



Analysis of the 26 December 2004 earthquake and tsunami in the Indian ocean on the basis of the subduction keyboard model

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This paper analyses a recent tsunami event in South-East Asian coastal region due to earthquake on 26 December 2004 at North-West underwater slope of Sumatra Island (Indonesia). The earthquake epicenter was located about 160 km away from the northern coast of Sumatra Island (Acheh Province), i.e. in the vicinity of a deep-sea trench. The magnitude of the earthquake was about 9 Richter scale. This earthquake was accompanied by a destructive tsunami which in fact washed down the island situated as far as 60 km from the epicenter. On Sumatra Island the Acheh Province is most damaged. This catastrophic tsunami was due to an anomalously long source caused by oblique subduction. The subduction keyboard model by Lobkovsky [1] treats the source of tsunami as a multiblock piston mechanism with non-simultaneous realization of each block. According to observed data, in a number of points of the coast the tsunami wave was preceded by rundown of water from the beach, and a distance of sea recession was in the order of hundreds of meters. In this work a preliminary numerical simulation of tsunami wave runup is performed for some points of Sumatra Island and Indian coast where the tsunami followed the water recession [2,3]. The numerical simulation is performed for both dipolar vertical motion in tsunami source, with downfall oriented to the nearest coast and multiblock piston source mechanism of the keyboard model. Comparison with the observed data is given.

[1] Lobkovsky L.I. Geodynamics of spreading and subduction zones, and two-level plate tectonics. Nauka Press, Moscow, 1988 (in Russian).

[2] Mazova R.Kh., Ramirez J.F. Natural Hazards. 20, 83, 1999. [3] Mazova R.Kh. et al. Izvestiya RAIN, PMM 4, 35, 2003 (in Russian).