Investigation of the Tropical Atlantic Variability during 1993-2010

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The variability of the upper tropical Atlantic circulation between 10°S-15°N along the nominal meridian of 26°W is studied on seasonal to interannual timescales using the following main data sets: a) XBT observations from the AX08 high density XBT transect; b) sea height anomaly fields from satellite altimetry; and c) CCMP wind stress fields. The meridional AX08 transect has been occupied four times a year since 2002. It collects temperature in the upper 800 m between North America and South Africa. Seasonal variability of the equatorial currents is studied using estimated geostrophic transport from 0-800 m XBT-based surface ($\sigma_0 < 24.5$) and subsurface ($24.5 < \sigma_0 < 26.8$) currents. In addition, satellite altimetry is used to estimate surface and subsurface currents using statistical methods that link the variability of the surface height to the dynamic height at different depths in the water column. Results obtained using this methodology allows extending the analysis back to 1993, the year when satellite observations started. This longer time series based on the satellite / XBT estimates serve to investigate the year-to-year variability. This work will present a time series of variability of geostrophic transport and location for the NECC and NEUC system and link their changes to wind stress. Results confirm that the NECC follows an annual cycle, is weaker during March-April, is closely related to the meridional displacement of the ITCZ, and its highest values of transport are approximately 12 Sv. The NEUC present variability in both annual and semi-annual scales, and a transport of 5.2 ± 3 Sv. Subject to many caveats, results obtained here emphasize the need for sustained altimetry and XBT observations for a long-term monitoring system of the region.

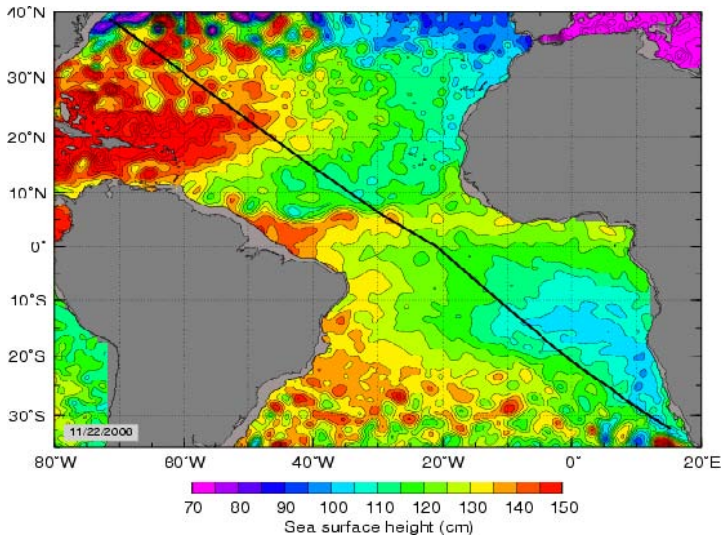

Figure: Contours: Sea Surface height (cm); Black line: Trajectory of the XBT AX08 transect for November 2006. (*http://www.aoml.noaa.gov/phod/hdenxbt/ax_home.php*).