Environmental factors controlling microbial colonization of plastics in the North Sea

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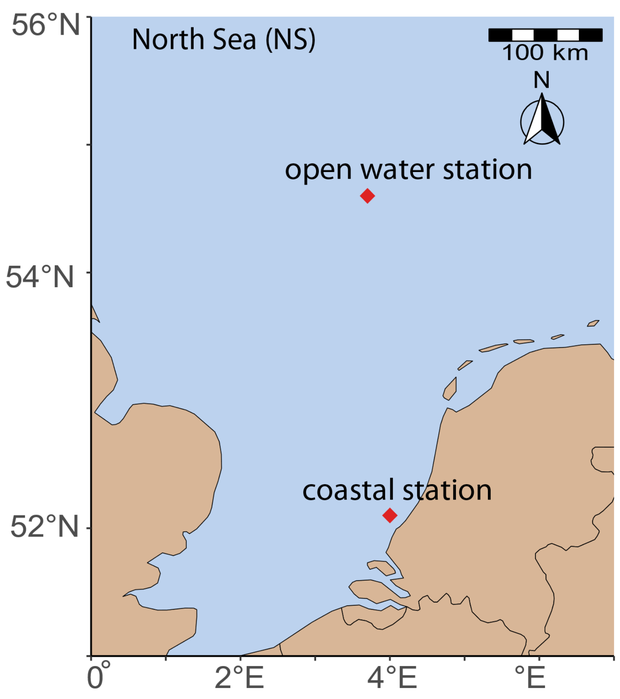
Background

Several million tons of plastic enter the ocean each year

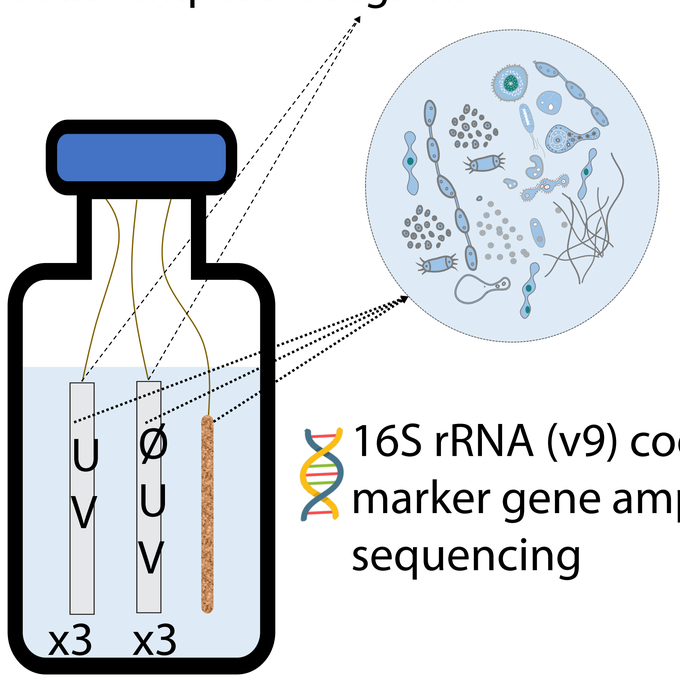
The interactions between marine plastic debris and environmental microorganisms not well constrained

Methods

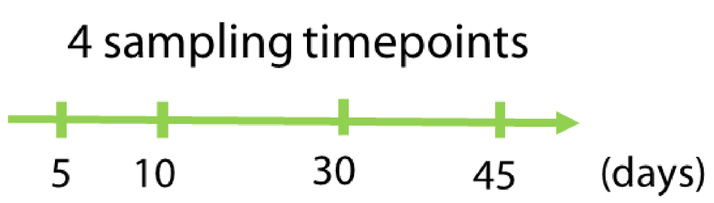
Water sampling sites for ex-situ incubations



