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# The Cruise of three European Seas of RV Belgica/Boris Aleksandrov – Microplastics in seabed sediment and surface waters – including a comparison of devices for surface water sampling

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## Abstract

As part of the handover of the research vessel Belgica recently renamed to "Boris Aleksandrov" from Belgium to Ukraine in autumn 2021, the transfer from Zeebrugge to Odessa was undertaken - the Cruise of Three European Seas of the RV Belgica (funded by European Union and the United Nations Development programme in the framework of the EU4EMBLAS project). This cruise was used to carry out measurement campaigns of various aspects, including the analysis of sediment and water samples for microplastics (MP). A special focus was put on the sampling of surface waters in a comparative study of three sampling systems: (1) Manta trawl, (2) volume water pump, and (3) Slurp system, a newly constructed pump system, providing a kind of basin where the surface water layer converges before being pumped off. During the cruise traversing the Atlantic Ocean, the Mediterranean Sea and the Black Sea a total number of 6 sediment samples and 23 water samples with different sampling systems were taken. Due to weather conditions, all three devices for water sampling could only be applied at two of the 18 stations simultaneously.

At the MRC laboratory (Hamburg) sample preparation was done via digestion of the biogenic organic material (KOH/NaClO) and subsequent density separation (NaI > 1.7 g/cm<sup>3</sup>) of sediment samples. Samples were transferred over a 40 µm sieve with Ethanol and stained with Nile Red (1 ml/mg in chloroform). Suspensions were transferred to aluminium oxide filters (Anodisc, 0.2 µm retention, 25/47 mm diameter) and investigated via fluorescence microscopy (AxioLab A.1, Zeiss, TRITC HC Filterset (AHF), 2.5x) for potential MP particles (numbers and dimensions). A subset of particles were investigated for their polymer composition with µRaman spectroscopy (DXR2xi Raman Imaging Microscope, Thermo Fisher Scientific).

Results on MP abundance in sediments and water comparing different sampling devices will be introduced and discussed.

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