Geophysical Research Abstracts, Vol. 8, 07388, 2006
SRef-ID: 1607-7962/gra/EGU06-A-07388

Exploring the physical causes for inter-model differences in predictions of THC-related climate change

R. Tailleux (1) and J. Gregory (1,2)

(1) Dept. of Meteorology, University of Reading (R.G.J.Tailleux@reading.ac.uk), (2) UK Met. Office, Exeter

Most current coupled ocean/atmosphere climate models simulate a decrease in the oceanic thermohaline circulation in response to anthropogenic global warming. As a result, the models usually simulate a reduction in the northward meridional heat transport in the Atlantic ocean, somewhat mitigating the effects of global warming in the northern hemisphere, while exacerbating them in the southern hemisphere. Large uncertainties remain, however, because the predicted changes can vary greatly from one model to the other, with the possible responses ranging from near stability to an almost complete shutdown of the thermohaline circulation.

To understand the physical causes for these inter-model differences, an intercomparison of a coordinated sets of experiments has been undertaken both as an international experiment supplementing the Coupled Model Intercomparison Project and by the UK RAPID programme. In total, about 20 coupled models, comprising both full AOGCMs and EMICs (Earth Model of Intermediate Complexity), are intercompared. The experiments are a CO2 increase experiment and a water-hosing experiment in which freshwater is released at high-latitudes. The first experiment is intended to explore future THC-related climate change with an idealised scenario of increasing anthropogenic GHG emissions, whereas the second one focuses on the effect of freshwater forcing in a sensitive region, and seeks to determine whether the models might possess bistable THC regimes by trying to push them accross their hypothesised stability threshold. This talk will describe the understanding achieved so far.