Integrated seismic image using airgun-OBS and MCS data

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Multichannel seismic reflection method (MCS) using airgun and hydrophone streamer is able to image the shallow structure towards sediments and acoustic basements, whereas there are some weak points: offset distance of recording signal is limited by the streamer length and recording signal is influenced by the sea conditions because streamer locates sea surface. On the other hand, structural surveys using ocean bottom seismometers (OBS) have conducted frequently and used to reveal the velocity model based on traveltime information. There are some merits of OBS survey: the recording condition is better than MCS because of sea bottom, the long offset distance and wide-angle recording survey is possible, and OBS records vertical and horizontal components. Integrated seismic image using airgun-OBS and MCS data is expected to be a powerful method to reveal the physical properties at the plate boundary of seismogenic zone and at the deep interfaces related with the arc growth model. Japan Agency for Marine-Earth Science and Technology (JAMSTEC) have developed the integrated seismic image using airgun-OBS and MCS data collaborated with JGI Inc.

The important thing for the integrated seismic image using airgun-OBS and MCS data is how clear the different recording situations between OBS and MCS data. The shooting and recording positions of MCS are located near sea surface. The intervals of shooting and recording of MCS are dense as 50 m and 25 m, respectively. On the other hand, shooting positions of OBS are near surface and recording positions are sea bottom. Although the shooting interval is dense as 50-200m, recording interval of OBS is sparse as 1-5 km. Moreover, the offset distance of OBS survey is able to be set as several hundred kilometers. We have developed the software to clear the different recording situations with considerations of pre-processing of input data. In this presentation, we will report the outline of the integrated seismic image using airgun-OBS and MCS data with applied examples.