

# Opportunistic Experiments to Constrain Aerosol Effective Radiative Forcing

## Referee Comments Point-by-Point Response

### Comments to the author:

Dear Matthew Christensen et al.,

I am pleased to let you know that, based on the two reviews of the revised manuscript, your manuscript has now been accepted for publication in ACP after technical corrections.

Both referees have final remarks to the paper (listed below) which I would ask you to consider before uploading the final manuscript.

Kind regards, Martina Krämer (as ACP Senior Editor)

Dear Marina Krämer, Referee #1 and Referee #2,

Thank you for your time and effort put into our manuscript. We appreciate that both referees provided a fair and insightful evaluation of this work and that their comments have led to changes in the manuscript that have made the review of natural laboratories more clear. We have made the technical changes in the manuscript as recommended by the reviewers as well as short responses below.

Best regards,  
Matt and Andrew

-----  
Referee #1:

P4 L65: The sentence beginning with “In this section...” would benefit from clarification that it refers to Section 4 and that ‘type 1 experiments’ refer to small scale/plume perturbations. Something like “In Section 4 we also examine the factors controlling the cloud response to aerosol perturbation and the challenges in using small scale perturbations to constrain ACI...”.  
>> We agree with your suggested changes as it increases clarity.

P4 L70: The first sentence of Section 2 is missing a ‘their’ or similar. For example, ‘significant interest and their influence on clouds and potentially climate’.  
>> Yes, ‘their’ was missing from this sentence and has now been added.

P12 L360: Missing or wrongly placed bracket for references following (i.e., that can manifest as pyrocumulonimbus...)  
>> The bracket was removed and the sentence was edited for grammar.

P13 L370: Check semi-colon use on top sentence on this page.  
>> Semi-colon’s were replaced by periods and the sentence was edited for grammar.

P28 L875: The sentence ‘The diversity in Figure 10 and Figure S4 cloud droplet perturbations show agreement in drop number changes...’ needs rewording to make more sense.

>> Thank you for pointing out the ambiguity of this sentence. We have changed it to: *Figure 10 and Figure S4 show good agreement of the increases in cloud drop number concentration (Figure 10a) and decreases in cloud droplet effective radius associated with most opportunistic experiments (Figure 10b).*

P28 L875: ‘This provides a hint at different adjustment...’ should be ‘This provides a hint that different adjustment...’?

>> Done

P28 L880: The sentence ‘This may be a useful framework for future studies’ is the second sentence in a row that begins with ‘this’ making the text harder to follow. Define what would be a useful framework for future studies here rather than using ‘this’.

>> Regarding the first ‘this’ it has been changed to, *This ‘analysis’ may...* Regarding the second ‘this’ it has been changed to, *This ‘approach which combines opportunistic experiments...’*

---

---

Referee #2:

- Line 212: The restructuring means that it is now not obvious what "this identification" refers to. I suggest rephrasing to clarify.

>> Good point, “this identification” was removed and replaced by this introductory sentence. *In order to evaluate shipping effects more holistically, several studies have attempted to circumvent issues involving detection and identification of individual ship tracks by analyzing entire shipping corridors instead.*

- Caption of Figure 11. I suggest rephrasing the last sentence of the caption to make it clearer that the blue line shows Christensen and Stephens 2012 + Toll 2017, and the green line is Toll 2019.

>> The caption was rephrased to distinguish which studies were used for the different line plots.