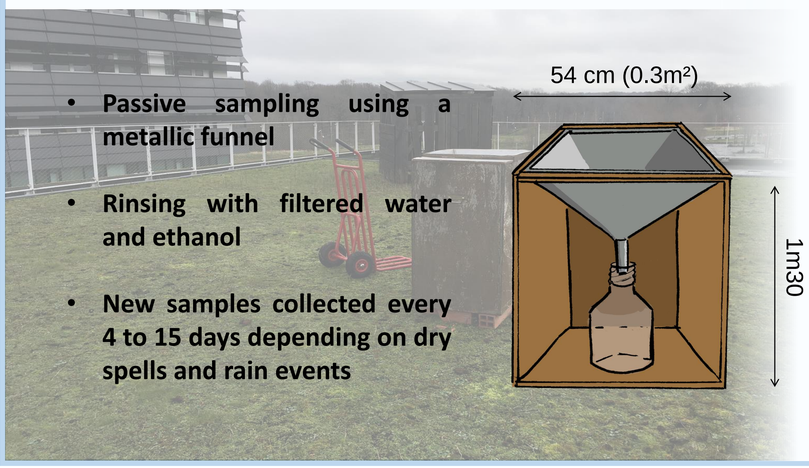
15 samples in 2020 campaign, suburban site (site A)

21 samples in 2021 campaign, suburban site (site A)

8 samples in agricultural site (site B)

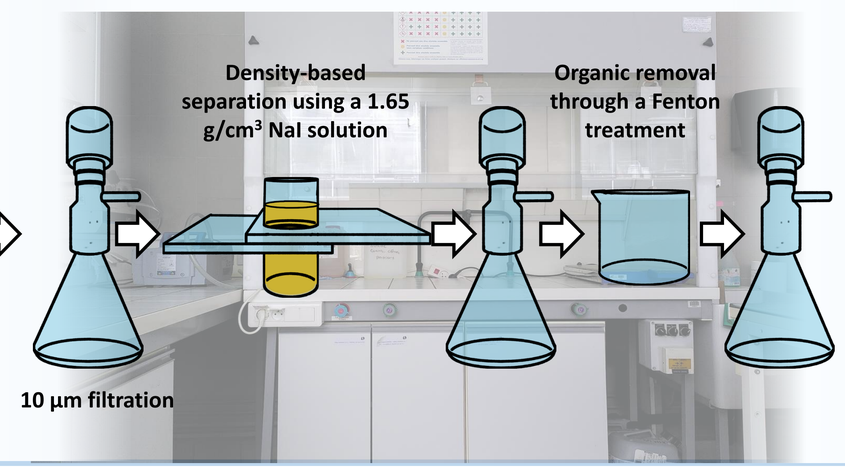


Sampling

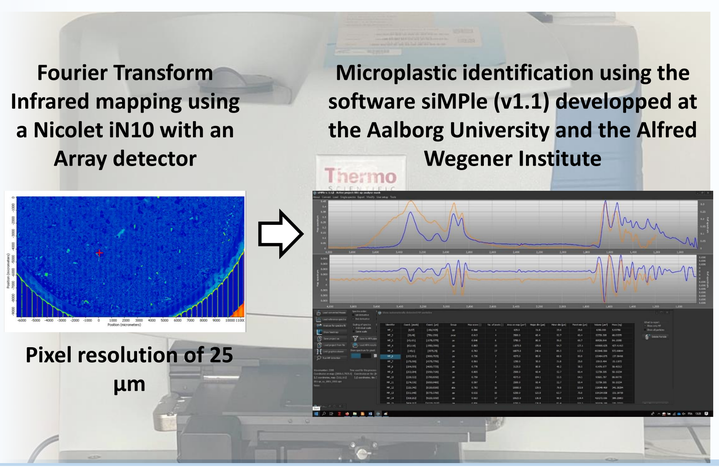


- **Passive sampling using a metallic funnel**
- **Rinsing with filtered water and ethanol**
- **New samples collected every 4 to 15 days depending on dry spells and rain events**

