Geophysical Research Abstracts
Vol. 15, EGU2013-1763, 2013
EGU General Assembly 2013

Travelling long waves in water channels of specific configurations

Efim Pelinovsky (1,2,3), Ira Didenkulova (2,4), Dmitry Pelinovsky (2,5), Dmitry Tyugin (2), and Arat Giniyatullin (2)

(1) Applied Physics Institute, Department of Nonlinear Geophysical Processes, Nizhny Novgorod, Russian Federation (pelinovsky@hydro.appl.sci-nnov.ru, 007 8314 365976), (2) Nizhny Novgorod State Technical University n.a. Alekseev, Nizhny Novgorod, Russia , (3) Far East Federal University and Special Research Bureau for Automation of Marine Researches, Yuzhno-Sakhalinsk, Russia, (4) Institute of Cybernetics, Tallinn University of Technology, Tallinn, Estonia, (5) McMaster University, Hamilton, Canada

The rigorous travelling wave solution in water channels of rectangular cross-section with variable depth and width is obtained in the framework of shallow water theory. The differential equation connecting depth and width of the channel for the case of the non-reflecting wave propagation is derived. It is shown that a number of geometries and configurations, which allow non-reflecting wave propagation, is unlimited. So, the effect of very long-distance wave propagation is rather common and can play an important role in the interpretation of sometimes observed extreme inundation caused by storm surges, tsunami and coastal rogue waves.