

# Tsunami Simulations of the 2006 and 2007 Kuril Earthquakes

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On November 15, 2006, an earthquake (Mw8.3) occurred off the Kuril Islands (the 2006 Kuril earthquake). Following tsunami was observed in the coastal region in Japan, Hawaii and North, Central and South America. About 2 month later, on January 13, 2007, another earthquake (Mw8.1) occurred and the tsunami was also observed (the 2007 Kuril earthquake). At the 2006 Kuril earthquake, tsunami warning had been cancelled in Japan before the maximum wave arrived. After the 2010 Chile Maule tsunami and the 2011 Tohoku tsunamis, technology simulating far-field tsunami was well developed including effect of elastic deformation of the Earth during tsunami propagation. In this study, using the new simulation method for the far-field tsunami, we revisited at the 2006 and 2007 Kuril earthquakes. The new simulation method has not been validated on tsunami cause by the outer-rise earthquakes, so that, especially, we focus on the 2007 Kuril earthquake because it was an outer-rise event.

In the tsunami calculations, tsunami sources were calculated by fault parameters from IISSE HP and Fujii and Satake (2008) with analytical solution using homogeneous elastic media. Tsunami propagations were solved by nonlinear shallow water equations with effects of dispersion, elastic loading and sea water density stratification on a finite difference scheme. We used GEBCO data resampled by 5 arc-min. and time step with of 5 s to calculate tsunami for 24 hours. The calculated tsunamis were compared with observed data by DARTs. As the results, the 2006 Kuril tsunami had been well modelled at the DART observation points in terms of arrival time and the maximum amplitude. However, for the 2007 Kuril tsunami, the agreement between the calculated and observed data were not good as the 2006 Kuril tsunami. The misfit became large as the lapse of time. This discrepancy may be caused by insufficient resolution of bathymetric data because the outer-rise earthquakes generate tsunami shorter wavelength than that of the subduction zone earthquakes.

Keywords: Outer-rise earthquake, Kuril earthquakes, Tsunami simulation