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**Spatial and temporal sound field fluctuations due to propagating
internal waves in shallow water**

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Fluctuating three dimensional acoustic wave propagation in shallow water presents a challenge due to the anisotropic nature of the environment. Temporal and spatial changes in the water column caused by the passage of internal waves are among the the primary causes of the anisotropy. Three main mechanisms for the acoustic field variations have been determined: 1) adiabatic propagation,. 2) horizontal refraction, and 3) mode coupling. All these mechanisms provide different characteristics of the sound fluctuations, and depend on the angle between the internal wave direction and the source receiver propagation path, as well as frequency and mode number. In a recent multi-institutional shallow water experiment (SW06) a series of source-receiver positions were created to examine the effects of 3D environmental fluctuations on the propagation of low to mid frequency (0.05-3 kHz) broadband acoustic signals while extensive environmental observations were made. These recent observational results confirm the above theoretical hypothesis. Work supported by ONR-3210A and RFBR.