

Interactive comment on “The time-space exchangeability of satellite retrieved relations between cloud top temperature and particle effective radius” by I. M. Lensky and D. Rosenfeld

Anonymous Referee #1

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This manuscript looks at the assumption of ergodicity for $T-r_e$ relationships in convective clouds based on high temporal resolution METEOSAT data. The paper is relevant to ACP and makes a useful contribution. However I am left unsatisfied with section 4.3 and the actual testing of the ergodicity assumption. The manuscript finishes up in the air. The problem and the data are well introduced but then in section 4.3 very little evidence is presented and the discussion is limited to 2 sentences (page 11918, lines 15–18).

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The authors need to show much stronger evidence that the ergodicity assumption is verified. At the very least the authors should plot on a same diagram the $T-r_e$ relationships obtained for each area from the snapshots and from the convective cell tracking methods. The comparison needs to be quantitative (e.g. compare the slopes of the relationships).

The discussion should raise and answer the following question. Is the ergodicity assumption verified at any time of the day (given the diurnal cycle of convection)?

It is not clear to me why the relationships obtained from the convective cell tracking should correspond to the 15th percentile of the snapshot relationship. More discussion of this aspect is needed.

Small corrections:

page 11912, line 22: delete full stop

page 11919, line 3: dependence or dependency

page 11924, figure 3: microphysicaly should read microphysically

page 11926, figure 5: specify which pixel is in each area

page 11918, line 23: its' should be its

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