A web application

to distribute and visualize altimeter-related

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The CoastWatch node at AOML has developed a Web interface to visualize and distribute operational altimeter-derived data, including estimates of geostrophic currents. We present here a description of the system and of future improvements.

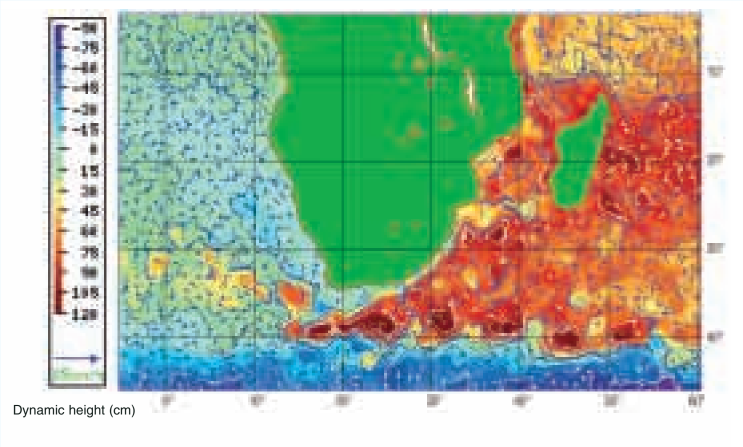

Figure 1. Geostrophic currents estimated for October 8, 2002, in the Agulhas retroflection region

The CoastWatch (CW) Project promotes the operational distribution of ocean-related satellite-derived products. The CW Caribbean node, located at the Atlantic Oceanographic and Meteorological Laboratory (AOML) in Miami, collects and delivers data focusing on the Caribbean and Gulf of Mexico regions. The capabilities of this node also have been expanded to manage additional datasets at regional and basin scales and resolutions, while providing an easy-to-use interface for users to access and visualize satellite and field data. An interface has been developed (Figure 2) to graphically display historical and near-real-time sea height anomaly (SHA) and significant wave height (SWH) data, processed by Navoceano and hosted at the GODAE site in Monterey and the NRL site at the Stennis Space Center. New data files from the Topex/Poseidon, Jason-1, ERS-2, and GFO altimeters are downloaded on a daily basis from these servers and made accessible to users in near-real time.

This system allows users to access SHA observations, display altimeter ground tracks, dynamic height fields and geostrophic current vectors, and to overlay contours, mask depths, and so on. The coverage is global and the region of interest can be selected interactively along with the desired period of time. This process is done in real time with the parameters entered by the user through the Java interface (time, geographic area, altimeter ground tracks, contours, depth masks, etc.). Several data

Figure 2. The opening Web page shows an SHA map generated for the tropical and North Atlantic regions.

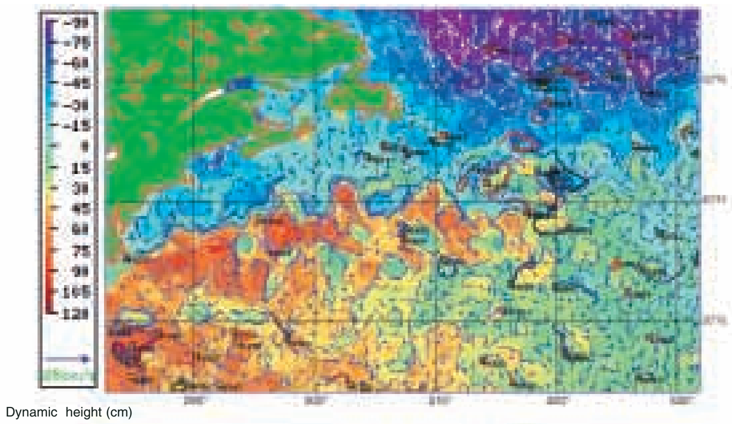

Figure 3. Map showing the estimated geostrophic currents and drifter paths obtained from GTS data. The yellow square denotes the drifter's initial position

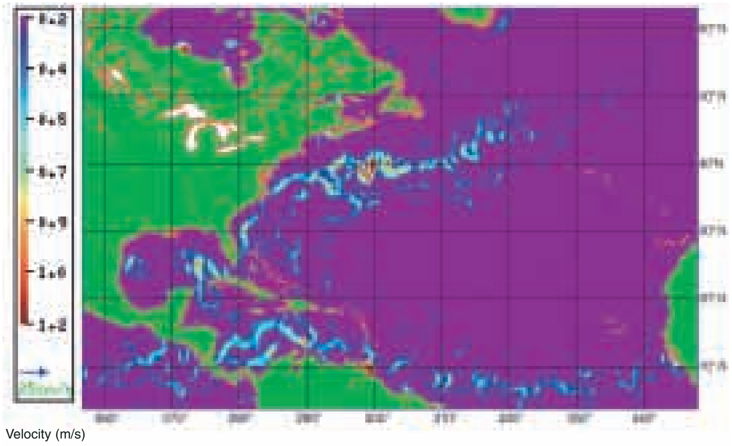

Figure 4. Map of absolute values of geostrophic velocity generated using the CW Web interface

and graphic formats are available, and efforts are currently underway to expand the output range to include other public domain formats. SHA maps are created by interpolating a ten-day period ending on the selected date, using a self-adjusting Gaussian filter that scales to best represent the main features on the selected area. The zonal and meridional components of the geostrophic current (Figure 1) are estimated from the gradients of the sea height using the SHA fields and three different mean dynamic topographies: a) three-year 0.25º OCCAM run with ECMWF winds, b) four-year 0.25º OCCAM run with ECMWF winds and assimilated XBT data, and c) 1° Levitus topography relative to 1,000 meters.

We plan to incorporate the Ekman component to produce a better estimate of the surface current field using an operational database of winds from QuikSCAT, SSMI, and TMI also maintained at the CW Caribbean node and distributed by NOAA/NESDIS, and from drifters gathered through the Global Telecommunications System (GTS). The wind data are accessible at http://cwcaribbean.aoml.noaa.gov/java2/java.html. The proposed methodology to compute the Ekman component follows Lagerloef et al [1999] and performs multiple regression on dynamic height gradients and wind stress to fit the observed surface drifter velocities.

In cooperation with the Global Ocean Observing System (GOOS) Center at AOML, historical and near-real-time field data including XBTs, ARGO floats, and drifters are available to external users at http://www.aoml.noaa.gov/phod/trinanes/xbt.html. The drifter dataset is used to compare the velocity estimates from altimeter and scatterometer data, with drifter velocities computed using a kriging interpolation method [Hansen and Poulain, 1996]. Presently, the altimeter interface allows users to overlay drifter paths on SHA or geostrophic maps (Figure 3) to easily check the agreement between both estimates, which will be improved once the Ekman component is added. Users can also view the areas with the highest geostrophic velocities (Figure 4).

We plan to extend the system's capabilities by completing the altimeter archive with historical data. In addition, users will be able to generate and download animations showing the SHA or current field evolution between any two dates. Other improvements will include track analysis, space-time diagrams, and sea height RMS variability.

References

Hansen, D.V., P.M. Poulain, 1996: Quality control and interpolation of WOCE/TOGA drifter data, *J. Atmos. Oceanic Tech.*, **13**, 900-909.

Lagerloef, G.S.E.; G.T. Mitchum, R.B. Lukas, P.P. Niiler, 1999: Tropical Pacific near-surface currents estimated from altimeter, wind, and drifter data, *J. Geophys. Res.*, **104**, 23313-23326.