



On a problem of abnormal high local tsunami run-up

Victor Kaystrenko

Institute of Marine Geology and Geophysics, Russian Academy of sciences, Yuzhno-Sakhalinsk, Russian Federation
(victor@imgg.ru)

Analysis of tsunami height distributions along the coast shows that far tsunami sources give a rather homogeneous and smoothed distributions. On the contrary, we have many examples of abnormal high tsunami run-ups produced by the source near the coast. There are Urup tsunami at 20 October 1963, Nihonkai-Chubu tsunami 26 May 1983, Okushiri tsunami 12 July 1993, Indonesia tsunami 26 December 2004 and others. Investigation of Go (1993) showed that mechanism of its forming looks random. The term “abnormal high” means abnormal high local tsunami run-up comparatively to the one on the nearest part of coast. There are several possible mechanisms of forming of abnormal tsunami height. It can be done by focusing bottom topography or non-linear interaction and other. All of these mechanisms are not investigated to the end. Additionally to it there is one smoothing mechanism which makes tsunami height distributions more homogeneous.

We can show that homogeneous shelf is working as smoothing mechanism for wave field.

Tsunami propagation in the shelf zone except area near the coast can be described by linear wave equation

$$\eta_{tt} = \text{div}(gh \text{ grad } \eta)$$

where η describes the disturbance of the sea level, g is the gravity acceleration and h is the sea depth..

Investigations of the amplitude-frequency characteristic of the shelf can give a result: there are no abnormal high local tsunami run-ups if tsunami source is locating out of homogeneous shelf zone.

The work was supported by Russian foundation for basic research, grant 08-05-01096.

REFERENCES

Ch.N.Go. The limitation of tsunami wave height. TSUNAMI'93. Proceedings of the International Tsunami Symposium. Wakayama, Japan, August 23-27, 1993, pp. 87-93.