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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 depictions. 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 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 sites and campaigns

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
- Density-based separation using a 1.65 g/cm³/NaCl solution
- Organic removal through a fenton treatment

FTIR mapping analysis
- Fourier Transform Infrared mapping using a Nicolet 6700 with an Array detector

Preliminary results

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

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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