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Atmospheric
Measurement
Techniques
Discussions

Interactive comment on "Observing ice clouds in the submillimeter spectral range: the CloudIce Mission proposal for ESA's earth explorer 8" *by* S. A. Buehler et al.

Anonymous Referee #2

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This manuscript describes the concept for a submillimeter instrument dedicated to cloud ice observations. The scientific and technical requirements are given, the retrieval algorithms described and some synthetic and aircraft observations are used to test the algorithms. The paper is very close to the proposal to ESA it originates from, but summarizes all the work that has been involved in designing the mission. As such, it could be considered as a review. My main objection is that some papers are only referred to and the readers have to find the publications themselves. In some cases, it would be better to have a summary of the publications in question. One example is he beginning of section 3.1 where it would have been interesting to read a summary of why the submillimeter spectral range is so useful for ice cloud observations. Overall the

paper is clear and well organized, and this reviewer's objections have more to do with the form than the content. Below are some detailed comments in order of appearance, not of importance.

Section 2.1:

1. How about retrievals of IWP from infrared spectroradiometers, such as those of ISCCP or MODIS? What is their accuracy?

Section 2.2:

2. You may also want to mention the work Heymsfield et al. (JAMC 2008) who compare different methods of retrieving ice water content based on a combination of radar and other instruments or in situ data.

Section 2.3:

3. top of page 1108: Please write in plain English what Zme and Dme stand for as this seems to be the first time you mention these quantities.

4. What does "MIPAS" stand for?

Section 3.1:

5. Please summarize in a couple of sentences what were the conclusions of Evans and Stephens (1995) or subsequent papers.

Section 3.3:

6. Why isn't it useful for polarization to use a cross-track scan?

7. What is the link between frontal system orientation and azimuthal biases?

Section 4.3.2

8. How does the minimum precipitation rate measurable by CloudIce compare with existing instruments? (e.g TRMM, AMSR, Cloudsat. . .)

Section 4.3.3

9. Figure 9: could you mark the CoSSIR retrievals in red or a color other than blue so we could see where they are within the error bars and in comparison with the radar retrieval.

10. The sentence on lines 7-8 “another case study. . .Sreerekha et al. (2008)” is missing a word.

Interactive comment on Atmos. Meas. Tech. Discuss., 5, 1101, 2012.