

Interactive comment on “Simulated pre-industrial climate in Bergen Climate Model (version 2): model description and large-scale circulation features” by O. H. Otterå et al.

Anonymous Referee #1

Received and published: 10 July 2009

Review of Paper: “Simulated pre-industrial climate in Bergen Climate Model (version 2): model description and large-scale circulation features” by Ottera, Bentsen, Bethke, and Kvamsto

General comments: This paper introduces newly updated version of Bergen Climate Model and describes the general performance of a pre-industrial simulation. Overall the paper reports the simulation well by assessing essential metrics that are necessary to check the climate models. This fits to the aim of the journal Geoscientific Model Development (GMD) and may be published after considering the comments below.

Major comments:

C107

- Discussion on the cause of warm bias over the Southern Ocean needs to be detailed and may be corrected. Authors argued that this was due to less sea ice in the Southern Hemisphere. In general sea ice distribution is rather passive and affected by the ocean and atmosphere circulations in advance and provides feedback accordingly. It will be helpful for the climate model development communities to provide the cause of Southern Ocean warm bias instead of criticizing poor sea ice distribution.

Minor comments:

- P511 line 4: Detailed description on the turbulence scheme in the atmosphere will be useful for the readers. If there is a reference, this can be referenced.

- P514 line 4: Version of OASIS can be specified, e.g. OASIS2 or OASIS3?

- P514 line 9: Variables that are exchanged between ocean-coupler-atmosphere need to be described (listed) in detail.

- P514 line 13: Benefit of the initialization technique comparing to the run without this initialization will be informative.

- P515 line 5: Solar constant 1370W/m² is higher than that is observed or accepted (1365 or so), and use of 1370 need to be justified. Even though this may not change the variability of the system, use of physically accepted values are better.

- P516 line 20: TOA radiation 2W/m² can be subtracted during the climate change analysis, but this value is still high and need to be reduced for further development. Maybe use of solar constant 1365 (i.e. return to value of the previous version) will be helpful (c.f. P518 line 9).

- P520 line 9: Presenting spectra of MOC strength will be informative

- P520 line 23: As mentioned in major comments, “caused by negative sea-ice biases” should be checked and described differently if it is not. Sea-ice bias may a result of circulation bias.

C108

- P524 line 4: Adding simple statistics such as skewness, kurtosis of Nino3 index will be informative for comparison to other models.
- P524 line 5: In addition to T2m regression on the Nino3, showing SLP or wind regression will verify the good atmospheric response. The new figures can be added in Figure 13.
- Figure 8: Showing same figures of SH will be a good reference for the future development. Overlapping surface current over the ice thickness is also informative to check Gyre circulation for both Hemispheres.

Technical corrections:

- Figure 7: overlapping contour lines will help to read scale of SST and SSS biases.

Interactive comment on Geosci. Model Dev. Discuss., 2, 507, 2009.