Microplastics (MPs) are tiny synthetic particles ranging between 5 mm and 1 µm. Each particle can consist of one of a variety of synthetic materials, produced from a series of polymer chains and chemical additives, to impart the characteristics needed for the final use of each plastic material. This leads to particles having unique characteristics between polymers and within each polymer. When these particles enter the environment, they undergo further physical and chemical alterations. Surface fracturing, volume and density changes, biofilm growth, and the ability to release and absorb toxicants from the surrounding environment lead to a scenario in which each MP particle may have unique traits and how they could impact organisms. These points lead to particles that are difficult to sample, analyse, characterise, and assess their impact on biota. In this study, MPs in rivers and streams in the Autonomous Province of Bolzano were investigated. Ten sites were selected where nine replicate sediment samples were collected to determine the MP content. These consisted of three bank replicates, three instream at 20 cm deep, and three instream at 5 cm deep to report a more representative abundance of MPs. The sediment was then dried, and MPs were separated through density separation with ZnCl2 and centrifugation. Particles were then filtered, quantified through stereomicroscopy, and characterised with a Shimadzu ATR-FT-IR with Labotech software and compared to spectra of both organic, additive, and polymer libraries. The mean concentrations varied between 38.85 ± 22.23 particles per kg in spring and 32.59 ± 10.94 particles per kg in autumn. Concentrations ranged between 16.65 and 79.55 particles per kg in the spring and 12.96 and 46.29 particles per kg in the autumn. Polymer analysis found that Polyester was the most prevalent polymer type. Other materials included polypropylene, polyacrylic, and other artificial natural fibres such as Bemberg. Some chemical additives were also identified; however, these can only be hypothesised, with more formal analysis required to concretely determine the type and concentrations of each additive present. Fifty additive signatures were detected, including 16 which are described as toxic to the aquatic environment, and more than half with no toxicological data available. This highlights not only the importance of studying MP abundances, but also the additives and other toxicants which may be bound to these particles.

Disclaimer/Disclosure:

The authors thank the PlasticFree project EFRE[CUP: B57H23004110007] for funding this research.

3.18.B.T-04 Towards Standardized and Open Data Reporting on Litter Monitoring in Inland and Transitional Waters

Maria Kazour[1], *Mariana Nogueira Miranda*[2], *Charlotte Dhondt*[1], *Therese Nitschke*[1], *Nelle Siele Meyers*[3], *Liesbeth De Keukelaere*[4], *Gita Maas*[5], *Daniel González Fernández*[6], *Miguel J. Sánchez-Guerrero Hernández*[6], *Luca Muth*[7], *Stephan Wagner*[8], *Marko Petelin*[9], *Samuel Zidaric*[9], *Jana Asselman*[10], *Rachid Amara*[11], *Perine Doyen*[12], *Guillaume Veillet*[13], *Patricia Martin Cabrera*[14], *Jelle Rondelez*[1], *Lisa Inès Devriese*[15], *Gert Everaert*[15] *and Ana Isabel Catarino*[1], *(1)Flanders Marine Institute (VLIZ), Belgium, (2)Research Department, Ocean and Human Health, Flanders Marine Institute (VLIZ), Belgium, (3)Ocean and Human Health, Flanders Marine Institute (VLIZ), Belgium, (4)Flemish Institute for Technological Research (VITO), Belgium, (5)Stichting De Noordzee, Netherlands, (6)University of Cádiz, Spain, (7)University of Applied Science Fresenius, Germany, (8)Institute for Analytical Research, University of Applied Science Fresenius, Germany, (9)Infordata Sistemi (INFOR), Italy, (10)Blue Growth Research Lab (BGRL), Ghent University, Belgium, (11)Universiy of the Littoral, France, (12)UMRt 1158 BioEcoAgro, France, (13)University of the Littoral, France, (14)International Oceanographic Commision (IOC)- Ocean Best Practices System Manager, UNESCO, France, (15)Ocean & human health, Flanders Marine Institute (VLIZ), Belgium*

