

New method for the evaluation of crustal structure analysis using OBS-control sources-MCS records

Tomoyuki Tanaka[1]; Shigeki Kawamura[2]; Shigeharu Mizohata[1]; Kunishige Tonoike[3]; Sadao Unou[1]; Ryuji Kubota[4]; Yumio Iwaki[1]; Kayoko Tsuruga[5]; Junzo Kasahara[6]; Azusa Nishizawa[7]; Kentaro Kaneda[8]

[1] JGI; [2] Nippon Geophysical Prospecting; [3] JGI, inc.; [4] Kawasaki Geol. Eng.; [5] JCSS/ORI; [6] JCSS; [7] Hydrogr. & Oceanogr. Dep., JCG; [8] HODJ

In order to obtain an accurate best crustal velocity structure model, it is very important to make the best fit between the major phases identified in waveforms of the OBS wide-angle reflection and refraction survey data, and the MCS reflection sections. An ideal result is a crustal structure satisfying the waveform characteristics in both survey data, especially the major reflection phases.

Recently, we have developed a new interactive software module for the 'Modeling-Pasteup' crustal structure analysis tool for OBS survey data to make a comparison between the OBS data and the MCS data in terms of time-offset distance sections. This software module computes the two-way travel times of normal incident waves from the analyzed crustal structure model. The software module also superposes the time contours of the layers in the crustal structure model over the migrated time section of MCS using the 'Pasteup' software developed by Fujie et al. (2000). By an independent analysis, we also compute travel times of wide-angle reflections and superpose on the OBS seismic record sections. Using a huge volume of real data, we confirmed that strong reflections from layers in the crust and the Moho seen in the OBS wide-angle reflection records are fairly consistent to the reflectors in the MCS section. Through above two processes, we can ensure the correctness of the resultant crustal structure model. Later, we confirm the result of forward processing by travel time inversion and comparison to synthetic waveforms. Such integrated analysis may give the best crustal model using all available data.

As a final result, the OBS survey data are found to make a good fit to the MCS reflection survey sections for many survey lines.