# グリーンランドICESG観測点で記録した2015年小笠原諸島西方沖深発地震

# May 30, 2015 Bonin Islands, Japan deep earthquake (Mw7.8) recorded by broadband seismographic station on Greenland ice sheet

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May 30, 2015 Bonin Islands, Japan earthquake (Mw 7.8, depth 679.9km GCMT) was one of the deepest earthquakes ever recorded. We apply the waveform inversion technique (Kikuchi & Kanamori, 1991) to obtain slip distribution in the source fault of this earthquake in the same manner as our previous work (Nakamura et al., 2010). We use 60 broadband seismograms of IRIS GSN seismic stations with epicentral distance between 30 and 90 degrees. The broadband original data are integrated into ground displacement and band-pass filtered in the frequency band 0.002-1 Hz. We use the velocity structure model IASP91 to calculate the wavefield near source and stations. We assume that the fault is squared with the length 50 km. We obtain source rupture model for both nodal planes with high dip angle (74 degree) and low dip angle (26 degree) and compare the synthetic seismograms with the observations to determine which source rupture model would explain the observations better. We calculate broadband synthetic seismograms with these source propagation models using the spectral-element method (Komatitsch & Tromp, 2001). We use new Earth Simulator system in JAMSTEC to compute synthetic seismograms using the spectral-element method. The simulations are performed on 7,776 processors, which require 1,944 nodes of the Earth Simulator. On this number of nodes, a simulation of 50 minutes of wave propagation accurate at periods of 3.8 seconds and longer requires about 5 hours of CPU time. Comparisons of the synthetic waveforms with the observation at Greenland ice sheet station, ICESG (epicentral distance 83.4 degree), show that the arrival time of pP wave calculated for depth 679km matches well with the observation, which demonstrates that the earthquake really happened below the 660 km discontinuity. In our present forward simulations, the source rupture model with the low-angle fault dipping is likely to better explain the observations.

キーワード：深発地震、グリーンランド氷床、理論地震波形
Keywords: deep earthquake, Greenland icesheet, theoretical seismograms