Geophysical Research Abstracts,
Vol. 11, EGU2009-13013, 2009
EGU General Assembly 2009

Meter scale 3D structure of the base of autumn mixing layer imaged by high resolution seismic profiling of the outer shelf offshore Haifa Bay, Israel

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The autumn 2008 cruise of the Charney School of Marine Sciences (CSMS) focused on investigation of the outer continental shelf (50 to 85 m depth) offshore Haifa Bay, Israel. The cruise combined the collection of oceanographic CTD and water samples transect with measurements every about 5 km, and subsequently (over a duration of about 12 hours) the acquisition of a grid of 2 km long high resolution (∼1-2.5 kHz) near zero (∼3 m) source-receiver offset single channel seismic reflection profiles with a nominal spacing of 100 to 200 m. The CTD measurement profile consistently portray a mixed layer extending from the surface to a depth of about 60 to 70 m with a temperature of about 25° C and salinity of about 39.55 PSU. The bottom of the mixed layer was marked by a 5 to 10 m transition zone where temperature decreased by about 5° C and salinity decreased by about 0.5 PSU. A faint set of reflections imaged on the high resolution seismic profiles above the seafloor at a depth of about 60 to 70 m, is interpreted by us to correlate with the base of the oceanographic mixed layer. This reflection suggests the existence of a sharp (<1 m) acoustic impedance contrast that corresponds to the base of the mixed layer. Mapping of this reflection over our grid of seismic reflection profiles constrains the fine scale lateral variations in the base of the mixed layer, while correlation of the reflection between crossing profiles constrains temporal variations of this layer over the survey duration. We will present initial results of our analysis, which will shed light on the workings of local eddies in the vicinity of the shelf edge.