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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Cloud Phase Characteristics Over Southeast Asia from A-Train Satellite Observations" *by* Yulan Hong and Larry Di Girolamo

Anonymous Referee #2

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General comment

This study examines characteristics of cloud phases in five, frequently occurring, overlapping configurations, over a wide area of southeast Asia. For this purpose, the authors use combined CloudSat-CALIPSO and MODIS data. The different cloud phases are examined in terms of their seasonality and relationship with meteorology, and frequency of occurrence. Their heterogeneity and spectral radiance characteristics are examined in combination with corresponding MODIS data. Associations with MJO and ENSO are also investigated.

The study is to a large extent comprehensive. The results are discussed adequately,

and the findings combine verification of previously known characteristics of specific cloud phases/types and their combinations, with new insights over their future usefulness in field campaigns and GCM evaluations. For these reasons, I recommend acceptance of this manuscript for publication in ACP. I include a list of minor comments and technical corrections for the authors to consider.

Comments

Page 5, lines 25-28: it would be useful to report how often these "multi-layer, same phase" vertical structures occur, and discuss possible consequences of this simplification.

Page 6, lines 24-25: I don't understand how MODIS detects less clear-sky cases than CC by missing some cloudy cases. Shouldn't it be the other way around?

Figure 5: this figure is hard to read. Please consider replacing with 2D plots.

Page 16, lines 26-27: how is the frequency of occurrence related to the average reflectance? Shouldn't they be thicker to have higher R?

Page 18, lines 25-27: it is hard to verify this statement based on Fig. 14d. For example, ice-above-liquid after 07/08 does not agree well.

Page 18, lines 29, 30: what is considered "abnormal" in the heterogeneity index variation?

Page 19, line 41: "where are relatively cold". Are you referring to the lower troposphere conditions? Please clarify.

Figure 6: what are the vertical dashed lines?

Figure 9: seasonality symbols are not clear. Please consider plotting differently or including a table.

Corrections

Page 2, line 14: “macrophyscial” should read “macrophysical”.

Page 2, lines 28-31: please consider rephrasing or breaking this long sentence.

Page 3, lines 8-9: do you mean “has not yet been examined”?

Page 9, line 1: “cloud” should read “could”.

Page 10, line 4: “summaries” should read “summarizes”.

Page 11, line 22: “CLIPASO” should read “CALIPSO”.

Page 13, line 3: please omit “that”.

Page 13, line 42: “spatial” should read “spatially”.

Page 14, line 2: “it” should read “its”.

Page 14, line 35: “reflected” should read “reflective”.

Page 14, lines 42-43: do you mean “refractive index”?

Page 15, line 16: please consider replacing “aware” with e.g. “note that”.

Page 16, line 25: “and thicker” should read “and they are thicker”.

Page 16, line 33: 0.546 should read 0.645.

Page 17, lines 18-20: please rephrase.

Page 17, line 22: please consider replacing “are with” with e.g. “display”.

Page 17, line 24: “connective” should read “convective”.

Page 19, lines 13-14: please rephrase.

Page 19, line 15: “well correlates” should read “correlates well”.

Page 20, line 18: “heterogenous” should read “heterogeneous”.

Page 21, line 5: please replace “attribute” with “contribute”.

Interactive comment on Atmos. Chem. Phys. Discuss., https://doi.org/10.5194/acp-2019-835, 2019.