

Review of 'Identifying the seeding signature in cloud particles from hydrometeor residuals'

Konwar et al.

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This is a second review following my first review of the initially submitted manuscript. As stated in my initial review, I believe this work makes an important contribution and is worthy of publication. However, I also noted several major points that the authors needed to address prior to publication. Unfortunately, I do not feel my points have been addressed adequately in the revised manuscript and/or in the 'response to reviewer' comments. For this reason, I recommend rejecting the manuscript at this time.

Below I point to specific comments in my original review and describe how/why I believe the authors response was not adequate in many cases.

In my summary review, second paragraph, I noted that I did not understand why all of the regions downwind appeared to have elevated K and Cl. The authors responded by noting that my original interpretation was incorrect and revised Figure 5 to illustrate elevated levels were only sampled at discrete locations. This was an excellent answer an explanation to my original question.

In the last two sentences of the third paragraph of my summary review, I asked the following questions: "I also wonder, since the same aircraft is used for releasing seeding material and making measurements; is there any potential for contamination? Were any experiments conducted where NSCI was re-sampled upwind following the release of seeding material?" The authors responded: "[We could sample the seeding clouds downwind, after the dispersal of seeding agents in the cloud.](#)

[Since the stratus cloud usually covers a large area, assuming spatial uniformity in the cloud properties, the measurement of the seeded clouds appears un-contaminated due to the transect made by the aircraft.](#)"

This does not answer the question(s) asked. Also, the authors state they can 'assume spatial uniformity' in cloud properties, but the LWC color plot in Fig 5a clearly indicates a lot of heterogeneity, even in regions with no elevated K or Cl. Also, in the new Fig 5, there is clearly a small area of elevated K and Cl prior to seeding release. The authors should explain that.

Under Major Comments

#1 – I suggested that the authors could strengthen the introduction by noting that previous tracer technologies used to identify seeded regions were unable to determine if the seeded material actually makes it into hydrometeors. (This new methodology does just that!). The authors responded: "[Thank you for the valuable suggestion. Now a few sentences are added emphasizing the limitation of past techniques.](#)"

However, I could not find where this had been added. If the author's had provided a revised manuscript with changes tracked (or even provided the new text in their response) it would have been helpful.

#3 I asked the question, that if the authors wanted to ensure they were in the 'core' of the cloud why use LWC_max instead of LWC_ad?

The author response (not copied here for brevity) stated that the goal was to select 'core' regions of the transect, noting (correctly) that measured LWC is always less than adiabatic values due to entrainment and mixing. They went on to state that in the present study ratios of max to adiabatic varied between 13 to 96%. I would suggest, that if they included regions of cloud in this study in which the maximum LWC was only 13% of adiabatic, than changes in cloud microstructure would be *strongly influenced* by processes such as entrainment and mixing. It is incumbent on the authors to prove that changes/differences in microstructure between seeded and non-seeded clouds are the result of seeding and not some other (natural) process.

#4 I asked the question(s) at the end of the comment: LWCs are generally higher after seeding (although the measurements are lower in cloud)...why? Seeding should not result in increased condensed water, but rather just changes in how the condensed water is distributed....etc. The authors response did not address this question.

#6 I asked roughly the same question as in #4, except for seeding case iii.

The authors responded describing why Nt might be different and discussed the role of updraft; all of which I agree with, but disregards the question completely.