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Multi-channel seismic reflection survey in the Sagami Bay by R/V KAIREI

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The Sagami Bay is located along the boundary between the Philippine Sea Plate and the Northeast Honshu arc. Great earthquakes (e.g., the 1923 Great Kanto earthquake, the 1703 Genroku earthquake) have frequently occurred in the Sagami Trough, including the Sagami Bay, and these earthquakes have caused very strong vibrations, large tsunamis, and serious damage around the Kanto and Tokai area. Studies conducted in the last ten years have contributed to the crustal exploration of the Philippine Sea Plate for territorial delimitation of the continental shelf. For example, the forearc in the Izu-Ogawasara arc includes a paleoarc formed during the Eocene, and an island arc formed during the Oligocene. Between these arcs is distributed a thin crust, which was rifted during the Eocene, and a thick sedimentary layer on the crust (e.g., Takahashi et al., 20 08). Since the Philippine Sea Plate has these heterogeneous structures which formed in the Izu-Ogasawara, it is important to understand how it affects the seismogenic zone around the Sagami Bay. To study the seismotectonics around the Sagami Bay, some seismic reflection studies have been conducted (e.g., Kato et al., 1983, Kinoshita et al., 2006). However, the past seismic reflection surveys have been carried out using short streamer cables. In order to study the deep crustal structure, we need to carry out data acquisition by using long streamer cables.
In January 2010, we have conducted a multi-channel seismic reflection (MCS) survey around the Sagami Knoll in the Sagami Bay using R/V KAIREI of the Japan Agency for Marine-Earth Science and Technology. The survey lines were set according to the drilling sites proposed for the IODP expedition of the Kanto Asperity Project and the fishing operations around the survey area. We used an airgun array with a spacing of 37.5 m. The total capacity of this array was 7,800 in. cu. (130-liters; tuned airgun array consisting of 32 guns). The standard air pressure was 2,000 psi (about 14 MPa). During operation, we towed a 360-channel hydrophone streamer cable with a 460 0-m maximum offset, and the group interval was 12.5 m. The towing depth of the airgun array and the streamer cable was maintained at 6 m and 10 m below the sea surface, respectively. The sampling rate was 2 ms, and the recording length was 15 s. During the survey, the weather and sea conditions were normal and the ocean currents were weak; therefore, the data quality of this exploration was good.
We present an outline of the data acquisition and preliminary results of data processing and interpretations in this study.

Keywords: Sagami bay, Multichannel seismic reflection survey, Great Kanto earthquake