

Adaptive Sampling for Velocity Measurements on the Shelf, Shelf Break, and Slope of the Mississippi Bight

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The Naval Research Laboratory is planning on deploying 6 Acoustic Doppler Current Profiler (ADCP) moorings on the shelf/shelf break and 8 ADCP arrays on the slope of the Mississippi Bight region in the spring of 2004. The objective of this endeavor is to better understand the mechanisms that cause/block vorticity exchange across this shelf break. The placement of this array of moorings has tentatively been set, and representer functions will be used to test this array's capability to observe fluxes across the shelf break. These functions will show the influence that each measurement contribution has in both space and time, therefore indicating the areas at which the measurements should be placed. Through the examination of these results an alternate array design should be found that would do a better job at reaching the objective at hand.

The representer functions are computed by forcing an ocean model adjoint by the measurement functional, convolving the result with expected error covariances, and then using the result to force the forward ocean model. The model dynamics used to create the representer functions is based on the dynamics of the Navy Coastal Ocean Model (NCOM). All background, forcing, and parameterization information needed for this inverse model come from a nested version of NCOM that runs real-time for the Intra-American Seas. This inverse model is currently linearized by simply ignoring nonlinear calculations (advection, total depth, nonlinear dependence of density on T&S, etc.). We are in the process of adding the tangent linearizations of these nonlinear dynamics into the inverse model and analyzing the impact that they have on the experiments mentioned above.