



## **Equivalent source of tsunamis from underwater explosions (review)**

Efim Pelinovsky

Applied Physics Institute, Department of Nonlinear Geophysical Processes, Nizhny Novgorod, Russian Federation  
(pelinovsky@hydro.appl.sci-nnov.ru, 007 8314 365976)

Since the description of the mechanism of wave formation during an explosion, as such, is an extremely complicated problem, the main attention here is given to the choice of the equivalent source that gives the possibility to explain the wave field on long distances. The definition parameter for the deep-water explosion is the energy, and this characteristic can be used for tsunami waves generated by the explosion eruption of underwater volcanoes. The application of the equivalent source developed by (Le Mehaute and Wang, 1996) to the tsunami waves is discussed. First of all, it can be used to estimate the energy of volcano eruptions in past (Mirchina and Pelinovsky, 1988). The second one, it was used to compute world-wide tsunami propagation after Krakatau eruption in 1883 (Choi et al. 2003). The last application is to analyze historic event in Karymskoe Lake in 1996 (Torsvik et al., 2010). Such source is used also in problems of tsunami generation by the asteroid impact (Ward and Asphaug, 200, 2003; Kharif and Pelinovsky, 2005).

References:

- Choi, B.H., Pelinovsky, E., Kim, K.O., Lee, J.S. Simulation of the trans-oceanic tsunami propagation due to the 1883 Krakatau volcanic eruption. *Natural Hazards and Earth System Sciences*, 2003, 3, 321 - 332.
- Kharif, Ch., and Pelinovsky, E. Asteroid Impact Tsunamis. *Comptes Rendus Physique*, 2005, 6, 361-366.
- Le Mehaute, B., Wang, S. Water waves generated by underwater explosion. World Sci., Singapore, 1996.
- Mirchina, N.R., and Pelinovsky, E.N. Estimation of underwater eruption energy based on tsunami wave data, *Natural Hazards*, 1988, 1, 277-283.
- Torsvik, T., Paris, R., Didenkulova, I., Pelinovsky, E., Belousov, A., Belousova, M. Numerical simulation of tsunami event during the 1996 volcanic eruption in Karymskoe lake, Kamchatka, Russia. *Natural Hazards and Earth System Sciences*, 2010, 10.
- Ward, S.N., and Asphaug, E. Asteroid impact tsunami: a probabilistic hazard assessment. *Icarus*, 2000, 145, 64-78.
- Ward, S.N., and Asphaug, E. Asteroid impact tsunami of 2880 March 16. *Geophys. J. Int.*, 2003, 153, F6-F10.