4 Virgin polymers: PE, PS, PET and Nylon-6
UV ~ 125 days of UV irradiance at the sea surface in temperate regions



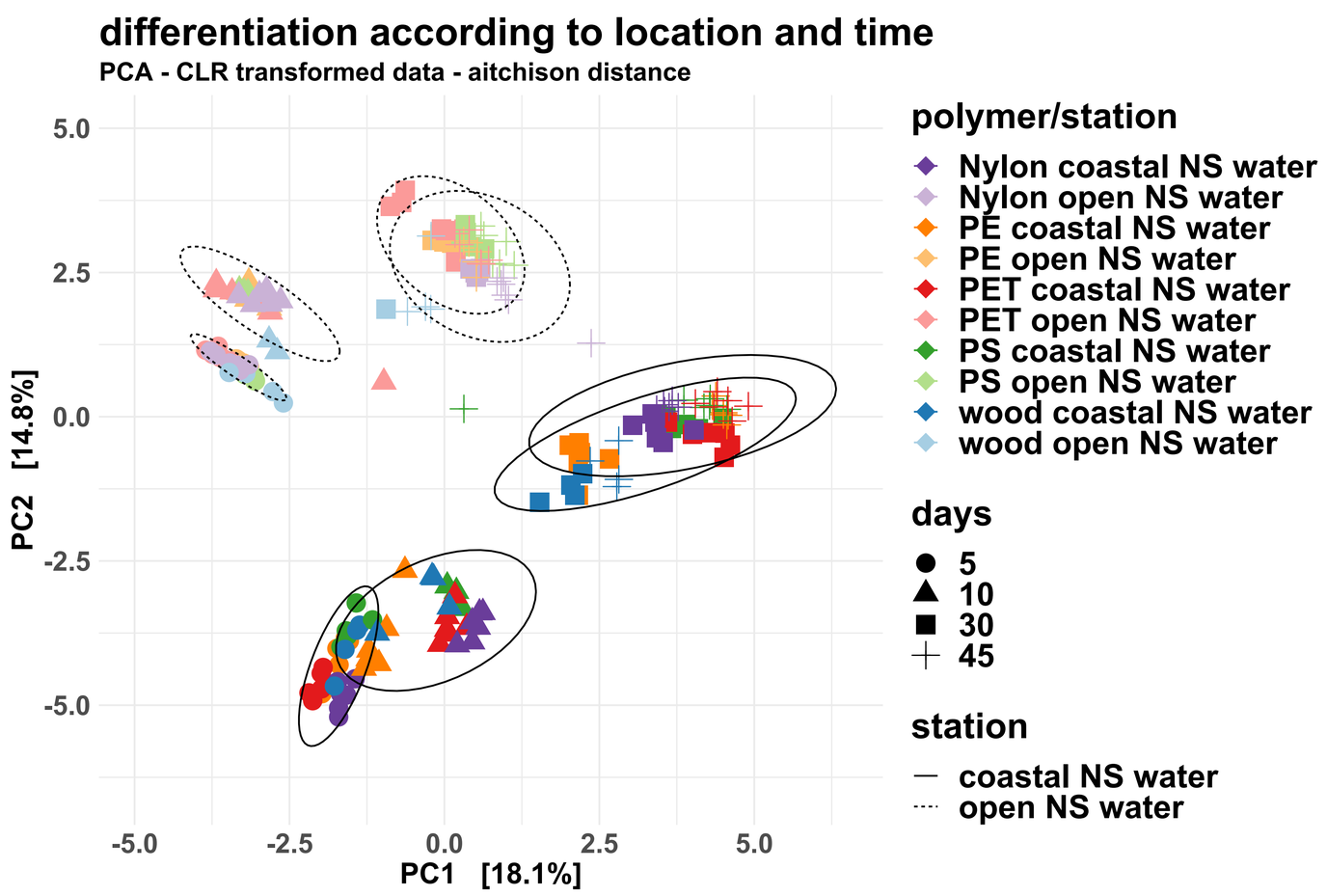
16S rRNA (v9) coding marker gene amplicon sequencing



