

Response to Reviewers

Manuscript title: Strong control of the stratocumulus-to-cumulus transition time by aerosol: analysis of the joint roles of several cloud-controlling factors using Gaussian process emulation

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We thank this reviewer again for dedicating time to improving this manuscript to make it publishable. We are very grateful for the time invested and we are excited to get it published. Personally, I absolutely will take on board their comments about writing the response to reviewers more succinctly. It was a big effort to write and, again, I really appreciate that you took the time to read it.

The first four points from the reviewer have been corrected as suggested:

2/39: "... driven by cloud top cooling _and surface fluxes._" I think the "cloud top cooling" was my suggestion, so I wanted to mention the surface fluxes, since they do play a role as well.

6/167: I think the exponent here should be "-6" rather than "-26".

9/270: "to be significant" seems a bit vague here. Maybe "... to give statistically significant information about the relationship of cloud controlling factors and transition time." or something like that.

13/342: "... due to the different _numerical methods,_ radiation schemes and mixing processes ..."

14/357: Is "cloud base" the stratocumulus cloud base, the median/mean cloud base height, or something else? Apologies if you've defined it already and I missed it.

The following text has been added to clarify.

Line 323: Cloud base was calculated as the domain-mean cloud base where cloud is present in the column.

30/648: Missing journal in Bretherton (2015) reference.

This reference is present, but the ACP reference style splits citations by single author first, then co-authored, and then team authored. For Bretherton, we have cited enough papers that all three categories are included. The 2015 paper is cited first, rather than chronologically for all Bretherton references.