Geophysical Research Abstracts,
Vol. 10, EGU2008-A-01392, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-01392
EGU General Assembly 2008

The effect of a northward shift in the Southern Hemisphere westerlies on the global ocean

W. P. Sijp (1), M. H. England (2)
The University of New South Wales, Sydney 2052, Australia (+61 (0)2 9385 7071

We examine the effect of the position of the southern hemisphere subpolar westerly winds (SWWs) on the thermohaline circulation (THC) of the World Ocean. The latitudes of zero wind stress curl position exerts a strong control on the distribution of overturning between basins in the Northern Hemisphere. A southward wind shift results in a stronger Atlantic THC and enhanced strat- iﬁcation in the North Paciﬁc, whereas a northward wind shift leads to a signif- icantly reduced Atlantic THC and the development of vigorous sinking (up to 1500m depth) in the North Paciﬁc. In other words, the Atlantic dominance of the meridional overturning circulation depends on the position of the zero wind stress curl over the Southern Ocean in our experiments. This position has a direct inﬂuence on the surface salinity contrast between the Paciﬁc and the At- lantic, which is then further ampliﬁed by changes in the distribution of Northern Hemisphere sinking between these basins. Our results show that the northward location of the SWW stress maximum inferred for the last glacial period may have contributed to signiﬁcantly reduced NADW formation during this period, and perhaps an enhanced and deeper North Paciﬁc THC. Also, a more poleward location of the SWW stress maximum in the current warming climate may entail stronger salinity stratiﬁcation of the North Paciﬁc.