# Crustal structure in the margin of the Japan Sea back-arc basin off Hyogo to Tottori deduced from the seismic survey

*Takeshi Sato[1], Tetsuo No[1], Seiichi Miura[1], Shuichi Kodaira[1]

1. Research and Development Center for Earthquake and Tsunami, Japan Agency for Marine-Earth Science and Technology

The Japan Sea is one of back-arc basins in the northwestern Pacific. It has been inferred from geophysical, geological, and petrological data that the back-arc opening of the Japan Sea was taken from the Early Oligocene to the Middle Miocene (e.g., Kano et al., 2007). After 3.5 Ma, in the eastern and southwestern margin of the sea, the crustal shortening occurred by a strong compression (e.g., Sato, 1994, Itoh et al., 1997). Therefore, in these regions, deformation zone such as fault-fold belts have developed because of the extension associated with the opening and shortening, and the destructive earthquakes occurred (e.g., Okamura et al., 2007). Recent results of seismic surveys in the eastern margin of this Sea revealed that the crustal structure formed by the back-arc opening had a connection with the distribution of this deformation zone (e.g., No et al., 2014). This show that it is necessary to clarify the back-arc opening process in order to the understand deformation process including active faults and folds. Even though the southern margin of the Japan Sea is interpreted as the region of the complex formation process (e.g., Jolivet and Tamaki, 1992), we have little information of the detailed opening and deformation processes in this margin because of a lack of the crustal structure. To obtain the structure and this information, we conducted the active-source seismic survey using ocean bottom seismographs (OBSs) and multi-channel streamer (MCS) in this margin from the Yamato back-arc basin to the coastal area of the southwestern Japan arc off Hyogo to Tottori in 2016. The seismic survey using 50 OBSs, a tuned air-gun array (7,800 cu. inch) and MCS system was conducted from the coastal area off Hyogo, Oki Trough, Oki Ridge, Yamato Basin to the Kita-Oki Bank. This survey line has about 225 km length. The MCS survey was also conducted in this margin off Tottori. The survey line of this MCS survey is same as the line by Sato et al. (2006). In record sections of several OBSs, not only the first arrived phases but also later phases reflected from interfaces in the crust and uppermost mantle are visible. Also, the MCS profile clearly images the sedimentary layer and the undulations of the basement.
The Oki Ridge has about 23 km of the crustal thickness. The upper part of the crust with P-wave velocity of 5.4-6.2 km/s corresponding to the continental upper crust has about 10 km. This shows that the Oki Ridge may have the character of the continental crust. On the other hand, the crustal thickness and the distribution of P-wave velocity in the Yamato Basin differs from that in the Oki Ridge. The upper part to middle part of the crust from the Oki Trough to the coastal area has a large lateral variation.

Keywords: Crustal structure, Japan Sea, arc-back-arc basin

 