The Impact on the Sound Speed Field of Internal Bores and Large Amplitude Internal Waves in the Continental Shelf/Slope Region

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Barotropic tides can generate internal waves that propagate up the continental slope and force deep water onto the continental shelf. Also dense water formed by winter cooling on the shelf flows down the continental slope to the deep ocean. Canyons are preferred locations for these cross-slope flows because the slopes are steeper than the average, thus accelerating the flows. Since cross-slope flows have an inherent vertical acceleration, they are nonhydrostatic. These flows produce large amplitude internal waves and internal bores. Previous simulations of internal bores over flat topography have demonstrated that nonhydrostatic models are required to obtain the correct dynamics of the head, the mixing region and the large amplitude internal waves of the bore. The organization of the temperature field generated by these dynamics significantly affects the propagation and coherence of acoustical signals. The sound speed field will be constructed from simulations of internal bores on slopes. The effect of the sound speed field on acoustical signals will be assessed particularly with respect to propagation and coherence.