Geophysical Research Abstracts
Vol. 20, EGU2018-2182-1, 2018
EGU General Assembly 2018

Transformations of mode-I internal breathers over a bottom step in a three-layer fluid

Pavel Lobovikov, Sergey Krylov, Ekaterina Rouvinskaya, Oxana Kurkina, and Andrey Kurkin
Nizhny Novgorod State Technical University n.a. R.E. Alekseev, Nizhny Novgorod, Russia (aakurkin@gmail.com)

The interaction of the internal breather of the first mode with the step on the bottom in a three-layer liquid within the system of full-linear non-hydrostatic equations in the vertical plane is studied. Various regimes of dynamics (incident wave transformation, transmission and reflection, including generation of higher-mode internal waves) are considered, determined by the ratio of the characteristic scales of the breather and the step, as well as the thicknesses of the layers in the three-layer fluid.
A comparison (when relevant) is produced with the weakly nonlinear dynamics in the framework of the Gardner equation with variable coefficients. Special attention in the comparison is paid to the structure of wave-induced flows and trajectories of neutral particles. The boundaries of applicability of the simplified equation are determined.
Acknowledgment: This study was initiated in the framework of the state task programme in the sphere of scientific activity of the Ministry of Education and Science of the Russian Federation (projects No. 5.4568.2017/6.7 and No. 5.1246.2017/4.6) and with the financial support of the grants of the President of the Russian Federation for state support of leading scientific schools of the Russian Federation (NSH-2685.2018.5).