The Coupled Ocean /Atmosphere Mesoscale Prediction System (COAMPS): Plans for Operational Implementation at Navy Production Centers

Richard Allard (1), Tomothy Campbell (1), Travis Smith (1), John Cook (2), Sue Chen (2), Frank Bub (3), Mark Swenson (4), and Daniel Geiszler (5)

(1) Naval Research Lab, NRL Code 7322, Stennis Space Center, United States (allard@nrlssc.navy.mil), (2) Marine Meteorology Division, Naval Research Laboratory, Monterey, CA 93943, USA, (3) Naval Oceanographic Office, Stennis Space Center, MS 39529, USA, (4) Fleet Numerical Meteorology and Oceanography Center, Monterey, CA 93943, USA, (5) Science Applications International Corporation, Monterey, CA 93943, USA

A two-way coupled atmosphere-ocean forecasting and data assimilation system developed by the Naval Research Laboratory is scheduled for operational transition to Navy production centers in 2011. The forecast component of the Coupled Ocean Atmosphere Mesoscale Prediction System (COAMPS®[1]) version 5.0 is composed of atmosphere and ocean models which are integrated using the Earth System Modeling Framework (ESMF) and an air-sea coupler. The coupler software provides the atmospheric wind stress, and bulk fluxes of latent heat and sensible heat (a function of the ocean model sea surface temperature [SST]) to the ocean model, which in turn feeds an updated sea surface temperature back to the atmospheric component at prescribed intervals, typically less than one hour. The ocean model is the limited area version of the Navy Coastal Ocean Model (NCOM). The atmospheric component of the system is based on the COAMPS mesoscale model that has been operational at Fleet Numerical Meteorology and Oceanography Center (FNMOC) since 1999.

COAMPS ingests meteorological observations including radiosondes, satellite data, ship reports, and ocean observations with time dependent global atmospheric lateral boundary conditions provided from the Navy Operational Global Atmospheric Prediction System (NOGAPS). Time-dependent ocean boundary conditions are derived from the global NCOM. Atmospheric and oceanographic forecasts include surface and upper-air meteorological fields, SST, three-dimensional (3D) ocean temperature, salinity, velocity, two-dimensional (2D) mixed layer depth (MLD) and ocean acoustic products.

The COAMPS-On demand System (COAMPS-OS®[1]) Graphical User Interface (GUI) is used for model setup and configuration as well as to provide graphical output of model forecast fields. Both atmospheric and oceanographic model domains are configurable by the user as well as the forecast periods, data assimilation cycles, model parameterizations, and coupling options, including spin-up time. The coupled model has been validated for numerous test cases including the Adriatic Sea, Ligurian Sea (LASIE07), Monterey Bay, and the Kuroshio Extension System Study (KESS). This presentation will provide an overview of COAMPS V5.0 and discuss plans for operational implementation on the Navy's high performance computational platforms.

[1]COAMPS and COAMPS-OS are registered trademarks of the Naval Research Laboratory.