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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Cloud's center of gravity – a compact approach to analyze convective cloud development" *by* I. Koren et al.

Anonymous Referee #1

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The authors have presented a new method based on the concept of center of gravity, designed to derive a compact measurement of cloud structures from the output of cloud resolving models without involving a multi-dimensional graphical display of the data. The actual usage of this method could be extended to analyses of data other than CRM output should an adequate skill be developed. Compared to the commonly used arithmetic means, the results derived using COG-based operators provide additional information that connects the averaged cloud parameters with dynamic and microphysical evolution of the modeled cloud. The authors have demonstrated the application of the method in a specific CRM simulation of a warm cloud. The paper is relatively well written and should be informative to the community of cloud modeling and beyond. There are a few rather minor issues that need to be addressed by the

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authors.

1. Introduction: The first paragraph appears to be not closely related to the central topic of the paper. I'd suggest removing it entirely or merging it into the later paragraphs. Also, "Cloud-resolving numerical models" (Line 5 of p.14089) and the second paragraph of p.14089 should be merged and those duplicating sentences could be removed.

2. In p.14090, Line 24, the point of "The COG representation ... sensitivity ... to the initial and boundary conditions, ..." was not adequately demonstrated in the paper. I'd suggest removing it from the text. Otherwise, the authors need to provide an in-depth discussion to support their point.

3. In p.14092, Line 17, "a multi-dimensional measure for the mass distribution" could be changed to "an abstract measure of the multi-dimensional mass distribution".

4. In p.14093, Line 18, "with different cloud condensation nucleus (CCN) concentrations", based on my understanding of the model configuration, this should be expressed as "with different specified cloud droplet number concentrations".

5. In p.14095, Line 6-20, the authors should define the aspect ratio (Sz/A?) first. The values of horizontal spread showed in Figure 3a are only a few meters (much smaller than the model's horizontal resolution). Is this a typo? Otherwise, the authors need provide an in-depth discussion on the result.

Interactive comment on Atmos. Chem. Phys. Discuss., 8, 14087, 2008.

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Interactive Comment