Analytical and numerical study of nonlinear effects at tsunami modeling

Narcisse Zahibo [a], Efim Pelinovsky [a,b,*],
Tatiana Talipova [b], Andrey Kozelkov [c], Andrey Kurkin [c]

[a] *Département de Physique, Université des Antilles et de la Guyane, UFR Sciences,
Campus de Fouillole, 97159 Pointe à Pitre Cedex, Guadeloupe, France*
[b] *Laboratory of Hydrophysics and Nonlinear Acoustics, Institute of Applied Physics,
46 Uljanov Street, Nizhny Novgorod 603950, Russia*
[c] *Department of Applied Mathematics, Nizhny Novgorod Technical University,
24 Minin Street, Nizhny Novgorod 603950, Russia*

Abstract

The giant tsunami occurred in the Indian Ocean on 26th December 2004 pays attention to this natural phenomenon and the possibility to use the analytical methods. The given paper demonstrates the role of nonlinear effects in the computed dynamics of the tsunami waves in shallow seas and the applicability of the rigorous and approximated solutions of the nonlinear theory of water waves to explain the results of the numerical simulation.
© 2005 Elsevier Inc. All rights reserved.

Keywords: Nonlinear hyperbolic systems; Nonlinear waves; Tsunamis; Perturbation method; Numerical simulation

* Corresponding author. Address: Laboratory of Hydrophysics and Nonlinear Acoustics, Institute of Applied Physics, 46 Uljanov Street, Nizhny Novgorod 603950, Russia.
E-mail addresses: narcisse.zahibo@univ-ag.fr (N. Zahibo), pelinovsky@hydro.appl.sci-nnov.ru (E. Pelinovsky).