



Indian Ocean Earthquake and Tsunami of December 26, 2004: General Overview

V.K.Gusiakov

Institute of Computational Mathematics and Mathematical Geophysics, SD RAS Novosibirsk 630090, Russia, Email: gvk@sscc.ru Fax: +7(3832)30-87-83

The devastating mega-thrust earthquake occurred on the morning of December 26, 2004 at 150 km south-west of Banda Aceh, northern Sumatra. With its $M_s=9.0$ value, it is the fifth largest earthquake instrumentally recorded and the first one of that scale in the Indian ocean region. The estimated rupture fault size is 1200 km by 100km with average slip amount up to 15 m. The earthquake generated a destructive tsunami that made a severe damage at coast of 11 countries and took more than 280,000 lives - the largest mortality toll for a single tsunamigenic event exceeding in total all other tsunamis historically known. This extraordinary high mortality toll resulted, first of all, from that tsunami waves heavily hit the highly populated coastline of Indonesia and, second, from the absence of early warning system in the region. The Pacific Tsunami Warning Center (PTWC) in Ewa Beach, Hawaii has timely determined the earthquake with operational magnitude as high as 8.0 but since its source was located outside of the PTWC area of responsibility, the warning was not issued for the affected areas. The wave heights varied from 10 to 15 m high along the large part of the nearest coast (north-western Sumatra), with the absolute run-up maximum of 34.5 m reached at the point in some 15 km east-west of Banda Aceh. Preliminary estimate for tsunami intensity of this event varies from 3.7 to 4.1 (on Soloviev-Imamura scale) that puts it within of top-ten of all historical tsunamigenic events. The international tsunami survey team investigated the most heavily impacted coastal areas in Indonesia, Thailand, India, Sri Lanka, Maldives and some other areas, making measurements of tsunami run-up height, inundation distance and evaluating degree of damager to different engineering constructions. The resulted of this survey will be presented along with the results of numerical modeling of tsunami generation and propagation.