



Dynamics of internal waves in the Sea of Okhotsk

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Based on the output data of the GDEM model, an atlas of the parameter set was calculated based on the theoretical weakly nonlinear model based on the Gardner-Ostrovsky equation for long short-period internal waves of the first and second modes in the Sea of Okhotsk. The aim of this atlas was to solve the problem of processing the initial hydrological data (temperature, salinity) directly into the kinematic and nonlinear characteristics of long internal gravity waves, available for further use within the framework of the variable-coefficient Gardner-Ostrovsky equation for a horizontally inhomogeneous medium. The possible polarities of the internal solitary waves of the first and second modes are discussed, as well as the possibility of generating internal breather-like waves of both modes. Within the framework of the Gardner-Ostrovsky equation, the degeneration of internal tidal wave over an inhomogeneous bottom for the Okhotsk Sea conditions has been studied. The transect chosen for modeling is located in the zone of offshore hydrocarbon production. It is shown that the wave field essentially depends on the season (winter-summer). It is found that the amplitude of generated solitary-like waves varies from 10 to 25 meters, and sometimes kinks with a height of up to 70 meters are formed in the pycnocline. The structure of the of near-bottom velocity field during the passage of large-amplitude internal waves is also discussed. It is shown that the arising velocities are capable of providing transport of bottom sediments. Estimates of sediment transport are also given for several sections of the eastern shelf of Sakhalin Island using the results of modeling the generation and propagation of internal waves within the framework of full non-linear non-hydrostatic equations of an inviscid incompressible stratified medium.

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