



## **Shelf break processes in the Gulf of Mexico from simulations with a Hybrid Coordinate Ocean Model**

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An assimilation experiment with a 3.5 km, 20 layer Gulf of Mexico version of the Hybrid Coordinate Ocean Model (HYCOM) has been run over the period November 2003 to the present. The model is used in a nowcast/forecast system that has been running in real-time since the Fall of 2006, with a 5 day hindcast and a 7 day forecast produced once per day. The NRL Coupled Ocean Data Assimilation (NCODA), a multivariate optimal interpolation (MVOI) scheme, is used as the assimilation technique. The ocean analysis variables in NCODA are temperature, salinity, geopotential (dynamic height), velocity and layer pressure. The horizontal correlations are multivariate in geopotential and velocity thereby permitting adjustments to the mass field to be correlated to adjustments in the flow field. The MVOI assimilates the satellite track data, available MCSST and in situ observations, including profile data from BT's and ARGO floats. The open boundary conditions are from a 1/12 degree Atlantic version of HYCOM.

Several assessments of model skill have been performed using data not assimilated into the system. These include frontal analyses performed at the Naval Oceanographic Office and "eddy watch" maps compiled by Horizon Marine. Also used are coastal tide gauge stations and ADCP velocity measurements collected on oil platforms in the Gulf. In some instances, ocean color has been very useful at evaluating different assimilative systems and some examples of these comparisons are presented. Also presented are results that demonstrate the difference when gridded fields from the Modular Ocean Data Assimilation System (MODAS) are used in the assimilation instead of NCODA. Finally, the vertical structure of the nowcasts are evaluated using BT's that were not assimilated into the circulation model.