

## ***Interactive comment on “Description and basic evaluation of BNU-ESM version 1” by D. Ji et al.***

**Anonymous Referee #1**

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Review of the manuscript entitled “Description and basic evaluation of BNU-ESM version 1” by D. Ji et al.

In this manuscript the authors document the Beijing Normal University Earth System Model and its climate simulation performance. The model consists of components adopted from various modeling centers in the world, with a number of modifications. The simulations of the climate mean and temporal variability from intraseasonal, annual, interannual to decadal scales demonstrate that the model performs reasonably well. The major problems that exist in other models also appear in this model, including double ITCZ, weak MJO and warm SST biases in the eastern part of the oceans. Putting together a comprehensive model, even with existing model components, is a tremendous effort. The BNU-ESM is a participant of the CMIP5 project, and its simulations have been examined in a number of studies as referenced in the manuscript. Thus, it is very useful for the global modeling and climate change communities to have

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a thoroughly documented reference in the literature. This study is timely for this purpose, and is suitable for publication in GMD. The paper is well organized and well written. I suggest publication with minor revision.

Minor comments:

1. I suggest using the full name of the model in the title, i.e., change “BNU-ESM” to “Beijing Normal University Earth System Model”.
2. I suggest adding the climatological mean fields from observations in Figs. 3 and 4. This will give a better sense of the model simulation performance.
3. The simulations of basic fields such as temperature, specific humidity, circulation and clouds are an important metric for GCMs. I suggest that the authors add a subsection 4.2, which describes the zonal mean  $T$ ,  $q$ , zonal wind from reanalysis and deviations from that of the model simulation (height-latitude cross section), and global distribution of cloud fraction compared with some observational products.
4. P. 3, L2. Change "much cooperation" to "collaboration".
5. P. 4, L3. Add "Zhang, 2002;" after "Zhang and McFarlane, 1995;"
6. P. 4, L21-22. Add "Data for" before "all" and change "published" to "stored".
7. P. 7, L9. Replace the reference "Zhang and McFarlane, 1995" by "Zhang, 2002". Zhang (2002, JGR) first modified the Zhang-McFarlane scheme.
8. P. 8, L22. Add “,” after “that is”. L24, change “a little” to “slightly”.
9. P. 11, L2. Add “is” after “there”.
10. P. 13, L15. Change “coast” to “coastal”.
11. P. 13, L19. Add “Oceans” after “Pacific”.
12. P. 16, L20. Change “averaged” to “average”. L21, delete “anomalously”.

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13. P. 17, L10. Delete “to” after “reach”.

14. P. 19, L1. Change “demonstrated in the simulation;” to “simulated,”

15. P19, L14-16. “While...40 days.” This is not a complete sentence. One way to change it is to combine it with the preceding sentence: As with BNU-ESM...(Kim et al. 2009), while ...

16. P 19, L17. Suggest changing the sentence to “...climate model to simulate realistic MJO depends not only on its convective parameterization, but also on interactions between...” It’s incorrect to say it does not depend on convective parameterization because it DOES.

17. P. 21, L10. Add “that” between “with” and “from”.

18. P 25, L22. A model is not a diagnostic tool. You can change “diagnostic” to “modeling”.

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Interactive comment on Geosci. Model Dev. Discuss., 7, 1601, 2014.

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7, C186–C188, 2014

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