Geophysical Research Abstracts,
Vol. 10, EGU2008-A-01139, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-01139
EGU General Assembly 2008

The changes in Southern Ocean stratification projected for the 21st century

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The projected changes in the Southern Ocean stratification are studied in the set of simulations performed with atmosphere-ocean general circulation models (AOGCMs) for the Fourth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC AR4). The upper ocean stratification is defined here as the density difference between the surface layer and the layer at 300m depth. Generally, the upper ocean stratification is projected to increase, in agreement with previous investigations. South of 55°S, the changes in the hydrology cycle seems to be predominant, while further north the temperature changes are more important. However, due to the large spread between the models, it is impossible to make a quantitative projection of the magnitude of the stratification changes. Finally, it can be seen that the stratification change is larger in models which possess already a large stratification in the 20th century, increasing the contrast between the models.