Geophysical Research Abstracts, Vol. 9, 01632, 2007
SRef-ID: 1607-7962/gra/EGU2007-A-01632

Decrease in the Atlantic overturning does not significantly impact oceanic CO_2 uptake over century timescales

D. Swingedouw, L. Bopp, A. Matras
Laboratoire des Sciences du Climat et de l'Environnement, Gif-sur-Yvette, France

Recent modeling studies have shown that anthropogenic climate change will have a negative effect on the CO_2 uptake by the ocean. It has been suggested that the projected weakening of the Atlantic Meridional Overturning Circulation (AMOC) would contribute to this effect. In this study, we propose to evaluate the impact of land-ice melting and associated AMOC weakening on carbon uptake using state-of-the art coupled climate and biogeochemistry models. We compare two scenarios with different freshwater forcing and AMOC. By isolating the different effect of salinity, temperature and sea-ice cover, we find that opposing processes tend to limit the effect of AMOC weakening on carbon uptake. Salinity, temperature and sea-ice cover changes due to land-ice melting and AMOC changes tend to increase CO_2 uptake and oppose the AMOC weakening effect on circulation and biology that decrease the CO_2 uptake. In this model, on a century time scale changes in the AMOC due to land-ice melting have a moderate influence on the CO_2 uptake.