Geosci. Model Dev. Discuss.,
https://doi.org/10.5194/gmd-2018-197-RC2, 2018

Geoscientific Model Development Discussions
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Interactive comment on "The Indian Summer Monsoon in MetUM-GOML2.0: Effects of air-sea coupling and resolution" *by* Simon C. Peatman and Nicholas P. Klingaman

Anonymous Referee #2

Received and published: 17 September 2018

Review of "The Indian Summer Monsoon in MetUM-GOML2.0: Effects of air-sea coupling and resolution" by Peatman and Klingaman

The main focus of this manuscript is the effect of air-sea coupling and horizontal resolution on the seasonal mean and intraseasonal variability of the Indian Summer monsoon in the UK Met Office model. The manuscript is written well and its figures are clear and well made. The methods seem thorough and detailed. The conclusions drawn concerning the effects of resolution are supported by the figures.

However, the evidence does not support one of their main conclusions (stated in the abstract) that "coupling slightly improves the simulation of northward BSISO propaga-

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tion over the Indian Ocean, Bay of Bengal and India". For example, there is very little difference between Figure 6b, which shows the intraseasonal poleward propagation of Indian Ocean convection in the coupled model, and 6f which shows the same quantity in the model with a prescribed seasonal cycle of SST. Table 2 even shows that this poleward propagation pattern is more highly correlated with observations in the uncoupled model than in the coupled model. So overall, the most accurate conclusion would be that coupling has a very small effect on the intraseasonal mode, and if anything coupling slightly degrades it. This is opposite to the conclusion stated in the abstract. The discussion in the text is more accurate, where the authors state (p 8) that "aspects of the propagation may be degraded by coupling" and that their results are "contrary to Klingaman et al. (2008), who found that HadAM3 produced almost no propagation with monthly mean SST but strong propagation with daily mean SST forcing."

I was a reviewer on a previous version of this paper that was submitted to another journal. Overall, many of my concerns about the prior version have been addressed here. One of my concerns was that a model that produces less than 30% of the observed rainfall over India may be a poor tool for drawing conclusions about the Indian monsoon. However, the new Figure 10 shows that the simulated intraseasonal variability of rainfall over the Indian Ocean and West Pacific are realistic, with the dry bias over India producing only a minor change in that predominantly oceanic pattern. So this model seem an appropriate tool for studying intraseasonal variability over the Indian Ocean. Also, I had wanted the authors to include more discussion of previous work that studied the effect of air-sea coupling on the Indian monsoon mean state and intraseasonal variability, and the authors have done this. The authors have also overhauled the diagnostics that they use to assess the time-decay of intraseasonal convection anomalies (Figures 12 and 15), with the modified figures and discussion being a substantial improvement.

In summary, my only substantial recommendation is that one of the conclusions stated in the abstract be rephrased so that they more accurately reflect the evidence and

discussion provided in the text. Even though this a change that is very easy to make in little time, I have categorized it as "major" simply because it concerns one of the two main findings of the manuscript.

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