

The large tsunami observed far away from the northern Sumatra coast during the 2004 Sumatra-Andaman earthquake

Masataka Ando[1]; Mamoru Nakamura[2]; Yoshinari Hayashi[3]; Mizuho Ishida[4]

[1] Inst. Earth Sci., Academia Sinica (Taiwan); [2] Sci., Univ. Ryukyus; [3] DMO, Nagoya Univ.; [4] JAMSTEC

<http://www.earth.sinica.edu.tw/>

Tsunami travels across the open sea very fast. It slows down as it approaches the coast, begins to pile-up and the waves becomes steeper and higher. The destructive tsunamis are believed to be generated in the harbors or near the shore. Most of the documented destructions related to tsunami are usually those near and along the shore areas. Nevertheless, fishermen onboard their fishing vessel located about half a kilometer to 20 km off the west coast of northern Sumatra when the tsunami occurred were interviewed to assess the offshore risk from tsunami. Almost everyone felt the earthquake shocks and some of them even had difficulty to control their boats during the shaking. Notably, they were located more than several km off the coast of northern Sumatra when the 10-20m high tsunami struck their boats. These waves were more or less isolated high waves and hit their boats repeatedly. A numerical simulation using a dispersive nonlinear long wave equation suggested that soliton waves are generated on the steeply uprising waves of long-period tsunamis, which are similar to the waves that struck the vessels. Based from these interviews, it is ascertained that tsunami can also pose danger even offshore off the coast when the water depths are shallower than about 50m.