



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

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This paper addresses the interesting question of the climate model uncertainty due to the round off and presents a methodology for estimating how many realizations of a climate model are necessary. It's very common to change CPU configuration or computational platform during a long-term model run in climate research. But some results could be quite different! And this uncertainty is a common problem for every climate model. The author suggests that the ensemble mean method could reduce the uncertainty and the minimum member number is 15 and minimum averaged years is 30 (the time-average can consider as the another meaning of the ensemble mean). In general, I consider the results reported here to be helpful to our understanding and use of the climate models, especially in model evaluation. And the paper is clear and concise yet

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complete. I would like to recommend this paper could be accepted for publication in GMD after some minor revision. I have some comments and suggestions below which might improve the paper. 1) Figure 3 shows that the deviation from the mean is reduced when the number of ensemble members increases, until at  $N=54$ , then the difference is zero. As you definition of the deviation, which is defined as difference from the 54-member average, of course it becomes zero. If you use different  $N$ , such as 30, 40, or even more, the conclusions of the ensemble size are also the same? 2) Does the ensemble size required depend on the variable, spatial average, location etc., all of which determine the standard deviation associated with the variable one in interested in? In other words, is the number 15 or 30yr a universal answer? I suggest and encourage the authors do deeper research for these issues in the future. 3) Page 3298, line17, “Community Atmospheric Model (CAM3)” should be “Community Atmospheric Model Version 3”. 4) Page 3298, line17, “the Parallel Ocean Program (POP 1.4.3)” should be “the Parallel Ocean Program Version 1.4.3 (POP 1.4.3)”. 5) Page 3298, line 25, “CLM”, “CSIM” and “POP” are suggested revised to “CLM3”, “CSIM5” and “POP1.4.3” to consist to atmosphere model name CAM3. 6) Page 3299, line 5, “The Land model” should be called “The Surface Land Model”.

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