

## The application of the fullwave inversion techniques to Ocean Acoustic Tomography

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The problem of Ocean Acoustic Tomography (OAT) is to estimate the state of ocean in temperature, salinity, etc. that are related to sound velocity structure from the travel-time or other properties in acoustic wave propagation. The ocean is nearly transparent for low frequency acoustic waves so that the acoustic wave could propagate for thousands of kms. OAT was first introduced by Munk et al. (1995) and based on a ray theoretical approach. A travel-time inversion method has been developed using a ray-tracing scheme in the Munk's method. There is some similarity with seismic exploration both in theory and in data processing methods. However the waveform analysis is not common in OAT although its importance is widely recognized in seismic explorations. Actually there is hardly any precedent studies on waveform inversion in the application of OAT. In this study, a full-wave inversion technique is applied to OAT in the 2-D acoustic FDTD model in order to investigate the effectiveness of the method through the comparison of the results with that of the ray-tracing inversion approach. Then, as an application for a field data, the full-wave inversion technique is applied to the VCS experiment data in Lake Biwa. The result shows applicability of the full-wave inversion technique to OAT and also shows that full-wave inversion provides higher image construction than in travel-times inversions.

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