

## New precise method for the crustal structure analysis using OBS and control sources

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Recently, in order to determine crustal structure in the oceanic region, a huge amount of seismic data has been collected using a set of digital OBSs and a large volume (e.g., 8,000 cubic inches) tuned airgun-array.

Such survey can provide full-waveform data of wide-angle reflected and refracted arrivals. Most of previous analyses using OBS data have commonly been carried out only by the travel-time inversion method using first arrivals only. However, it is well known that the travel time inversion strongly depends on a starting model.

To avoid this problem, it is necessary to make a reasonable crustal initial model to satisfy full-waveforms, MCS reflection data and geological and geophysical backgrounds. In our analysis we are adopting a combination of several datasets such as MCS data, Pg, Pn first and later arrivals, PmP and crustal reflected phases, P-S and S-P converted phases, and the amplitude of each phase.

Travel-times and raypaths are calculated by the graph-method (Kubota et al., 2005). Synthetic waveforms are calculated by the finite difference method (Larsen, 2000). Travel-time inversion is carried out by Tomo2D developed by Korenaga et al. (2000).

Seismic records are interactively processed using 'Pastup' software developed by Fujie (1999). Those dataset are analyzed by the forward modeling, the ray tracing, the first-arrival and reflection travel-time tomography, and the calculation of synthetic seismograms. We have applied the above analysis for the crustal structure studies in the western Pacific Ocean near the Japanese archipelago.

Crustal structures obtained by the above analysis stream satisfactory fit to the original waveforms and MCS reflection sections. Travel-time misfits between observed travel-times and theoretical travel-times are nearly 40 milliseconds or less. Most of analysis has been carried out by colleagues in Japan Continental Shelf Survey Co., JGI Inc., and Kawasaki Geological Engineering, Co. Ltd.