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Interactive comment on "Early Morning Peaksin the Diurnal Cycle of Precipitation over the Northern Coast of West Java and Possible Influencing Factors" *by* Erma Yulihastin et al.

Anonymous Referee #2

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Overview: The study combines 17 years of TRMM satellite and multi-sensor rainfall data, reanalysis datasets, and SST observations to investigate the climatology of diurnal rainfall patterns in the region of northwestern Java, the largest east–west-oriented island in the western Maritime Continent. While the focus region is highly localized, the Maritime Continent is an exceedingly complex region, thus warranting study of potentially unique dynamics in different sub-regions. Further, it is possible that the results extend to other regions in the Maritime Continent, to some measure, though further work would be necessary to determine this.

Recommendation: Accept after minor revisions. Overall, the study is clear and con-

cise, well-organized, and supported in its claims, with some minor exceptions as noted below.

Comments:

Background context and propagation mechanisms: A growing body of studies argue for the likely importance of gravity waves in governing diurnal offshore rainfall propagation, which often manifests at phase speeds faster than the nocturnal land breeze alone can explain, as first highlighted by Mapes et al. (2003). Two studies that argue for this mechanism in the Maritime Continent are Love et al. (2011) and Ruppert and Zhang (2019). It might be useful to note this mechanism since it is likely relevant to the findings.

Love, B. S., A. J. Matthews, and G. M. S. Lister, 2011: The diurnal cycle of precipitation over the Maritime Continent in a high-resolution atmospheric model. Q. J. R. Meteorol. Soc., 137, 934–947, doi:10.1002/qj.809.

Mapes, B. E., T. T. Warner, and M. Xu, 2003: Diurnal Patterns of Rainfall in Northwestern South America. Part III: Diurnal Gravity Waves and Nocturnal Convection Offshore. Mon. Weather Rev., 131, 830–844, doi:10.1175/1520-0493(2003)131<0830:DPORIN>2.0.CO;2.

Ruppert, J. H., and F. Zhang, 2019: Diurnal Forcing and Phase Locking of Gravity Waves in the Maritime Continent. J. Atmos. Sci., 76, 2815–2835, doi:10.1175/JAS-D-19-0061.1.

While propagation is clearly evident in some of the panels, text like the following may not be fully justified by the figures and results (P.6 L11–12): "It should also be clear that extreme precipitation events that occurred during late-night (Fig. 6a) and late-morning (Fig. 6c) time have *single origin* of either land-based or oceanic convection" (I placed asterisks for emphasis on what I think is dubious). Perhaps the authors would agree, that evidence of propagation does not necessarily mean that the offshore and inland

rainfall peaks would not exist without this propagation. Perhaps it is equally plausible that some mechanism(s) favor rainfall in both regions, independent of the propagation (especially when these peaks are quite separate, as in Fig. 6a)?

P. 6 L28: “land-ward shifting of precipitation” Again, Figs. 5 and 7a seem to suggest that the SCS-CT favors *offshore* rainfall. I do not understand why the emphasis is placed specifically on land-ward propagation, based on these figures alone.

Colors in Figs. 5 and 6 are saturated, making it difficult to interpret relative rainfall magnitudes.

Editorial comments:

P.4 L24: “-4.5 m-2” I think you mean m s-1?

P.5 L12–13: Just to clarify, does Fig. 13a,b show (N-days*17-years) samples, or have they been averaged by month? Please indicate in the text.

P.5 L22–23: Could this be due to sampling? I.e., EMP is greatest since it has been averaged over fewer samples than the other categories?

P.6 L36: Should be “In Figures 9b and 9c,. . .”

Fig. 1: Consider expanding the domain shown to provide a broader context for those less unfamiliar with this region.

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