



Edge internal waves and their interaction with the bottom profile in the shelf zone

O. Shishkina

Institute of Applied Physics RAS, Hydrophysics and Hydroacoustics, Nizhny Novgorod, Russian Federation
(olsh@hydro.appl.sci-nnov.ru)

Hydrodynamics of the shelf zone, particularly an induction of periodic near-shore flows, was studied rather thoroughly. But an existing analysis of the natural data did not give an adequate interpretation of the periodic flows observed appearing in the shallow part of the shelf in different regions of the World Ocean. A study of the hydrological data (the bathymetry, the hydrology, wind velocities, near-shore flows and internal waves) published earlier and made by the author proved clearly an assumption of the decisive role of internal waves in the formation of the near-shore flows observed.

The experimental results gave evidence to conclude that bottom irregularities normal to the direction of propagation of the solitary wave can induce near-bottom shear flows or three-dimensional wave motion with the wave vector normal to that of the incoming wave. The phenomenon observed in the experimental conditions with the visualization of the on-shelf flow confirms the mechanism of mass exchange between the shelf and the deep part of the ocean – an induction of intense turbulent motion at the shelf edge by the internal wave passing along the coastline. According to the experimental results this happens when the amplitude of the wave is large relative to the pycnocline elevation above the shelf.

An understanding of the nature of interaction between hydrological processes at the shelf edge based on the experimental and natural investigations may be used for the development of the theoretical and numerical models of the field phenomena.

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