Non-reflective Propagation of Internal Waves in a Channel of Variable Cross-Section and Depth

Tatiana Talipova (1,2), Efim Pelinovsky (1,2,3), Oxana Kurkina (2), and Ekaterina Rouvinskaya (2)

(1) Applied Physics Institute, Department of Nonlinear Geophysical Processes, Nizhny Novgorod, Russian Federation (tata@hydro.appl.sci-nnov.ru, 007 8314 365976), (2) Nizhny Novgorod State Technical University, Nizhny Novgorod, Russia, (3) 3) Special Research Bureau for Automation of Marine Researches, Yuzhno-Sakhalinsk, Russia

A class of exact solutions for linear long internal waves in a two-layer flow with variable depth and cross-section is found. These solutions describe the so-called non-reflective propagation when the wave field can be represented as the sum of two independent waves with variable amplitude and phase that propagate in the opposite directions. The existence of such reflectionless waves is possible only under certain configurations of the water flow, which are found in this paper. Applications of reflectionless waves intended for the description of the internal waves' transformation on real shelves in bays and inlets are discussed.