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# Variability of plastic input from the Northern Dvina River

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## Abstract

Northern Dvina River is one of the largest rivers in the European Arctic flowing into the White Sea through the populated regions with developed industry. Floating plastics include microplastics (0.5–5 mm) and mesoplastics (5–25 mm) were observed on seasonal and interannual variations in the Northern Dvina River mouth. The samples were collected every month during the open water season in 2019-2021 with a Neuston net that was toged 3 nautical miles in the Korbel'nyy Branch of the River delta. Chemical composition of the plastic particles was determined using a Fourier transmission infrared spectrometer. The majority of the microplastics were identified as polyethylene, followed by polypropylene. Annual average concentrations of microplastics in the Northern Dvina were lower than in other European rivers (with a higher anthropogenic load). Input fluxes of microplastics from the Northern Dvina River to the White Sea were estimated based on monthly discharge. The results show that microplastics abundance is lower at high water season and higher at low water season that result in no significant difference in seasonal MPs input from the river, with average found - 10 items/s. Significant fraction of found total plastics were meso/macro particles, which can serve as a source of secondary MPs in the Arctic. During the period of observations from 2019 to 2021 MPs pollution decreased while meso/macroplastic pollution increased showing the growth of total plastic input from the river.

**Keywords:** plastics, microplastics, Northern Dvina river, river input, Arctic

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