Results

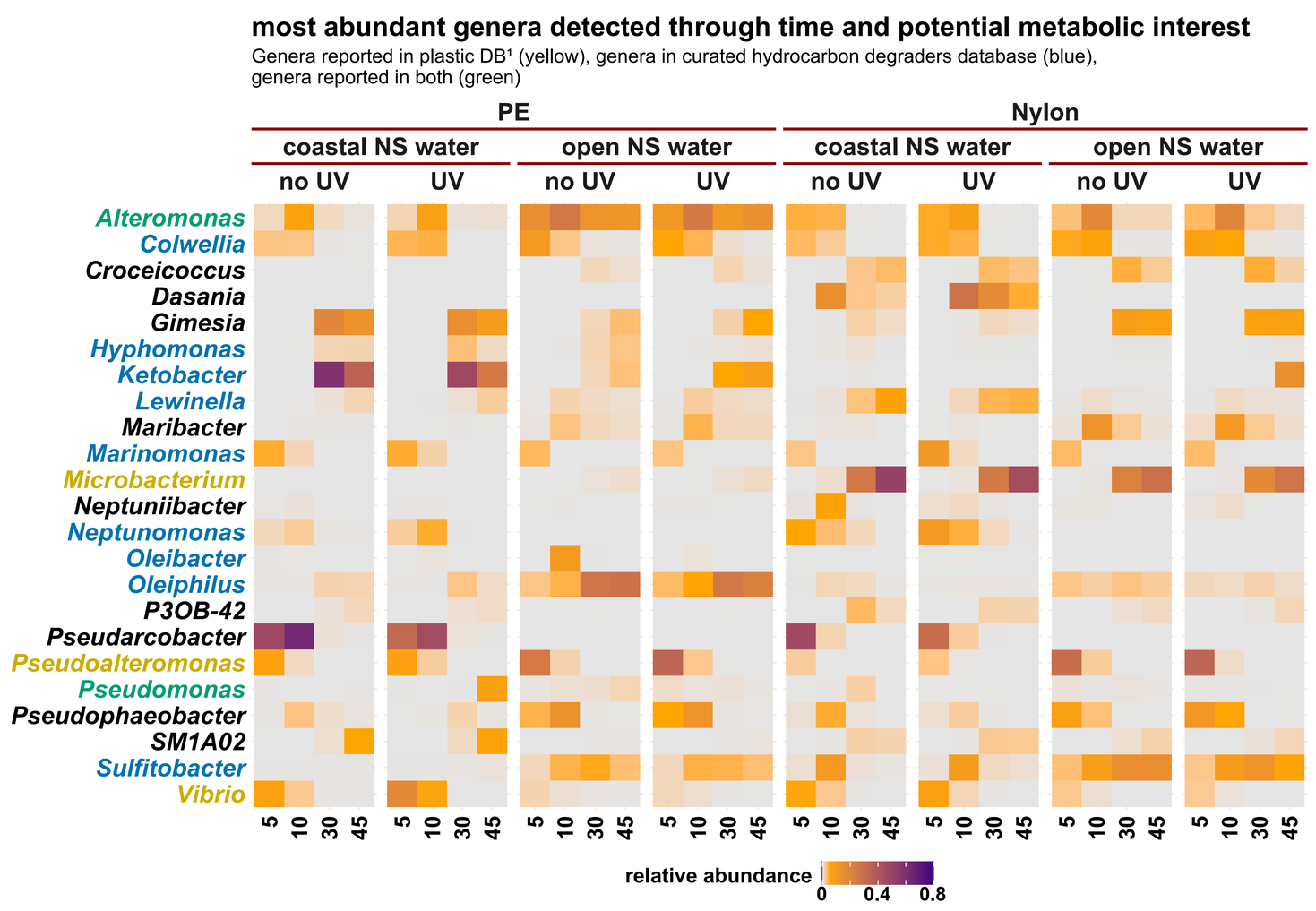
differentiation according to location and time

PCA - CLR transformed data - aitchison distance



most abundant genera detected through time and potential metabolic interest

Genera reported in plastic DB[1] (yellow), genera in curated hydrocarbon degraders database (blue), genera reported in both (green)



Conclusions

- **Location, time** and **polymer type** influence microbes' attachment on plastic in marine environments unlike UV weathering (statistical confirmation via ANOSIM)
- Genera encompassing **hydrocarbon degrading and/or plastic degrading** strains were detected

References :

[1] Gambarini, V., Pantos, O., Kingsbury, J. M., Weaver, L., Handley, K. M., and Lear, G. (2022). PlasticDB: a database of microorganisms and proteins linked to plastic biodegradation. *Database* 2022, baac008. doi: 10.1093/database/baac008.

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