Detection of hydroacoustic signals associated with the 2015 Torishima volcanic tsunami earthquake

*Hiroko Sugioka[1], Natsuo Nemoto[1]

1. Kobe University

On 2015 May 2, a submarine earthquake occurred underneath the Smith Caldera near Torishima on the Izo-Bonin arc, Japan. The occurrence of such earthquakes is quasi-regular, approximately every 10 years, always accompanying anomalously large tsunamis. The focal mechanism is always a type of non–double couple known as compensated linear vector dipole (CLVD) with the vertical T axis. The moment magnitude is always 5.6 to 5.7. Most CLVD earthquakes with a vertical T (or P) axis have been reported at active volcanoes on land or on an island but not under the sea. The Torishima earthquakes are unique in that they are submarine CLVD events accompanying anomalously large tsunamis (Satake and Kanamori, 1991; Kanamori et al., 1993) and successive T-wave trains (Sugioka et al., 2000). Its mechanism of the 2015 earthquake was estimated as a CLVD with vertical opening of the shallow horizontal tensile fault (Fukao et al., 2018).

We calculated the autocorrelation function of data recorded on hydrophones of the Dense Oceanfloor Network system for Earthquakes and Tsunamis system (DONET) to improve the noise to signal ratios. We extracted significant hydroacoustic signals at the frequency of around 1.3 Hz associated with the 2015 Torishima volcanic tsunami earthquake.

Keywords: volcanic tsunami earthquake, CLVD, hydroacoustic

