2012 Project Summary

Assessing the Sensitivity of Northward Heat Transport/Atlantic Meridional Overturning Circulation to Forcing in Existing Numerical Model Simulations

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The main objectives of this proposal are to investigate the similarities and differences in the AMOC-related processes between observations and model simulations, and to diagnose the potential causes underlying the observed differences in the role of Ekman and geostrophic transports, as well as the overturning and horizontal transports to the AMOC and the net northward heat transport in the North and South Atlantic on seasonal to longer time scales.

*Recent Results*

(1) Examination of an eddy-resolving model outputs (Dong et al. 2011) suggested that ocean interior region contributes significantly to long-term changes in the strength of the AMOC at 34°S, and the inter-ocean exchanges are important to explain the long-term changes in the northward heat transport.

(2) Dong et al. (2011) examined the MOC and MHT from GFDL CM2.1 and GFDL coupled data assimilation (CDA) models at 34°S in the South Atlantic to evaluate the model performance after assimilating Argo data. The results show that the boundary currents are too weak and interior overturning flow is relatively strong in both the GFDL CM2.1 and GFDL CDA before assimilating Argo data. However, after 2002 when Argo data started being assimilated, the performance of GFDL CDA in simulating the MOC processes was greatly improved: the boundary currents were twice as much as those prior to 2003, and the interior overturning flow is reduced by 20% due to a better representation of salinity field.

*Bibliography*