Litter surveying and monitoring in the aquatic environment still relies on disparate reporting methodologies. While the Marine Strategy Framework Directive (MSFD) provides guidance for marine environments, comparable requirements are limited under the Water Framework Directive (WFD) and have not been implemented yet, resulting in heterogeneous datasets and reduced comparability across studies. To address this gap, we developed FAIR-compliant and openly accessible dataset templates for micro-, meso-, and macrolitter monitoring that align with existing international best practices for gathering and managing metadata and data, including the guidelines of the European Marine Observation and Data Network (EMODnet). A structured development workflow was followed, informed by European directives, technical guidance documents, and controlled vocabularies. The templates were tested using pilot datasets and refined through multiple local and European projects (e.g., PLUXIN, PLASTFLOW, TREASURE, INSPIRE) to ensure applicability across diverse sampling environments and methods. Delivered in a machine-readable format (*.CSV), the templates capture campaign-level metadata (e.g., geographical and temporal coverage, environmental setting, and responsible institutions) as well as detailed methodological information such as sampling approach, equipment, and processing workflows. Litter observations are reported at the sample or item level, with standardized descriptions of material, size, count, morphology, and other key characteristics. These harmonized templates

enhance transparency, interoperability, and long-term reusability, enabling more reliable spatial and temporal assessments of litter pollution in aquatic environments. By translating policy needs into practical data structures, this work supports a consistent, FAIR, and open workflow for litter monitoring and reporting in inland and transitional waters.

3.18.B.T-05 Do Current Microplastic Data From Global Karst Groundwater Show Real Environmental Contamination or Methodological Bias?

Syeda Maria Zainab[1], *Dan Lapworth*[2], *Richard Cross*[3], *Katherine Pond*[4], *Monica Felipe-Sotelo*[5] *and Louise Maurice*[2], *(1)School of Engineering, University of Surrey, United Kingdom, (2)British Geological Survey, United Kingdom, (3)UK Centre for Ecology & Hydrology, United Kingdom, (4)Department of Civil and Environmental Engineering, University of Surrey, Guildford GU2 7XH, UK, United Kingdom, (5)School of Chemistry and Chemical Engineering, University of Surrey, United Kingdom*

Microplastics have been found in karst groundwater in several regions, but the overall picture is still unclear. Most studies come from only a few countries and focus on caves, whereas springs and wells in many karst areas remain unexplored. Reported concentrations vary from low to extremely high, but it is not always clear how much of this variation reflects the hydrogeology, contamination sources and how much comes from the methods used.

To clarify this, we compiled published studies on microplastics in karst groundwater and examined how methodological choices shape the results. We compared the main approaches used for sampling, particle extraction and identification, and considered how these choices affect what each study detects. Variation in detection limits, polymer confirmation methods, and contamination control helps explain the high variation in number of particles detected between studies. For instance, Raman or micro-Fourier Transform Infrared Spectroscopy detect many more small particles and a wider range of polymers, while studies that rely mainly on visual identification using microscopy or sodium chloride for density separation are biased toward larger or low-density particle fragments and fibres.

To assess how comparable the available data are, we applied existing quality assessment criteria for microplastics. This helped show where analytical biases are likely to happen and where results are better supported by stronger QA/QC. It not only helps us identify uncertainties but also shows where studies are directly comparable despite using different methods. Although some studies report using basic contamination control and limited spectroscopic confirmation, recovery tests are never carried out, and visual identification is still common practice, restricting the types of microplastics that can be confidently identified, typically towards larger plastic fibres.

By putting the published evidence into context, we show that many of the differences between studies reflect methodological bias rather than differences in environmental contamination. By linking the results published so far to their sampling and analytical choices, it becomes clearer where studies can genuinely be compared and where methodological artefacts limit what can be concluded. This supports more realistic communication of microplastic exposure in karst groundwater and highlights the benefit of moving towards more consistent and standardised approaches in future work.

3.18.P Microplastics Research: Beyond Fear-Mongering, Towards Trustworthy Science

3.18.P-Mo190 Beyond Polystyrene: Precipitation-Based Production of Pristine Micro- and Nanoplastic (MNP) Test Materials

Oliver Kretschmar[1], *Kathrin Harre*[2], *Lucas Kurzweg*[3], *Keno Herzog*[1] *and Günther Auernhammer*[4], *(1)University of Applied Sciences Dresden (HTW Dresden), Germany, (2)Agriculture/Environment/Chemistry, University of Applied Sciences Dresden (HTW Dresden), Germany, (3)Chemical Engineering, University of Applied Sciences Dresden (HTW Dresden), Germany, (4)Leibniz Institute of Polymer Research Dresden, Germany*

Polystyrene remains the dominant focus of ecotoxicological micro- and nanoplastic (MNP) research, despite representing only a minor share of global plastic production. Environmentally relevant test materials from polymers such as LDPE, PET, PA6 and PP remain scarce, particularly below 20 µm.

A fast and straightforward precipitation-based approach is presented in this work for producing pristine MNP reference materials from these polymers using tailored solvent–nonsolvent systems. The method enables the generation of irregular and spherical particles within a reproducible micro- and nanoplastic size range, yielding LDPE (0.5–10 µm), PET (0.4–4 µm), PA6 (0.6–6 µm) and PP (0.2–6 µm).Polymer-specific yields of 250–920 mg of MNP material can be achieved in a single run.