

Interactive comment on “Incorporation of inline warm-rain diagnostics into the COSP2 satellite simulator for process-oriented model evaluation” by Takuro Michibata et al.

Anonymous Referee #2

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Review Michibata

Michibata et al. propose new inline warm rain diagnostics for a community satellite simulator project (COSP) to enable process-oriented model evaluation. The diagnostics are well described and motivated. The diagnostics are similar to those developed by Kay et al. (2018) for precipitation frequency, but include important process-inspired criteria beyond Kay et al. (2018) for warm rain. The implementation of these new diagnostics in MIROC6 reveals interesting results. I have only minor comments. I recommend publication.

Abstract. Can you more specifically describe the diagnostics beyond “two diagnostics

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for warm rain processes”? What are the new outputs in COSP?

Line 5-7, page 2. I recommend removing “apple-to-orange” and “apple-to-apple”. Instead - can you describe what makes the comparisons more credible when they are done with COSP?. For example, the reader should be aware that “definition aware” and “scale aware” comparisons are made possible by the use of satellite simulators and a sub-column generator respectively.

Line 12, page 2. “such as CMIP6” to “including CMIP6” or “e.g., CMIP6”. Much was done with CMIP5 as well. . .

Line 30-31, page 4. Please explain how the number of sub-columns (140) was selected. The rationale behind the selection of the number of sub-columns is important to describe, especially for those new to COSP.

Line 12-14, page 5. “The spatial resolution of the reference A-train data ...”. This sentence is incorrect. The A-train native spatial resolution is much higher than 1.5 degrees – For CloudSat it is ~1 km. While the statistics of both the models and the observations are compared at 1.5 degrees – this study has taken a lot more care to make “scale aware” comparison not at 1.5 degrees. Specifically, the climate model data were “down-scaled” to the A-train data native resolution using a sub-column generator in COSP. Please describe in detail so that the reader does not confuse the resolution of the grid at which the statistics are reported (1.5 degrees) and the resolution at which the comparisons are being made (≪≪≪ 1.5 degrees).

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