

Interactive comment on “Effect of hygroscopic seeding on warm rain clouds – numerical study using a hybrid cloud microphysical model” by N. Kuba and M. Murakami

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Received and published: 29 December 2009

We appreciate the profitable comments of Anonymous Referee #1.

Following the comment “The model deployed is a very sophisticated microphysics model but it is used in a kinematic flow field that does not allow dynamical feedbacks associated with entrainment, subcloud evaporation, and cold pools which impact the potential response of clouds to varying aerosols. These limitations should be clearly stated in the introduction as well as in the conclusions.”,

we will insert the sentences into Introduction and Conclusions of revised manuscript as follows;

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As the first step, we installed our hybrid cloud microphysical model into simple two-dimensional cloud model. This simple cloud model includes subcloud evaporation but can not estimate the effect of cold pool on dynamics. And it can not estimate the effects of rainfall-induced drag and entrainment on dynamics. These effects can not be neglected and will be studied by installing our hybrid cloud microphysical model into a non-hydrostatic cloud model in next paper. Our focus is on the effect of seeding on the cloud microphysics in this paper.

Regarding the comment of “I think the discussion in section 3.3.1 can be interpreted in terms of Taffe Bowen’s (1950) model in which larger drops formed on GCCN have lower trajectories in the cloud than smaller drops formed on smaller CCN. The result being the lowered trajectory drops fall out of the cloud as smaller raindrops which can lead to reductions of rainfall noted. Likewise in the conclusion section, the use of the Taffe Bowen concept might be useful in discussing the radar results. I think a bigger deal can be made out of the discussion of radar-estimated rainfall if they interpreted the results in terms of the size distribution of raindrops as well as rainfall amounts”:

Unfortunately we can not find the paper Taffe Bowen (1950) in major journals. To confirm the effect of lower trajectories of drops on GCCN, we will check the size distribution of rain drops in the revised manuscript.

We will reconsider the title following the referee comment.

Interactive comment on Atmos. Chem. Phys. Discuss., 9, 24145, 2009.

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