Microplastics in Lake Onego sediments: occurrence and accumulation patterns.

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Lake Onego is the second largest lake in Europe. Sediment samples (23) were collected in different regions of the lake. Microplastics (MPs) were extracted from sediments with heavy liquid, oxidized and its abundance was determined using a microscope with a magnification of 40x. The extraction efficiency and the level of external contamination were evaluated, the results were blank-corrected. The anthropogenic origin of randomly selected MPs items was confirmed by Raman spectroscopy. MPs were detected in all samples. Maximum MPs abundances in sediments were observed in areas associated with the mouth of the second largest tributary of the lake – river Shuya and Petrozavodsk Bay (2244 ± 1901 pcs/kg DW; n= 6, p = 0.95), the open part of the lake (2356 ± 1689; n = 5, p = 0.95) and in Kizhi National Park (3413 ± 2005; n = 4, p = 0.95). In mean MPs abundance in Lake Onego was 2141±1144; n=22; p = 0.95). Fibers dominated in most of the samples (64±14%; n=22; p = 0.95). It was established, that fibers accumulate in sediments together with medium silt fraction (0.01-0.05 mm). MPs abundance was extremely high in Kondopoga bay (217 000 pcs/kg DW) and was mainly represented by microcapsules, possibly due to impact of the wastewaters of the Pulp and Paper mill plant at this site. In mean, MPs abundance in Lake Onego sediments was at least two times higher, than was previously established in Baltic Sea with similar methodology. Further comprehensive assessment of MPs contamination rates and forecasting consequences of this contamination to ecosystem is an urgent need in current research.

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