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"Microplastic pollution of the Kara Sea surface in different seasons."

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The present study addresses spatial and temporal distribution of floating microplastics in the Kara Sea. The studies were carried out in two cruises: on board the R/V «Akademik Mstislav Keldysh» in October 2020 and 2021, and the cruise on the R/V «Akademik Ioffe» as part of the MIPT Floating University in July-August 2021. A neuston net was used for sampling surface microplastics, each catch lasted an average of 30 minutes. Only particles up to 0.5 mm in size (detection limit with the naked eye) are considered in this work. In total, 85 samples were processed, including the samples in Kara Gates, estuaries of the Ob, Yenisei, Pyasina rivers, Baydaratskaya Bay, the central and northern parts of the Kara Sea (the northernmost point is 82.5 °N). All particles were analyzed on a Fourier transform infrared-spectrometer «Perkin Elmer spectrum two».

A number of trends have been found. First, microplastics concentrations in plumes of Siberian Rivers were significantly lower than in the sea water (0-0,032 items/m³ in summer and 0-0,02 items/m³ in autumn). Second, higher concentrations were observed in the sea water (it can be noted that microplastic particles were found at the northernmost point of the expedition route). There was a local maximum in the Kara Gates Strait (1,53 items/m³), which can be explained by the local hydrophysics features, as well as by the general intensification of the processes in straits. Also a noticeable decrease of the microplastics concentration in the autumn in the same areas. Chemical composition of microplastics was diversified, all polymers with positive buoyancy were found: polyethylene, polypropylene, polystyrene and polyurethane foam. The most common were polyethylene and polypropylene, which correspond the level of their use. Particles of all morphological types were found. There was no significant seasonal variability in the polymer composition.

Brief conclusions: Although the Great Siberian Rivers are one of the main sources of microplastics in the Kara Sea, they seem to dilute the total number of particles. The most considerable

contribution is made by the Barents Sea waters coming from the Kara Gates Strait. A similar conclusion can be made due to the observed decrease in the concentrations of microplastics when moving eastward from the Kara Gates. There is a slowdown in the rate of microplastics inflow in the autumn period. There is no seasonal changes in the polymer composition of microplastic particles and their morphological composition.