Geophysical Research Abstracts
Vol. 14, EGU2012-2408-3, 2012
EGU General Assembly 2012

Atlantic Meridional Overturning Circulation and freshwater budget: a simple model to investigate their connection.

A. A. Cimatoribus (1), S. S. Drijfhout (1), and H. A. Dijkstra (2)
(1) KNMI, De Bilt, Netherlands (cimatori@knmi.nl), (2) IMAU, Utrecht University, Utrecht, Netherlands

The driving mechanism of the Atlantic Meridional Overturning Circulation (AMOC) is a highly debated subject. Recent results from numerical models point out to the importance of the remote forcing by winds as well as stratification, in particular in the South Atlantic. Furthermore, there is growing evidence that the freshwater budget of the Atlantic Ocean plays an important role in determining the stability of the circulation.

A box model is developed, extending the Gnanadesikan pycnocline model, that allows the study of different regimes of the AMOC driven by the joint effect of winds over the Southern Ocean and the north–south density difference. The phase space of the model is explored, focusing in particular on the importance of the different components of the freshwater budget of the Atlantic Ocean. The behaviour of the AMOC in higher complexity numerical models is reproduced, and it is tracked down to the simple mechanism of salt– advection feedback at the basin scale, with the density driven component of the AMOC playing a dominant role.