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Atmospheric Measurement Techniques Discussions

Interactive comment on "Performance assessment of a triple-frequency spaceborne cloud–precipitation radar concept using a global cloud-resolving model" *by* J. Leinonen et al.

Anonymous Referee #2

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This is a nice manuscript that will instigate constructive conversations within the spaceborne radar community about future mission capabilities. The manuscript is well-written and organized in a logical fashion. I recommend publication after some minor issues are resolved.

Point to consider:

1. The authors justify the ice model choices used for each frozen hydrometeor category, and their choices are logical given the plethora of possible models that could be used. Scattering characteristics between different ice models can be significant,

however, and there might be significant sensitivity to the results presented based on the microphysical model assumptions. Can the authors provide an example of how results may differ if a different snow or ice model is used for some of the ice and snow categories? For instance, the NICAM simulated reflectivity PDF shown in Fig. 2 might appreciably change with different scattering models. The rosette model is used for cloud ice, and this choice is justified by previous results from Geer and Baordo (2014). But I'm not sure about the snow category. What happens to the reflectivity PDF if the snow category is changed to a different type of aggregate or dendrite model? Maybe there isn't much sensitivity in the reflectivity PDF on a global basis.

2. Fig. 2: Approximately how many CloudSat samples were used to create the PDF? The authors provide the time period used to construct the PDF, but a comparison between the total number of global observations between CloudSat and NICAM would be interesting to know.

3. Figure 3a: How is this image generated to produce clouds of differing brightness? I know this is a qualitative image to provide the reader with a better context of the modeled global cloud distribution. It is a very nice visual addition to the manuscript. Is the sun assumed to illuminate all sectors of the globe at a constant solar zenith angle with brightness differences due to cloud microphysical differences? Was an idealized VIS RT simulation performed to obtain this image? A descriptive sentence to explain how this image was generated would be beneficial.

4. Is there any reason not to use current CloudSat and GPM radar characteristics to demonstrate possible improvements in cloud and precipitation detectability using the radar configurations used in this study?

5. Figs. 4, 7, 9, 11, 13, 15: It is difficult to read the red wording at the bottom of each panel.

Interactive comment on Atmos. Meas. Tech. Discuss., 8, 4137, 2015.