2004 Ocean Sciences Meeting
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Cite abstracts as *Eos Trans. AGU, 84*(52),
Ocean Sci. Meet. Suppl., Abstract xxxxx-xx, 2003

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AN: **OS51D-04**
TI: **Turbulence Estimates Near Coastal Fronts at the Entrance to Long Island Sound**
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AB: Microstructure observations have been made in the FRONT coastal network, near the mouth of Long Island Sound, offshore, and in the plume front of the Connecticut River. The region has been observed to be rich in frontal features, as observed in satellite-derived SST and color. This regime is strongly influenced by tides, estuarine outflow, and alongshore shelf flow. The Connecticut River is the primary fresh water input to the estuary. The FRONT observational and modeling program provided the framework for multi-scale studies of the fronts and their bio-physical importance. The NUWC turbulence AUV acquires both microstructure and finestructure measurements. It is an extended REMUS, with shear sensors to estimate turbulent kinetic energy dissipation rates, and ultra-fast thermistors to estimate thermal variance dissipation rates. Turbulence data were obtained in a shelf front, a headland front, in surface boils over sand waves, and near a MITgcm predicted tidal mixing front. Classical turbulence theory yields promising results in the comparison of the velocity shear spectrum with the "Universal spectrum". Similarly, a comparison of the turbulent temperature spectrum with Batchelor scaling yields promising results. Inshore of the tidal mixing front, pycnocline estimates of KE dissipation rates of 10-6 to 10-5 W/kg were obtained, comparable to estimates for the river plume front. Offshore of the tidal mixing front, pycnocline estimates of KE dissipation rates of 10-6 to 10-9 W/kg were obtained. These estimates are used to verify mixing fidelity in a coastal version of the MITgcm model, which includes nonlocal "K profile parameterization'' (KPP) of vertical mixing. For the example of the headland front, modeled and observed dissipation rates and eddy viscosities are in reasonable agreement.
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