

Qualitative and quantitative composition of microplastics particles during the expeditionary measurement program in the South-Eastern Baltic Sea

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According to the tasks of the Russian Science Foundation project “Physical and dynamical properties of marine microplastics particles and their transport in a basin with vertical and horizontal salinity gradient on the example of the Baltic Sea” number 15-17-10020, a comprehensive expeditionary program of measurements in the South-Eastern Baltic started. The project is aimed at finding solutions for a number of problems caused by superfluous plastic pollution in the World Ocean and, in particular, in the Baltic Sea. This pollution has been accumulating for years and just recently it has become obvious that only multidisciplinary approach (geographical, biological, chemical, etc.) to the issues related to the processes of transformation of properties and propagation of plastic particles will allow the study of physical aspects of the problem.

During the first stage of the study samples should be selected from the water surface, water column at various horizons, bottom sediments in the Baltic Sea, from different areas at the beaches – in order to further examine the qualitative and quantitative composition of microplastic particles in different seasons for different hydrophysical situations. Reconnaissance survey was begun to choose the fields for research close to point and distributed sources of microplastics. Preference is given to those beaches that are exposed to maximum anthropogenic pollution: areas around the town of Baltiysk, the northern part of the Vistula Spit (near the settlement of Kosa), and the Sambia peninsula coast (settlements of Yantarny, Donskoye, Primorye, Kulikovo, towns of Svetlogorsk, Pionersky, Zelenogradsk). Locations for experimental sites were found in order to assess time for formation of microplastics (Vistula Spit, Kosa settlement).

In June-November, 2015 there were 5 expeditions in the waters of the South-Eastern Baltic, 7 expeditions along the coast line of the Baltic Sea (in Kaliningrad Oblast), and 5 expeditions to the Vistula lagoon to take samples and collect experimental materials. Altogether, 61 samples were taken from the surface of the beaches, water and bottom sediments in the Baltic Sea. The primary examination of those samples revealed abundant microplastic particles of the required sizes (0.5 – 5 mm) shaped as pellet of various configurations, spheres, threads, fragments, as well as particles of amber and small fractions of paraffin.

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