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Preliminary report on multi channel seismic reflection survey around the strain concentration area off Niigata

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Recently, damaging earthquakes have occurred along the strain concentration areas located at Niigata prefecture (e.g. the 2004 Mid-Niigata Prefecture earthquake, and the 2007 Niigata-ken Chuetsu-oki earthquake). The 1964 Niigata earthquake (M 7.5) was the earthquake of largest magnitude in the Niigata prefecture in the last 50 years. These caused great damage along the strain concentration areas. However, this area has not been identified as one of the priority areas to be investigated. Therefore, we have joined as a member of the strain concentration areas study in collaboration with other Japanese research institutions using part of the Special Coordination Funds for Promoting Science and Technology, "priority investigations of strain concentration areas", and performed seismic surveys using R/V KAIREI at the eastern margin of the Japan Sea since 2008. Objectives of this cruise are to reveal structural characteristics of the strain concentration areas, which are active faults and fold structures. In particular, one of the main targets is to clarify crustal structure showing mechanism of the 1964 Niigata earthquake and understand the tectonics as the geologic background.

In August-September 2010, we conducted a MCS survey around the area near Sado Island and off Sakata in the eastern margin of the Japan Sea using the R/V KAIREI. MCS data was acquired along 11 lines with a total length of approximately 2,680 km. Survey lines were crooked to avoid the many fishing operations and equipment in the survey area. We shot a tuned airgun array with a spacing of 50 m. This array has a total capacity of 7,800 cubic inches (about 130 liters). The standard air pressure was 2,000 psi (about 14 MPa). During the shooting, we towed a 444-channel hydrophone streamer cable with a 5600-m maximum offset, and the group interval was 12.5 m. The towing depth of the streamer cable was maintained at 12 m below the sea surface using depth controllers. The sampling rate was 2 ms, and the recording length was 15 s.

We present an outline of the data acquisition and preliminary results of data processing and interpretations in this study.

Keywords: Eastern margin of the Japan Sea, Strain concentration areas, Seismic reflection survey, 1964 Niigata earthquake, Mogami Trough, Sado Ridge