

Structured Session: Shallow Water Acoustics

Source Localization in Time-varying and Range-dependent Environment

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The spatiotemporal varying of environmental parameters in the ocean, especially the varying of sound speed profile caused by internal waves, can lead to a "mismatch" problem which is a critical challenge for matched field processing technique of the passive sound source localization in shallow water. According to the characteristics of the spatial and temporal variations of sound speed caused by the internal waves in the Yellow Sea of China, a passive localization method based on matched field processing is proposed. Both the time and range varying of the sound speed profile are considered in the method. The sound speed profile is reconstructed by the empirical orthogonal functions to describe its time-varying, and the space varying of the sound speed profiles is approximated by multiple piece-constant profiles. In theory, it will mitigate the model mismatch of the sound speed profile and improve the performance of source localization in shallow water. Both the simulated and experimental data show that this method has good robustness on the localization of broadband sound source in the presence of internal waves, and the localization accuracy is improved comparing with the traditional normal match-field processing method.

Keywords: internal waves; passive source localization.