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An overview of Beaufort Sea eddies, internal waves, and spice from several recent field efforts and implications for acoustic propagation

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Abstract

Several recent field efforts have revealed surprisingly complex and dynamic thermohaline structure in the upper ocean of the Beaufort Sea. Solitary and compact eddies with strong temperature contrasts and currents have been observed in multiple locations and are associated with vigorous mixing, staircase structure and intrusive feature formation. While many of the eddies are primarily found in the upper 300-m of the water column, rare deep eddies with cores near 500 to 1000-m depth have also been observed. Internal waves are generally weak with energies an order of magnitude less than mid-latitude values and they show marked dominance by near inertial waves, intermittency, spatial inhomogeneity, and deviations from the Garrett-Munk model. Strong intrusive structure, termed spice, is observed in the upper 150-m of the water column and is associated with the mixed layer and eddy activity. Acoustic implications of the associated sound speed structure will be discussed.