



Variability of the Atlantic Equatorial Undercurrent – a SODA Perspective

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The Equatorial Undercurrent in the Atlantic represents a strong and sustained current connecting the western boundary current regions off northeastern Brazil with the upwelling zones along the equator and in the Gulf of Guinea. Fluctuations of the EUC are generally believed to have an impact on climate variability on both sides of the Atlantic.

The latest SODA (Simple Ocean Data Assimilation Version 2.1.2) model for the time period 1958 – 2007 is used to analyze the variability of the Equatorial Undercurrent in the Atlantic on fortnightly to decadal time scales. Particular emphasis is placed on the spatial structure of the annual signal along the equatorial channel, as well as the propagation of long-term signals in the flow field as they correlate with SST and wind stress anomalies.

On interannual to decadal time scales, the SODA model shows a significant west-to-east weakening of the EUC core velocities over the time period 1996 to 2005, accompanied by a 1000 km westward shift of the equatorial cold tongue and an increase in the westward component of the zonal wind stress. The implications of these features for the near-equatorial circulation are investigated.

The model output is also compared to recent shipboard and moored measurements within the EUC obtained by IFM-GEOMAR as part of the German “Nordatlantik” project and related prior programs. Strengths and weaknesses of the SODA assimilation model for this particular application are discussed.