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Application of Hydroacoustics for Studying of the Estuarine Ecosystem (On the Example of the Penzhina and Talovka Hypertidal Estuary, Northwest Kamchatka)

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Acoustical methods are presently widely used mainly for monitoring of lakes, marine and ocean ecosystems. That are very rarely applied to study estuaries because that is often problematic given the particularities of estuarine environmental conditions (such as water stratification, large shallow waters, considerable turbidity, etc). Despite that, our experience has shown that hydroacoustics can be very effective as additional instrumental methods for studying of estuarine ecosystems. This presentation is based on results of our integrated fieldwork in the Penzhina and Talovka River estuary (northwest Kamchatka). That is one of the greatest estuaries in the North Pacific which to be under the hypertidal influence (the tidal range of 13 meters and more). Economic activities in this area are completely absent. Despite the unique conditions, the Penzhina and Talovka Estuary had never been studied before. Two research expeditions in that estuary were conducted in July–September 2014 and June–August 2015. Hydrology–morphological conditions in the estuary were estimated using various STD equipment. Biological data were collected with Small Juday Net, bim–trawl, haul seine and gillnets. Hydroacoustics investigations were conducted with scientific echosounder BioSonics DT–X (transducer 200 kHz) as a track survey (downward orientation) and stationary observation on the daily stations (horizontal orientation). As a result, environmental conditions, biodiversity, population and community structure, distribution and migrations hydrobionts (including zooplankton) in the different subzones of estuary (freshwater, estuarine and coastal) were studied. Trophic interaction, food web and productivity of the estuarine ecosystem on the base of all environmental, biological and acoustical data analysis were determined.

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