位相補正した津波波形インバージョンによる2006年・2007年千島列島沖地震のすべり分布
Slip Distribution of the November 2006 and January 2007 Kuril Earthquakes from Inversion of Phase-corrected Tsunami Waveforms

堂山 俊貴[1]、楠本 聡[1]、綿田 辰吾[1]、*佐竹 健治[1]、藤井 雄士郎[2]
Toshiki Doyama[1], Satoshi Kusumoto[1], Shingo Watada[1], *Kenji Satake[1], Yushiro Fujii[2]

1.東京大学地震研究所、2.国立研究開発法人建築研究所
1.Earthquake Research Institute, The University of Tokyo, 2.Building Research Institute

Along the Kuril-Kamchatka trench, two Mw 8-class earthquakes occurred at a two-month interval: an intraplate underthrust earthquake in November 2006 (Mw 8.3, the Global Centroid-Moment-Tensor (CMT) Project) and an outer-rise normal fault earthquake in January 2007 (Mw 8.1, the Global CMT Project). Tsunamis generated by the two earthquakes were recorded at far-field observation stations in Hawaii (e.g. Hilo) and the west coast of the United States (e.g. Crescent City) as well as in and near Japan and Russia.
We usually forecast and invert tsunami waveforms by assuming the linear long waves. However, we could not use far-field tsunami waveforms for inversion because simulated tsunamis arrive earlier than observed ones, and the initial phases of simulated and observed ones show the reverse polarity at far-field stations. Recently, Watada *et al.* (2014) completely explained the observed tsunami delay and developed a model to correct the initial phases of synthetic waveforms. In this study, we estimated the fault slip distribution of the two earthquakes from tsunami waveform inversion using the tsunami phase correction method (Watada *et al.*, 2014).
The slip distribution of the November 2006 Kuril earthquake estimated by using phase-corrected tsunami waveforms indicates that a main rupture area is located in the shallower side, which is different from the slip distribution estimated by using uncorrected tsunami waveforms (e.g. Fujii and Satake, 2008), where the deeper side has a large slip amount, and agrees well with the inversion results of previous studies estimated from teleseismic body waves (e.g. Lay *et al.*, 2009). For the January 2007 Kuril earthquake, the location of a main rupture area estimated by using phase-corrected tsunami waveforms also approximately coincides with the inversion results of previous studies estimated from teleseismic body waves. At far-field observation stations as well as at near-field observation stations, the phase-corrected synthetic waveforms agree very well with the observed waveforms. Furthermore, by using phase-corrected tsunami waveforms for inversion, the seismic moment and moment magnitude become larger and closer to the Global CMT solution and previous inversion results estimated from teleseismic body waves. Therefore, through the tsunami phase correction method, far-field tsunami waveforms can be used for the inversion for the slip distribution estimation.

キーワード：千島列島沖地震、千島・カムチャツカ海溝、断層すべり分布、津波波形インバージョン、津波位相補正法、遠地観測点
Keywords: Kuril earthquakes, Kuril-Kamchatka trench, Fault slip distribution, Tsunami waveform inversion, Tsunami phase correction method, Far-field observation stations

