



Interactive comment on “Influence of parallel computational uncertainty on simulations of the Coupled General Climate Model” by Z. Song et al.

Anonymous Referee #2

Received and published: 20 January 2012

This paper addresses an interesting question on how the MPI may induce the uncertainty in the climate simulations. This issue could be potentially very important for climate studies. I find the results are useful but the analysis needs to be improved. I would recommend it for publication after addressing following issues. General comments: 1. Experimental design: is there any scientific basis for the experimental design? For me, the CPU numbers seem to be too small. People are using much more CPUs in the real simulations. I am curious about the dependence of uncertainties on the total number of CPUs, and if the conclusions are the same with more CPUs, e.g. 24, compared to the small 2-12 CPUs in this study. Also, nowadays very few people run GCMs without using MPI. A discussion on MPI and OpenMP would be more useful. 2. The authors draw their main conclusions based on one model, one set of CPU configurations and two spatially averaged variables. The conclusions do not necessarily represent other

C1418

GCMs and variables. 3. Generally, the analysis of all the figures needs to be improved, with more detailed and more quantitative descriptions. Specific comments: 1. Page 3296, Line 7-9: Is this 15 universal? Be precise especially in the abstract. 2. Page 3296, Line 26 – page 3297, Line 7: This paragraph is kind of unnecessary. It could be removed or merged the first paragraph. 3. Section 3.1, Page 3300, Line 12 – 20. How different are these 16 cases, quantitatively or statistically? The authors showed the figure and mentioned that the difference is due to parallel computational uncertainty, but we really need some quantitative measure to figure out how big the difference is. 4. Page 3301, Line 9 – 13: Same as comment 1, the ensemble number threshold of 15 is only for the two variables chosen in this study, i.e., the SSTs averaged over the large area (global, and Nino). Other physical parameters should have much higher uncertainties, I guess. Nonetheless, the authors cannot claim “. . . the ensemble mean number of 15 is enough . . .” 5. Figure 4: The spectra for Nino-SST cases are certainly much more disperse than the global case. Why same conclusion? More detailed discussions are needed. 6. Section 3.3: Same issue as mentioned earlier, the authors only looked at two SSTs. This may not apply for the climatological mean of other variables.

Interactive comment on Geosci. Model Dev. Discuss., 4, 3295, 2011.