

Analysis of the doublet outer-rise earthquake and tsunami in Off-Miyagi coast occurred in 7 December 2012

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An earthquake with M7.3 occurred in Off-Miyagi coast, Japan in 7 December 2013. This earthquake was reviewed differently from seismological point of view. The US Geological Survey (USGS, 2012), for instance, concluded this event as reverse faulting in oceanic lithosphere. In contrary, the Geofon program (GFZ, 2012) and Aqua project (NIED, 2012) suggested the event as the normal faulting in the subducted slab. Global moment tensor (Harvard, 2012), however, examined this event as doublet earthquake consists of two different fault mechanisms as described by the previous sources. We carried out numerical analysis to determine the appropriate source and reconstruct the tsunami by verifying the simulated waves with the observed tsunami in 4 tide gauges and one GPS buoy (central Miyagi) in off-Miyagi coast. We conclude that tsunami were generated by two earthquakes where the reverse fault occurred much deeper than the normal faulting yield a lower through followed by high amplitude peak of the first tsunami wave.

Keywords: normal fault, outer-rise earthquake, tsunami simulation