

Fin whale signals recorded by seafloor seismic observation network along the Japan trench

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S-net (Seafloor observation network for earthquakes and tsunamis along the Japan trench) is the online and real-time seafloor observation network that consists of 150 observatories for earthquakes and tsunamis along the Japan Trench. It covers the focal region of the 2011 off the Pacific coast of Tohoku earthquake and its vicinity regions. All the data from 150 seafloor observatories are being transferred to the data center and being automatically processed for monitoring of earthquake activities in these regions.

Recent studies have showed that the acoustic signals transmitted by fin whales are recorded on the S-net seismic data (Nakamura and Iwase,2020). Waveforms of fin whale signals have characteristic spectral peaks in narrow frequency bands of 14-25 Hz. They have a short duration of about one second and are repeated at regular intervals of several tens of seconds. The fin whale signal is one of noise sources that contaminate seismic signals recorded by S-net and cause deteriorating of automatic earthquake detection capability.

Nakamura and Iwase (2020) developed a method that automatically detect and count fin whale signals from continuous seismic records. This method was applied to the seismic data caught by the 150 observatories of S-net from 2017 to 2019. They found that the observatories, located at area off Kushiro and Aomori, recorded the fin whale signals frequently from early autumn to spring. The migration of the signals among the observatories from northeast to southwest direction in winter was also recognized.

Mochizuki et al. (2021) performed the analysis, based on the method of Nakamura and Iwase (2020), on the S-net seismic data for 2020. They found similar migrating pattern of signals from northeast to southwest direction in 2020, compared with the previous years. They also found that the appearance times of the fin whale signals at some observatories off Kushiro and Tokachi were delayed for a few months than the previous years.

Monitoring and counting the fin whale signals within S-net area with the method by Nakamura and Iwase (2020) have continued, in order to understand characteristics of observation environment at each of S-net observatories. We report spatiotemporal distributions of fin whale signals recorded by S-net observatories in the year of 2021 in this presentation.

Keywords: S-net, fin whale