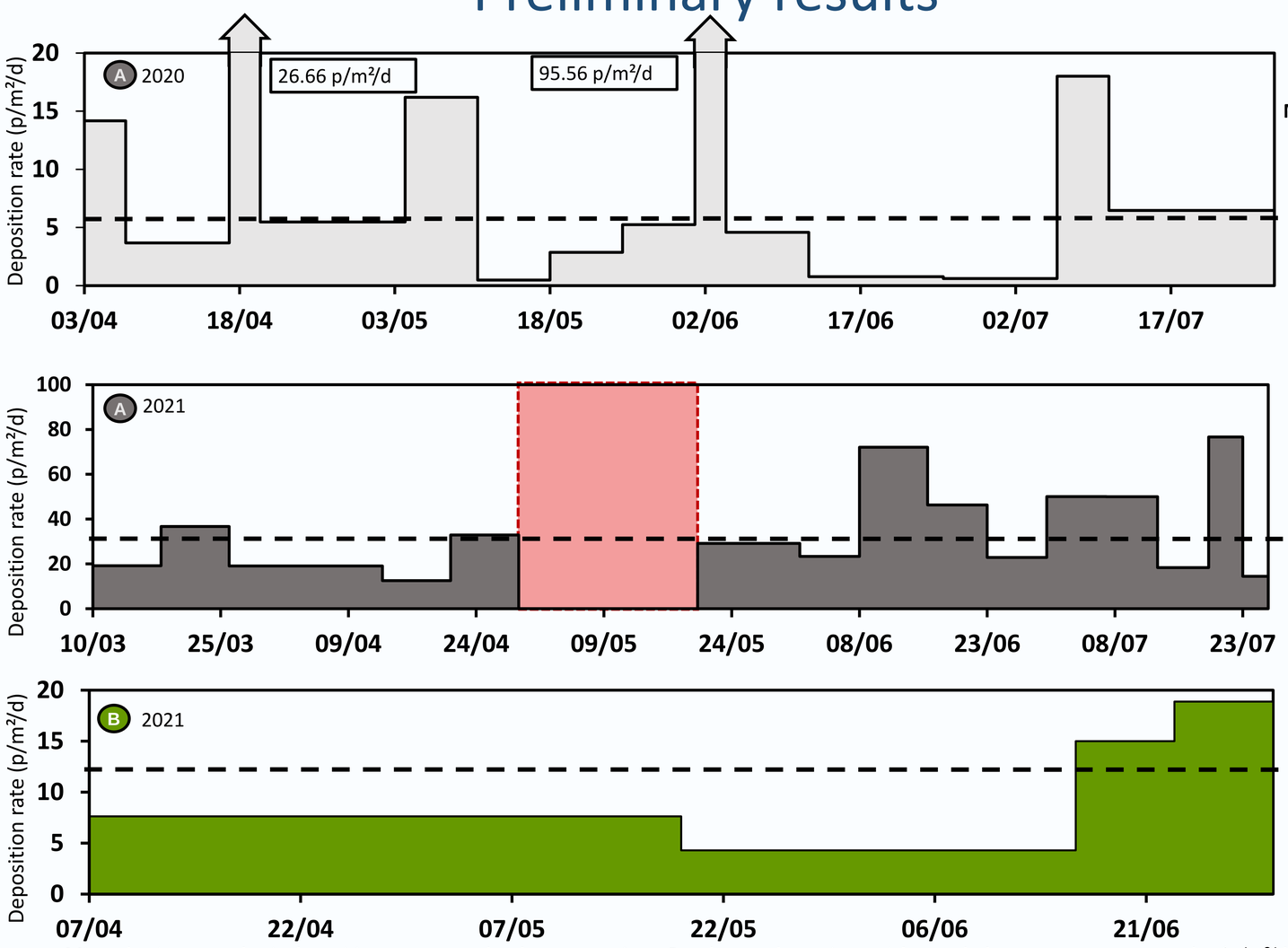
Treatment



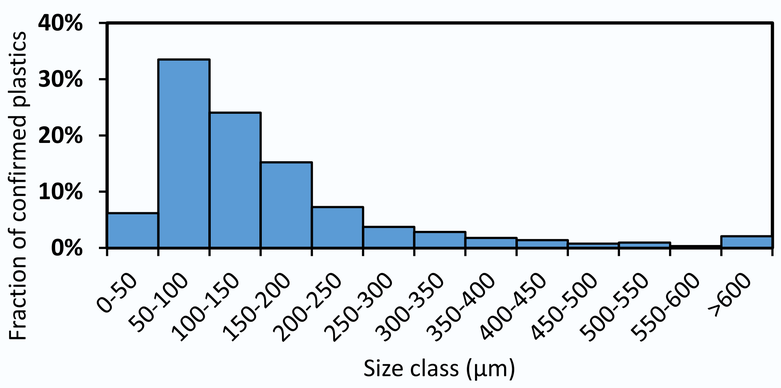
FTIR mapping analysis



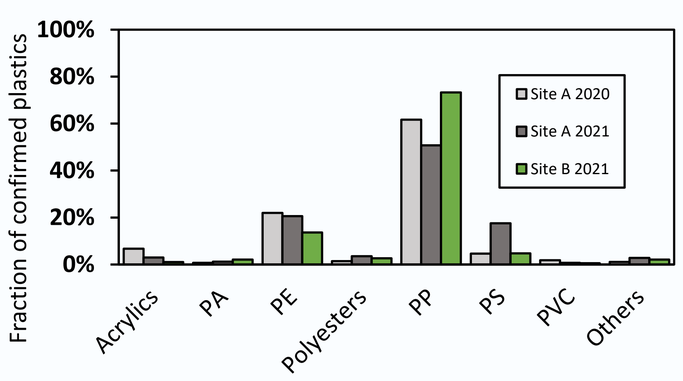
Preliminary results



Microplastic atmospheric deposition rates over the three campaigns. Results are shown in particles settled per square meter per day (p/m²/d).



Size repartition chart of all identified particles pooled together. Smaller microplastics appear more frequent, down to a point where analytical methods limit the analysis.



Polymer groups repartition in the three campaigns. The dominant polymer groups always were polypropylene followed by polyethylene and polystyrene groups.

Discussion

- Deposition rates are lower in the agricultural site than in the suburban site.
- The lockdown monitoring campaign in site A shows the lowest microplastic deposition rates (median of 5.36 p/m²/d).
- Important precipitation events seem to be followed by higher deposition rates.

Further steps

- High precision comparison of microplastic deposition rates, precipitation and rain event characteristics.
- Dynamic Atmospheric fallout monitoring during single rain events.
- Comparison with earlier studies on the area.

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- The authors certify that they have no affiliation with or involvement in any organization or entity with a financial or non-financial interest in the subject matter or materials discussed in this poster.

References

- [1] R. C. Thompson *et al.*, 'Lost at Sea: Where Is All the Plastic?', *Science*, vol. 304, no. 5672, pp. 838–838, May 2004, doi: 10.1126/science.1094559.
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