

Occurrence and fate of microplastics in river catchments

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Introduction

Microplastics are tiny plastic fragments which originate from the decomposition of plastic products such as bottles and textiles or which are intentionally used in other products including cosmetics (Figure 1). They have been monitored mainly in the marine environment but work in freshwaters is only just beginning (Kay et al., 2018; Wagner et al., 2014; Eerkes-Medrano et al., 2015). Very little is known about where microplastics occur in river catchments and which areas are key sources of them. Similarly, almost nothing is known about their behaviour once they enter river channels. This is of particular concern given that microplastics can be ingested by wildlife, representing a physical hazard and a source of potentially toxic chemicals.

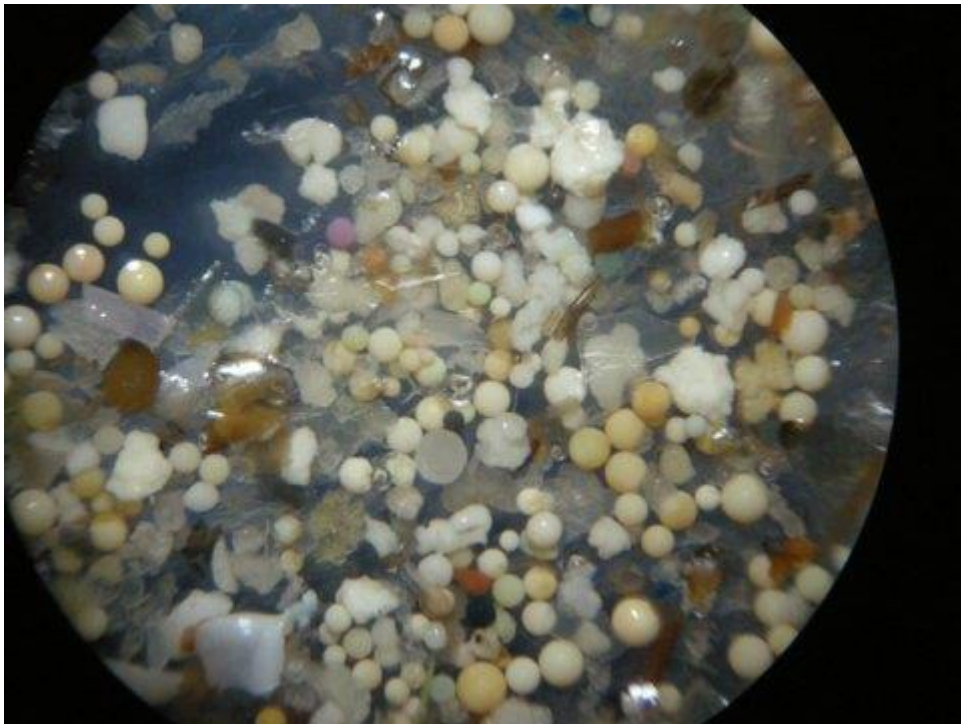


Figure 1. Microplastics collected from the River Rhine (source: Thomas Mani, University of Basel).

Aim and objectives

The overall aim of this project is to better understand the occurrence and fate of microplastics in river catchments. The specific objectives are to:

1. Measure the occurrence of a range of microplastics throughout river catchments.
2. Quantify the extent to which difference land uses and human activities are associated with the occurrence of microplastics and their make-up.

3. Study the fate of microplastics in rivers and relate this to microplastic and river physical characteristics.

Training

The successful candidate will benefit from inter-disciplinary training in analytical techniques, hydrology and chemical fate, as well as wider water management skills, as part of water@leeds. Training at Leeds deals fully with the elements described in the Joint Research Centre statement on skills training for research students. PhD students take modules provided by the staff development unit (e.g. starting your PhD, small group teaching) and a 15-week faculty-training course (covering elements such as planning, critical reading and writing, oral presentations, writing research papers). Students present results and receive constructive feedback from peers in a Research Support Group, from colleagues in water@leeds, and at a university postgraduate research day. An additional important part of the training will be to attend national and international conferences to present results and gain feedback. The student will be encouraged to write and submit papers for publication during the project.

Student profile

Suitable candidates will have, or be close to gaining, a good degree (1 or 2.1) or MSc in a suitable discipline, such as geography, environmental science, chemistry or biology. A background in hydrology, water management, chemistry and hydroecology would be useful, although experience will be developed during the course of the project.

References

- Eerkes-Medrano, D., Thompson, R.C. and Aldridge, D.C., 2015. Microplastics in freshwater systems: a review of the emerging threats, identification of knowledge gaps and prioritisation of research needs. *Water Research*, 75, 63-82.
- Kay, P., Hiscoe, R., Moberley, I., Bajic, L. and McKenna, N., 2018. Wastewater treatment plants as a source of microplastics in river catchments. *Environmental Science and Pollution Research*, 1-4.
- Wagner, M., Scherer, C., Alvarez-Muñoz, D., Brennholt, N., Bourrain, X., Buchinger, S., Fries, E., Grosbois, C., Klasmeier, J., Marti, T. and Rodriguez-Mozaz, S., 2014. Microplastics in freshwater ecosystems: what we know and what we need to know. *Environmental Sciences Europe*, 26(1), 1-9.