Dear Editors of GMD and dear Reviewers:

Thank you for the positive feedback and for thoroughly reading the manuscript with constructive comments. Appropriated changes, suggested by the Reviewer #2, has been introduced to the manuscript. The following is a point-by-point response to the reviewer's concerns, whereas our corresponding revisions in the manuscript (version R1) are identified by colored text. Specifically, red text indicates changes made in response to the suggestions from Reviewer #1, blue text demonstrates changes made according to Reviewer #2, and green text shows changes made to better clarify model descriptions in a clear, concise, and well-structured way. Moreover, we revised the manuscript carefully to ensure that it is grammatically and typographically error-free and hopefully meets the high quality standards of GMD.

Sincerely,
Yung-Yao Lan, Huang-Hsiung Hsu, Wan-Ling Tseng, and Li-Chiang Jiang

Anonymous Referee #2

The reviewer comments are formatted in italics and the authors response to the comments are formatted in bold.

Notation *RC2.P#* represents Reviewers Comment. Paragraph Number

> *RC2.P1 When describing model results, I would suggest to use "present tense" instead of "past tense" throughout the paper.*

Response:

Thanks for your kind reminders. In the revised manuscript, we describe the model results in the present tense.

> *RC2.P2 Line 37: move "in the year 2011" after "Dynamics of the MJO"?*

Response:

The modifications are part of "an overview of findings from a multi-nation

field campaign called Dynamics of MJO/Cooperative Indian Ocean Experiment on Intraseasonal Variability in the Year 2011 (DYNAMO/CINDY2011)" in the revised manuscript. Please see Page 3, lines 36-39.

RC2.P3 Line 68: may delete "and climate models"

Response:

The revised manuscript removes the wordiness from this sentence. Please see Page 4, line 71.

RC2.P4 Line 109: may change to "regarding the effect of air-sea coupling on the MJO"?

Response:

To make reading easier, we corrected this statement as reviewer's suggestion. Please see Page 6, lines 112-113.

RC2.P5 Line 273-274: Are U850 anomalies not averaged over 10N-10S, instead of just on the equator?

Response:

This was indeed an unclear statement in the original manuscript. These modifications are described as follows: "Figure 2d–f show the time evolution of precipitation and U850 anomalies in Hovmöller diagrams, which represent lagged correlation coefficients between the precipitation averaged over 10°S–5°N, 75–100°E and the precipitation and U850 averaged over 10°N–10°S on intraseasonal timescales". Please see Page 11, lines 251-255.

RC2.P6 In general, figure quality can be improved (many look blur with detals difficult to identify), and some figures can be a bit enlarged.

Response:

Thank you for the suggestions. Figure quality has been improved and size has been enlarged.

RC2.P7 Line 305: the "observed" MJO characteristics

Response:

In response to the suggestion by another reviewer that ERA-Interim reanalysis and NOAA post-processed satellite data (ERA-I/NOAA) should not be referred to as "observation", we have modified the description to "In summary, C–30NS produce coherent and energetic patterns in the eastward-propagating intraseasonal fluctuations of U850 and OLR in the tropical IO and WP that are generally consistent with the MJO characteristics derived from ERA-I and NOAA OLR". Please see Page 12, lines 283-288.

RC2.P8 Line 467: in the first few meters "below the surface" allows ….?

Response:

Thank you for the suggestion. It has been modified to "This result confirms the finding reported by Tseng et al. (2014) that a higher vertical resolution in the upper few meters below the sea surface allows for a faster air–sea interaction, thus resulting in a more realistic simulation of the MJO". Please see Page 19, lines 454-456.

RC2.P9 Line 556: I didn't see faster MJO propagation when the diurnal coupling is turned off based on Fig. 9b. If compared to Fig. 5a, seems to me the MJO propagation speed is even faster in the C-30NS run with diurnal coupling. This is also related to the following comments on Fig. 10. Generally, I don't see significant differences in MJO simulations between the no-diurnal coupling experiment and the control experiment.

Response:

Thank you for the comment. Fig. 9b should be compared with Fig. 2e instead of Fig. 5b. A comparison by eye inspection is not easy to see the difference. Propagation speeds estimated based on the Hovmöller diagrams of U850 and precipitation are shown in Fig. 10. For U850, the MJO with diurnal cycle (marked by target sign) is faster than the one with no diurnal cycle (marked by Star of David sign). The difference is more evident for U850. We agree that the difference is very small for precipitation. The statement is modified as above in revised manuscript. Please see Page 22, lines 547-550.

