Microplastic Deposition Flux in Vienna

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What am I doing and why?

- **Plastic production:** 400 million tonnes of plastic are produced each year, 110kg per person in Europe. This plastic can remain in the environment for up to 500 years but do not degrade *(Mohajan, 2025).*
- This degradation results in microplastics (MP), problematic due to their ubiquity of sources, environmental contamination and pressing health concerns.

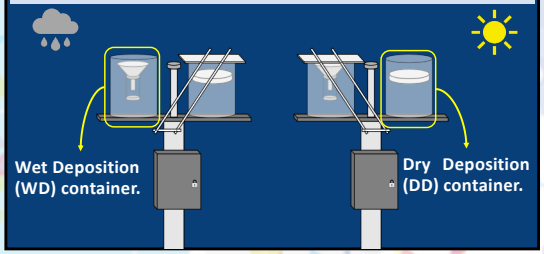
Research Questions:

1) Quantify the atmospheric deposition flux of MPs in Vienna and assess if any difference can be found between seasons
2) Determine if the MPs come from long-range transport or from local influence

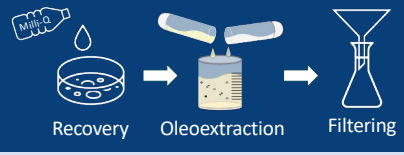
How I do it!

Sampling: Wet&Dry Passive Sampler

The system uses a rain sensor which, when triggered, exposes the wet deposition container, and closes in the absence of precipitation



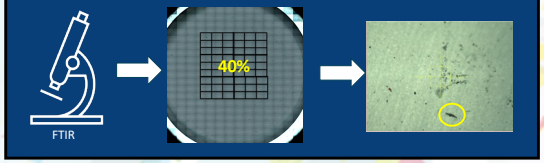
Laboratory Procedure: Oleoextraction



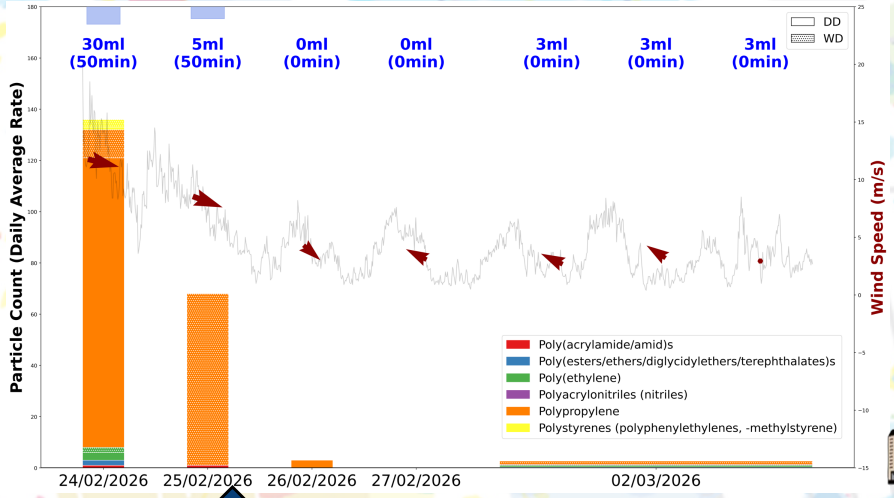
Why oleoextraction?
Adding oil extracts the MPs and adding hydrogen peroxide digests organic material. Oleoextraction studies suggest a higher variety of polymers recovered from environmental samples when comparing to other methods *(Corami et al., 2021; Rosso et al., 2023)*

Analysis: Fourier Transform Infrared (FTIR)

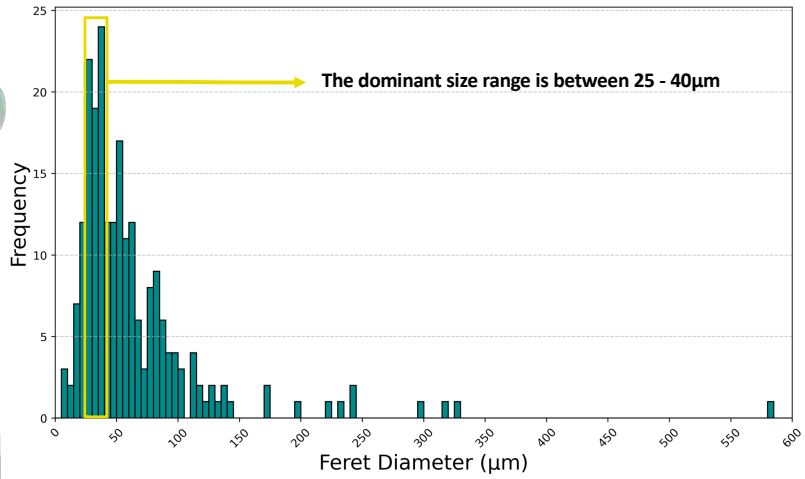
Why FTIR?
Infrared light passes through a filter measuring light absorption. From here spectra are obtained and analysed with a MP machine learning algorithm. This determines if a particle is plastic and the respective confidence interval. FTIR also allows for shape examination not possible with alternative methods.



Winter Campaign Results



Winter Campaign Size Classification



What I found!

- Higher quantity of MPs with **North – Westerly winds**
- **Higher wind speed** likely connected with **higher MP concentrations**
- **Polypropylene** is the dominant species observed

Main Points

- This research gets **novel information on MP deposition** in Vienna
- Both fragments and fibres are observed, however, **fragments dominate**
- A **large daily variability** is observed which may be explained from the wind speed and direction

What's next?

- Ongoing **Spring campaign**
- **Correlation analysis** between wind speed, direction and precipitation to MP deposition
- Run **FLEXPART simulations** to track back the likely sources of the MPs

References

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Background image: *Illustrations by Aimee Andrion: https://lsa.umich.edu/lsa/news-events/lsa-magazine/lsa-magazine-archive/Fall-2023/microplastics-macro-problem.html*