Seismic observation of tsunami at island broadband stations

*Kiwamu Nishida[1], Takuto Maeda[1], Takashi Tonegawa[2], Yoshio Fukao[2]

1. Earthquake Research Institute, University of Tokyo, 2. JAMSTEC

Tilt motions by tsunami were reported at island stations after huge earthquakes. Coastal loading by tsunami can explain the observed tilt motions. For the further quantifications, tsunami propagations in coastal slope are required. For the modeling, we assumed tsunami propagations in a flat ocean floor the conical island. For a plane wave incidence of tsunami, the scattered wave field is estimated. Using the tsunami wavefield, We estimate deformations at the center of the conical island using the static Green's function with a first-order correction. By fitting the modeled deformation to observed seismic data, We propose a simple method for estimating tsunami height and the propagation direction without the conical island virtually. First, we apply this method to 3 components of seismic data at a volcano island Aogashima when the Torishima Oki earthquake on May 3rd, 2015. The estimated wave height is consistent with an array observation of pressure gauge close to the island from 1 to 5 mHz quantitatively. The estimated incident angle is also consistent with past studies. We also apply this method for seismic data at 4 island broadband stations in Indian ocean when the tsunami earthquake in Sumatra on October 25, 2010. Although the observed frequency range was limited from 0.5 to 2.0 mHz, the amplitudes and incident angles are consistent with past studies. This method could be feasible not only for the tsunami but also background ocean infragravity wave activities.

Keywords: Tsunami, Broadband seismometer, Ocean infragravity wave