RC2.P10 Fig. 10: It would be better provide more details on how the U850 and P slopes are determined, e.g., based on which longitude bands. Also the colors for "C-30NS-nD" are not consistent between the figure and legend.

Response:

In the revised manuscript, we corrected the conflicting colors between the figures and the legend (Fig. RC2.1). Based on the maximum precipitation anomaly and zero values of U850 (indicating deep convection region), propagation speeds of U850 and precipitation are calculated from Hovmöller diagram on intraseasonal timescales between 60°E and 150°W. Please see Page 24, lines 585-588.

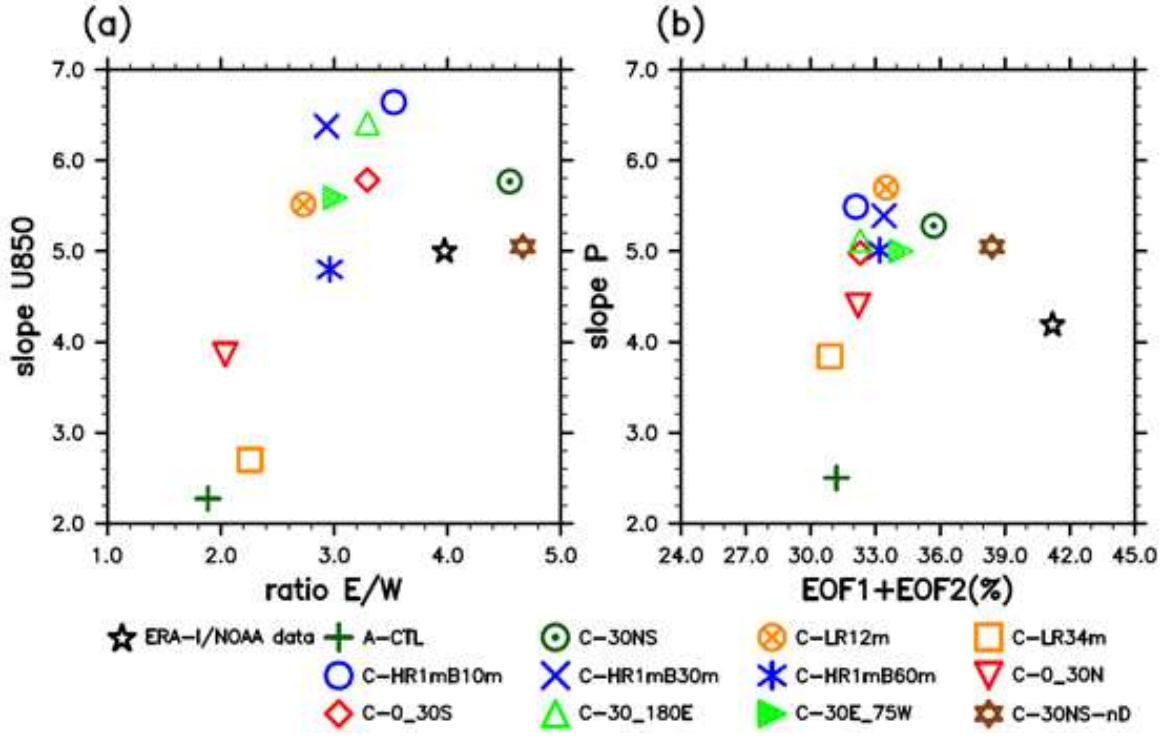

Fig. RC2.1 Scattered plots of various MJO indices in the ERA-I/NOAA data and 12 experiments: (a) power ratio of east/west propagating waves of wavenumber 1–3 of 850-hPa zonal winds (X-axis) with a 30–80-day period and eastward propagation speed of U850 anomaly (Y-axis) from the Hovmöller diagram and (b) RMM1 and RMM2 variance and eastward propagation speed of the filtered precipitation anomaly derived from the Hovmöller diagram.

References:

Tseng, W.-L., Tsuang, B.-J., Keenlyside, N. S., Hsu, H.-H. and Tu, C.-Y.: Resolving the upper-ocean warm layer improves the simulation of the Madden-Julian oscillation, Clim. Dynam., 44, 1487–1503, https://doi.org/10.1007/s00382-014-2315-1, 2014.