



Dissolved methane in the residual basins of the Aral Sea

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The state of the Aral Sea has changed significantly since the second half of the 20th century. Due to the level decline the present-day sea consists of the several water bodies: the Large Aral Sea, the Small Aral Sea and Lake Tshchebas. Water balance peculiarities of each basin caused the differences in physical, chemical and biological structure of the ecosystem. Severe salinization of the Large Aral resulted in the increase of water stratification and formation of the anoxic conditions in the bottom layer. According to the field survey of 2002 [Zavialov et al., 2003; Friedrich, Oberhansli, 2004], hydrogen sulfide was detected in the bottom layer of the Large Aral Sea for the first time.

Methane formation is the next reaction after sulfate reduction within process of sequential oxidation of organic matter [Break, 1974]. Thus, methane is an important indicator of biogeochemical processes in natural water environments. Besides due to high greenhouse activity of methane study of its emission to the atmosphere is essential for solution of climatological problems [Bazhin, 2000].

The presented study aims to the evaluation of methane dissolved in waters of the Aral region. Measurements of the gas concentration were carried out on surface and vertical profiles, as well as on point stations in 2012, 2013, 2015 and 2016 years in different parts of the sea. Water samples were analyzed by the head-space method with further gas chromatographic determination of methane concentration [Bolshakov, Egorov, 1987].

According to the obtained data, dissolved methane content in the surface waters of the residual basins of the Aral Sea ranges from 12 to 234 nM/l. One of the main results of the research is detection of intensive methane increase in the lower water layer of the Large Aral to 17014 nM/l in central part and to 147316 nM/l in the Chernyshev Bay.