TOPIC A. OPERATIONAL / ROUTINE OBSERVATIONS

U.S. GODAE: Global Ocean Prediction with the HYbrid Coordinate Ocean Model (HYCOM)

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A broad partnership of institutions proposes to collaborate in developing and demonstrating the performance and application of eddy-resolving, real-time global and basin-scale ocean prediction systems using the HYbrid Coordinate Ocean Model (HYCOM). These systems will be transitioned for operational use by the U.S. Navy at both the Naval Oceanographic Office (NAVOCEANO), Stennis Space Center, MS, and the Fleet Numerical Meteorology and Oceanography Center (FNMOC), Monterey, CA, and by NOAA at the National Centers for Environmental Prediction (NCEP), Washington, D.C. The systems will run efficiently on a variety of massively parallel computers and will include sophisticated, but relatively inexpensive, data assimilation techniques for assimilation of satellite altimeter sea surface height (SSH) and sea surface temperature (SST) as well as in-situ temperature, salinity, and float displacement. The Partnership will address the Global Ocean Data Assimilation Experiment (GODAE) goals of threedimensional (3D) depiction of the ocean state at fine resolution in real-time and provision of boundary conditions for coastal and regional models. It will also provide the ocean component and oceanic boundary conditions for a global coupled ocean-atmosphere prediction model. It will make these results available to the GODAE modeling community and general users on a 24/7 operational basis via a comprehensive data management strategy.

The Partnership under this proposal represents a truly broad spectrum of the oceanographic community, bringing together academia, federal agencies, and industry/commercial entities, spanning modeling, data assimilation, data management and serving, observational capabilities, and application of HYCOM prediction system outputs. The institutions participating in this Partnership have long histories of supporting and carrying out a wide range of oceanographic and ocean prediction-related research and data management. All institutions are committed to validating an operational hybrid-coordinate ocean model that combines the strengths of the vertical coordinates used in the present generation of ocean models by placing them where they perform best. This collaborative Partnership provides an opportunity to leverage and accelerate the efforts of existing and planned projects, in order to produce a higher quality product that will collectively better serve a wider range of users than would the individual projects. In addition to operational eddy-resolving global and basin-scale ocean prediction systems for the U.S. Navy and NOAA, respectively, this project offers an outstanding opportunity for NOAA-Navy collaboration and cooperation ranging from research to the operational level.

Number of years: 5
Total Proposed Budget: $11,875,760
Table of Partners:

Partner	Sector	Role and Task

University of Miami	Educational	Project Coordination, ocean, modeling data assimilation, remote sensing, numerics, ice modeling, analysis and outreach
University of Southern Mississippi	Educational	Comparison of HYCOM results with observational databases
University of North Carolina	Educational	Site-specific, limited-area forecasting of the coastal ocean circulation along the South Atlantic Bight
Rutgers University	Educational	High resolution coastal modeling
University of South Florida	Educational	Comparison of HYCOM results with observational data
The Naval Research Laboratory	Government	ocean modeling, data assimilation, provision of boundary conditions for models
The Naval Oceanographic Office	Government	Computational runs of the eddy-resolving 1/12○ global HYCOM prediction system
Fleet Numerical Meteorological and Oceanographic Center	Government	Computational runs of HYCOM as the ocean component of an operational coupled global ocean-atmosphere prediction system
The National Oceanographic and Atmospheric Administration	Government	Data assimilation methodologies and managing the data sharing framework
SHOM (France)	Government	Complete the writing of the HYCOM adjoint model
LEGI (France)	Government	Data assimilation research
Lawrence Livermore National Laboratory	Government	Development and validation of the massively parallel ocean and sea-ice components of HYCOM
Planning System Incorporated	Industrial	Responsible for hindcast and pre-operational real-time runs of HYCOM
OPeNDAP	Industrial	Data sharing toolkit
Fugro-GEOS / Ocean Numerics	Industrial	Establish a number of regional forecast systems in active deepwater oil and gas exploration and production

		areas and develop a commercial market for operational ocean products within the oil industry.
Horizon Marine Incorporated	Industrial	Evaluate the skill for forecasting major eddy events for the oil and gas industry for economic and safety applications
ROFFS	Industrial	Evaluate the HYCOM output compared with our ocean circulation features analyses for fishing forecasting nowcasts and forecasts.
Orbimage	Industrial	Provide feedback on the accuracy and utility for commercial fisheries applications
Shell Oil Company ExxonMobil	Industrial	Will evaluate the potential of the forecast system outputs in deriving useful criteria for deep water oil and gas facilities and operations