Geophysical Research Abstracts
Vol. 15, EGU2013-1787, 2013
EGU General Assembly 2013

Solitary interface wave propagation in two-layer flow of slowly varied bottom

Tatiana Talipova (1), Efim Pelinovsky (1,2,3), Oxana Kurkina (2,3), Ira Didenkulova (2,4)

(1) Applied Physics Institute, Department of Nonlinear Geophysical Processes, Nizhny Novgorod, Russia, (2) Nizhny Novgorod State Technical University n.a. R.E. Alekseev, Nizhny Novgorod, Russia, (3) National Research University - Higher school of Economics, Nizhny Novgorod, Russia, (4) Institute of Cybernetics at Tallinn University of Technology, Tallinn, Estonia

The model of transformation of two-dimensional nonlinear internal waves in stratified fluid is described. The proposed model is based on the Korteweg-de Vries equation and its generalizations. Coefficients of the equation are calculated from vertical distributions of fluid density by solving the Sturm-Liouville eigenvalue problem. The model takes into account the horizontal variability of hydrological fields and of water depth. As an example, a transformation of a solitary wave (soliton) in two-layer flow of decreasing depth is studied. It is shown that the soliton breaks in two critical points. One of them is associated with the transformation of two-layer flow into one-layer flow. Another critical point occurs when the fluid layers have the same thickness. Amplitude of a solitary wave is calculated as a function of the variable thickness of the lower layer.