Japan Geoscience Union Meeting 2013
(May 19-24 2013 at Makuhari, Chiba, Japan)

STT56-P05 Room:Convention Hall Time:May 19 18:15-19:30

Portable multi-channel seismic reflection system for high-resolution structural imaging

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Japan Agency for Marine-Earth Science and Technology (JAMSTEC) has been conducted seismic survey using multi-channel seismic reflection (MCS) system and ocean bottom seismometers (OBS) for understanding seismogenic and arc evolution processes. Existing seismic systems are large scale fixed-type on R/V Kairei and Kaiyo, which are research vessels of JAMSTEC, because targets are deep from crust to uppermost mantle. Recently, new demands for seismic surveys are increased as acquiring high-resolution data in shallow waters or arctic area for drilling and environmental researches. Therefore JAMSTEC has developed a new portable MCS system in 2011, which can easily be attached to or removed by vessels with cranes.

Four cruises have been conducted with newly developed portable MCS system. The first one was the first sea trial for the portable MCS system by R/V Kaiyo in the Sagami Bay, because sea condition is always calm and many previous seismic lines exist. We confirmed the high-resolution data from a comparison between the portable MCS data and previously acquired by R/V Kairei for deep imaging (Miura et al., 2013). Second cruise was dense 2D grid survey at the tow of the Japan Trench revealing deformation process at the tow of the trench (Kodaira et al., 2012), contributing for drill site selection (Mori et al., 2012) of Integrated Ocean Drilling Program (IODP). Third cruise was for high-resolution imaging of landward slope deformation and sedimentary sequences on oceanic crust around the Nankai Trough. And fourth one was the first cruise with R/V Mirai acquiring high-resolution images around the Nankai Trough partly overlapping the third cruise. In 2013, the portable MCS system will be used for seismic cruise of R/V Kairei. In this presentation, we will show the portable MCS system and examples of high resolution data comparing with existing data.

Keywords: high-resolution, multi-channel reflection seismic, seismic survey