



Nano-particles and colloids in 50 small lakes of Kola North (Arctic region) under different anthropogenic loads (2014-2018)

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Understanding the trace elements distributions (metals and metalloids) in nature and its concentrations increasing at a regional and global level is one of the topical challenges for the current environment. It is a proven fact that anthropogenic input of trace elements into environment has increased strongly over the last century, which is associated with continuously growing volumes of metal production and dispersion of metals in environment.

From the point of view of the ecological state of surface waters, information on the specification of elements in the zonal gradient is important, taking into account the anthropogenic influence and the "wind rose". During the expedition, more than 50 waters of the lakes in the Kola Peninsula were selected. Within one or two days, all analytical work was carried out - "1st day analysis," separation into fractions, and measurement by ICP-technique. In addition, light scattering techniques (Melvern) have been used to measure zeta potential, molecular weight, and particle size.

To assess the form of elements, namely the proportion of nanoscale components inactivated by organic matter and labile ions based on sequential and parallel membrane filtration with parameters of filters 8, 1.2, 0.45, 0.2, 0.1, 0.05 μm and 100 kDa; as well as ion-exchange methods (mixture of cation-exchange resins of strong / weak nature) were applied.

The combined use of two analytical methods — the ion-exchange technique, and then the filtration fractionation (nuclear filtration) of tightly bound metal complexes with organic substances of water made it possible to estimate the proportion of fulvate and humate components, i.e. aromatic or aliphatic dominance of the organic component of humic substances.

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