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STT11-11 会場:203 時間:5 月 21 日 17:00-17:15

海洋音響場の解析における全波形インバージョン手法適用性の研究
Applications of the full waveforim inversion techniques to the estimation of the sound velocity structure in the ocean.

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The travel-time inversion method has been developed using a ray-tracing scheme in the Munk's Ocean Acoustic Tomography (OAT) method. The method has some similarity with seismic exploration both in the theory and data processing methods except for the direct utilization of waveform in seismic exploration. The waveform analysis is a powerful tool to investigate the velocities in the areas of interest, and the importance to use waveform is widely recognized in seismic explorations. However there are few precedent studies dealing with waveform inversion in the application of OAT. This study investigates the effectiveness and applicability of the full waveform inversion method to estimate underwater sound velocity structures. We use an adjoint-state method for the calculation of the gradient in an iterative inversion based on a pre-conditioned conjugate gradient method. We first demonstrate results from a full waveform inversion method applied to a synthetic dataset that reflects the sound velocity structure. The results are then compared with those from a conventional ray-based travel time inversion method to evaluate the effectiveness of the method. The results show that the full waveform inversion method could provide more precise image with higher resolution than the ray-based method. The full waveform inversion method is also applied to a VCS experiment field data in Lake Biwa. In spite of very limited path condition using only direct arrival wave, the full waveform inversion method could describe the horizontal velocity structure possibly due to seasonal thermocline in the lake. We conclude that the FWI method could be the key success factor for the higher resolution at estimation of underwater sound velocity structure.

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