Challenges and best practice in monitoring of micro- and nano-plastic abundance and environmental distribution

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While problems related to ocean plastic litter pollution have been recognized since the early 1970's, microplastic (MP) pollution of marine areas has been subject to renewed focus in recent years. A number of more recent publications have pinpointed that also freshwater systems may be at risk from MPs, mainly due to release of particles and fibers from waste-water treatment plants (WWTP). Although certain types of MPs thus may originate from point sources such as WWTP, plastic tend to travel large distances in the aquatic environment and many sources of plastic pollution is inherently more diffuse. This makes plastic pollution a transboundary pollution problem that cannot be managed alone by individual sovereign states, but requires international collaborative management efforts. However, regardless of the management frameworks, successful management of the plastic litter problem eventually comes down to the quality of input information originating from ecological risk assessments, i.e., based on estimates of exposure and studies of potential effects. The number of monitoring studies on MP abundance and distribution in especially surface waters is increasing. However, due to practical constraints many of these operate with a lower particle size range of ca. 0.3 mm, and since the number of particles tends to increase with decreasing size, as may possible effects on lower trophic level organisms, this range may not adequately represent the main risk from MPs. Thus, there is a current need in particular, for methods and procedures to pick up and identify particles in the lower range of micro-sizes, not to speak of nano-sized particles. However, also sampling procedures for larger particles need optimization and standardization. In addition, for open oceans, MPs are sampled primarily in the top few meters, whereas a major fraction of the MPs is expected to sink to deeper waters and eventually to the seafloor. Thus sampling methods may in themselves bias sampling towards particular particle sizes, shapes or types of polymers. Analysis of complex matrices, such as sediments, soils and sludge, also pose a challenge that generally increases with decreasing particle size, and optimization is needed as well as standardization for better comparisons among different studies. The aim of this session is to: 1) highlight challenges in monitoring and predicting MP abundance & distribution, 2) share and evaluate (new) methods for addressing observed challenges. We welcome contributions presenting studies focused on method optimization, contributions presenting a critical view on methods employed in particular studies, as well as contributions suggesting possible solutions to overcome identified obstacles.