Long-term observation in the Japan Sea using broadband ocean bottom seismometers

Kazuo Nakahigashi[1], Masanao Shinohara[2], Hajime Shiobara[3], Tomoaki Yamada[4], Michio Arisaka[5], Masakazu Ito[6], Kenji Uehira[7], Shin'ichi Sakai[8], Toshihiko Kanazawa[9]

[1] ERI, [2] ERI, Univ. Tokyo, [3] OHRC, ERI, Univ. Tokyo, [4] ERI, Univ. of Tokyo, [5] ERI,Univ of Tokyo, [6] ERI,Univ.Tokyo, [7] SEVO, Kyushu Univ., [8] Earthquake Research Institute, Univ. of Tokyo, [9] ERI, Tokyo Univ

The Japan Sea is one of the back-arc basins in the western Pacific. Many seismic experiments using Ocean Bottom Seismometers (OBSs) with controlled sources have performed in the Japan Sea and many crustal structure models including uppermost mantle were obtained. However there is little information about the upper mantle structure beneath the Japan Sea, because energy of controlled sources is not enough for deep penetration of seismic waves to reveal a deeper structure. It is important for understanding dynamics of back-arc opening to obtain the upper mantle structure including the mantel wedge beneath the Japan Sea. To reveal the deep structure beneath the Japan Sea, earthquakes especially deep earthquakes below the Japan Sea and teleseismic events must be observed in the Japan Sea. Therefore long-term seismic observation on the sea floor is required for recording many earthquakes. In addition, high dynamic range for records and broadband observation are important to derive more information from the seismic records. From these points of view, a long-term broadband seismic observation by using OBSs is being carried out in the Japan Sea.

In September 2001, we deployed 4 pop-up type OBSs for the long-term observation in the central part of Japan Sea during KT01-15 cruise, the R/V Tansei-maru. To carry out simultaneous observation on sea floor and land, the sensor of Hegura-jima seismic station, ERI, Univ. Tokyo, which is placed on an extension of the profile of OBSs in the Japan Sea, was replaced to broadband type CMG-3T sensor. The three kinds of sensors were used for OBSs: one broadband sensor CMG-1T, two PMD 2023, and one 3-component geophone with a natural frequency of 4.5 Hz. In November 2002, All OBSs were recovered during KT02-17, the R/V Tansei-maru. During KT02-17, we deployed two long-term OBSs equipped with CMG-3T on the profile to continue the observation. We obtained the data with good quality about 12 months from three OBSs. Unfortunately one OBS had no vertical records due to a problem of sensor.