

Interactive comment on “Sensitivities of the MJO Forecasts on Configurations of Physics in the ECMWF Global Model” by Jun-Ichi Yano and Nils P. Wedi

Anonymous Referee #2

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By using the ECMWF IFS Cy43r3, this study investigates the sensitivity of MJO prediction to various configurations of physics in the model, with an assumption that the MJO is a free nonlinear Rossby wave. Sensitivity tests include turning off the momentum dissipation and diabatic heating. Authors conclude that the reduction of momentum dissipation improves the MJO prediction but leads to a weaker MJO overall. My overall impression is that, there may be many interesting results, especially that can help the world-best MJO forecast model to be even better. Therefore, I agree with the authors that (from the reply to the reviewer's comment) this is a significant study. However, as the other reviewer pointed out already, it is very hard to follow their argument, and I think this is mainly because of the presentation of the results (low-quality figures) and too

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complicated results due to various sensitivity tests performed. I don't think the readers will get to the key point of this study with the present form. Here are some suggestions to improve the manuscript. By doing that, the results would be more convincing and easier to review.

1) Presentation of Figures: There are many aspects of atmospheric convection and circulation discussed with showing only the hovmuller plot, which averaged out many detailed structures of what the author wants to explain. For example, I am not sure how I can see the “anticyclonic vortex pair symmetric to the equator” (Line 132) with the 15S-15N averaged plots. So, additional figures besides Hovmuller will help.

2) Hovmuller plots can be further improved this way: i) only show one shading bar on the bottom of each figure if they present the same interval. ii) shorten the title of each figure (for example, “Hovmuller of stream function 150 hPa (20.0N-0.00N)” doesn't need to be repeated in each figure. Or just simply say “SF150: Analysis”, “SF150: CF” or something like this. iii) There are also some typos in figures: For example, two ‘(b)’ in Figure 3 which detracts me from reading. iv) In all Hovmuller plots, there is a white shading but does not present in the color bar. What is it?

3) Results: I'd suggest to only pick several sensitivity experiments, focus on them, and discuss them thoroughly with strongly connecting the results with the existing theories.

4) MJO event selection: The selection of this specific event needs to be better justified. I don't understand why ‘a low-skill event’ is selected. Also, as the other reviewer pointed out, comparing a standard index (RMM index) would be useful.

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