



Prognostic characteristics of internal waves for the Baltic Sea

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The Baltic Sea is known as a sea with unusual water stratification and there are a lot of areas where the density jump layers are located in the vicinity of seabed. The internal waves in such areas are the major driver of sediment resuspension and erosion processes which may be dangerous for underwater constructions. These processes begin to be studied for the Baltic Sea and first of all the possible parameters of internal waves are to be estimated.

The nonlinear dynamics of short-period internal waves in variable media is well described by the generalized nonlinear evolutionary models of Korteweg - de Vries type. Parameters of these models such as long wave propagation speed, nonlinear and dispersive coefficients can be calculated using hydrological data (sea water density stratification), and therefore have geographical and seasonal variations. The internal wave parameters for basin of the Baltic Sea are computed on a base of recent versions of two different hydrological data sources: WOA 2005 and GDEM 2003. Geographical and seasonal variability of internal wave characteristics is investigated. It is shown that annually or seasonally averaged data can be used for linear parameters calculation. The nonlinear parameters are more sensitive to the temporal averaging of hydrological data and detailed data (both in vertical and horizontal) are preferable to use. The zones for nonlinear parameters to change their signs are selected. There are very important for extreme internal wave appearances. The important characteristic is also the near-bottom velocity in internal waves in areas where the density jump layers are located in the vicinity of seabed. The key outcome of our calculations is an express estimate of the expected internal wave parameters for different regions of the Baltic Sea.