

## Overall opinion

This study tries to answer the scientific questions related to 1) the possibility of interpreting the MJO as a free nonlinear Rossby wave through turning off the diffusion terms and 2) the high latitudinal impact on the MJO initiation process. In the revised manuscript, I think the scientific questions become clearer, and the explanations become more detailed. However, the main results are not sufficient to support two scientific questions (L55-58). The results for the first question and its related explanations are not well summarized. It is still hard to figure out the main points. The results for the second question are not enough to argue the role of extratropical forcing. More specific comments are written below.

## Major comments

1. L143-147 “From a dynamical point of view, this is before the anticyclonic activity begins to develop over the Indian Ocean (Fig. 1(d)). Thus the key forecast question is whether the model can predict the onset of this activity”. It isn’t clear. The sentence is not logically connected with the first two sentences in L143-145.

2. L279-281: I cannot figure out the author’s point in this sentence “the emission of the Rossby wave energy from west during 22-28 January is suggested as a major source for initiating the anticyclonic signal associated with the MJO by the time-longitude plots (Fig. 6(a) for Ma)”. Do the authors think that Ma’s better simulation is from the Rossby wave energy? I could not find any evidence about the anticyclonic signal is the major source.

3. L316-317: In 3.3.1-3.3.2, the authors show that the dissipation terms and convective frictions affect the MJO simulation. However, does the sentence in L316-317 mean the results are dependent on the integration time?

4. L297: Based on the results from Mbc and Mbs, how did the authors get those interpretations? Please discuss more in detail.

5. L337-343: The authors argue that the pattern correlation is recovered by the westward propagating Rossby wave. In my opinion, “recovery” is not right expression. The expression exaggerates the results, and the high pattern correlation is a coincidence. I think this result cannot support the impact of the Rossby waves on the MJO simulation. Please carefully discuss it.

6. Second scientific question and Figure 9: I’m suspicious that the Rossby-wave train is really important in this event. If the Rossby-wave train is important, please show the longitude-latitude plot with time integration. The Rossby-wave train does not directly propagate into the lower latitude with no change in longitudinal location. In this regard, I think Figure 9 is not sufficient to examine the role of the Rossby-wave train. It is also hard to figure out why the results in NQ, QF, and Ma experiments are needed to test the extratropical Rossby wave train.

## Minor comments

1. L5: “but hardly in any additive manner”: What’s meaning?

2. L32: I would recommend to add a short explanation about “free-Rossby wave dynamics

in MJO”

3. L73 & L197: summarised -> summarized
4. L75 & L184: emphasised -> emphasized
5. Y axis in Figs. 1, 4, and 5 are not consistent. Please revise it.
6. L266: To clarify the information, please remove the sentence. “This subsection discusses this overall aspect. The next subsection focuses more specifically on convective friction.”
7. Page 26: Figure.5 => Figure.6