



SAM2: The Second Generation of MERCATOR Assimilation System

C.E. Testut (1), B. Tranchant (1), F. Birol (1), N. Ferry (1) and P. Brasseur (2)

(1) Mercator-ocean, 8/10 rue Hermes, 31520 Ramonville-St-Agne, France, (2) LEGI, B.P.53, 38041 Grenoble Cedex 9, France

The French MERCATOR project is developing several operational ocean forecasting systems to take part in the Global Ocean Data Assimilation Experiment (GODAE). Prototype systems are designed to simulate (1) the Atlantic and Mediterranean Sea (from 1/3 to 1/15 of degree), and (2) the global ocean circulation (from 2 to 1/4 of degree). The first generation of multivariate assimilation scheme referred to as SAM1v2 is based on the SOFA reduced order interpolation scheme (developed at LEGOS, Toulouse). It uses a vertical/horizontal separation of error statistics, and an order reduction in the vertical in terms of multivariate Empirical Orthogonal Functions (EOFs) of temperature, salinity, and barotropic streamfunction. This scheme has been implemented in the operational system and provides routine weekly analyses and forecasts. The new generation of fully multivariate assimilation system referred to as SAM2v1 is being developed from the SEEK (Singular Evolutive Extended Kalman) algorithm (developed at LEGI, Grenoble). This scheme is a Reduced Order Kalman Filter using a 3D multivariate modal decomposition of the forecast error covariance as well as an adaptive scheme to specify parameters of the forecast error. The use of the SEEK filter and its 3D modal representation for the error statistic is intended to overcome some of the limitations of SAM1v2 in highly inhomogeneous, anisotropic, and nonseparable regions of the world ocean such as shallow areas, as well as in the surface layer. As the previous system, it allows to assimilate vertical profiles and SST in addition to altimetry (JASON, ERS-2 and GFO), but in larger quantity at a lower cost. Results will be presented and discussed for hindcast experiments during 2003.