



The 2013 Sea of Okhotsk earthquake: evidence for tsunami generation by a deep earthquake

Efim Pelinovsky (1), Emile Okal (2), and Andrey Zaytsev (3)

(1) Institute of Applied Physics, Nizhny Novgorod, Russia (pelinovsky@gmail.com), (2) Northwestern University, Evanston, IL USA (emile@earth.northwestern.edu), (3) Special Research Bureau for Automation of Marine Research, Yuzhno Sakhalinsk, Russia (aizaytsev@mail.ru)

The Sea of Okhotsk earthquake of 24 May 2013 is the largest ever recorded deep earthquake ($h = 603$ km; $M_{sub w} = 8.3$).

Despite the generally accepted concept that such deep events do not generate significant tsunamis, a long-period signal with a tentative peak-to-peak amplitude of 3-4 mm is present on the records of DART buoys 21402 and 21419, deployed seawards of the Kuril Island arc. This interpretation is confirmed by numerical simulations, using both a shallow-water approximation algorithm (based on surface displacements calculated in the framework of Mansinha and Smylie [1971] and/or Okada's [1985] formulae), and a normal mode summation, based on the original work of Ward [1980].

Both approaches confirm tsunami amplitudes in the millimetric range at the two DART sensors, and reaching 1-2 cm in the epicentral area. More generally, the dependence of tsunami amplitude with focal depth between 20 and 670 km is investigated theoretically on the basis of numerical simulations.