# Low-frequency hydroacoustic phenomena in tsunami sources

**M.Nosov**, S.Kolesov

Faculty of Physics, M.V.Lomonosov Moscow State University
(nosov@phys.msu.ru/+74959328820)

The problem of tsunami generation by bottom earthquake is reconsidered in respect of the role of hydroacoustic phenomena. It is shown theoretically that water elasticity is significant at the stage of tsunami generation by an earthquake, while the propagation and onshore wave run-up can be described as incompressible fluid motion. The main difference in the behavior of a compressible ocean, as compared to an incompressible model medium, is in the formation of the low-frequency (˜0.1 Hz) elastic oscillations of the water column. Due to existence of the cut-off frequency these oscillations can not be detected near the shore; their manifestations are observed only at sufficiently large depths (in the open ocean). The energy of elastic oscillations is estimated to be up to two orders of magnitude larger than the energy of gravitational wave (tsunami). Therefore, strong elastic oscillations can contribute to the tsunami wave by means of nonlinear mechanisms. A clear manifestation of the low-frequency elastic oscillations of water column has been recently detected in the JAMSTEC bottom pressure records obtained during the Tokachi-Oki 2003 tsunamigenic earthquake. From these records we estimated the tsunami source parameters: vertical displacement, velocity, and duration.