Related articles

Volume 5, issue 2 | Copyright

Development and technical paper | 13 Mar 2012

Influence of parallel computational uncertainty on simulations of the Coupled General Climate Model

Z. Song et al.

Received: 01 Oct 2011 – Discussion started: 28 Nov 2011 – Revised: 29 Jan 2012 – Accepted: 08 Feb 2012 – Published: 13 Mar 2012

Abstract. This paper investigates the impact of the parallel computational uncertainty due to the round-off error on climate simulations using the Community Climate System Model Version 3 (CCSM3). A series of sensitivity experiments have been conducted and the analyses are focused on the Global and Nino3.4 average sea surface temperatures (SST). For the monthly time series, it is shown that the amplitude of the deviation induced by the parallel computational uncertainty is the same order as that of the climate system change. However, the ensemble mean method can reduce the influence and the ensemble member number of 15 is enough to ignore the uncertainty. For climatology, the influence can be ignored when the climatological mean is calculated by using more than 30-yr simulations. It is also found that the parallel computational uncertainty has no distinguishable effect on power spectrum analysis of climate variability such as ENSO. Finally, it is suggested that the influence of the parallel computational uncertainty on Coupled General Climate Models (CGCMs) can be a quality standard or a metric for developing CGCMs.

How to cite: Song, Z., Qiao, F., Lei, X., and Wang, C.: Influence of parallel computational uncertainty on simulations of the Coupled General Climate Model, Geosci. Model Dev., 5, 313-319, https://doi.org/10.5194/gmd-5-313-2012, 2012.