Clim. Past Discuss., 6, C735–C736, 2010
www.clim-past-discuss.net/6/C735/2010/

Climate of the Past Discussions

Interactive comment on "Variations of the Atlantic meridional overturning circulation in control and transient simulations of the last millennium" *by* D. Hofer et al.

Anonymous Referee #1

Received and published: 10 September 2010

The manuscript presents interesting modeling results of the AMOC variability in control and transient experiments for some periods during the last millennium. AMOC variability is found to be stronger in the transient experiments. The manuscript also shows the impact of AMOC variability on the North Atlantic ocean circulation and the associated atmospheric response, especially the Scandinavian SAT response. The manuscript contributed to the literature of simulated climate variations of the last millennium with a novel focus on AMOC variations. The results would be to attractive to the communities studying both the climate of the last millennium and the modern climate. I recommend the manuscript be accepted for publication in the journal "Climate of the Past" after minor revisions to issues outlined in the following specific comments.

1, The model employed in this work is the low resolution configuration of CCSM3. The manuscript should discuss the model biases in the 1990AD control simulation, especially in the North Atlantic ocean circulation, and how these model biases would affect the results of AMOC variability, the mechanism, and the climate impact. For example, does the 1990AD control simulation has a realistic spatial distribution of mixed layer depth in the North Atlantic? Does simulated deep convection in the Labrador Sea and Nordic Sea realistic compared to modern observations?

2, How do the mechanism of the AMOC variability in this study compared to previous proposed mechanisms of AMOC variability?

3, The manuscript should discuss some comparison of the simulated AMOC variations during the last millennium with available paleo reconstructions of AMOC variations over the same period.

4, As discussed in the end of the manuscript, millennial oscillations of the AMOC may be responsible for the Medieval warm period and the little ice age. How do the modeling results fit in with this scenario?

Interactive comment on Clim. Past Discuss., 6, 1267, 2010.