Atmospheric Chemistry and Physics Discussions

Interactive Comment

Interactive comment on "What does reflection from cloud sides tell us about vertical distribution of cloud droplet sizes?" by A. Marshak et al.

A. Marshak et al.

We absolutely agree with the Rev 1 comments and will make changes in the manuscript accordingly. Specifically, (1) surface albedo is zero for all plots discussed in the manuscript. We have run a few cases with non zero dark surface albedo. Though we didn't plot a scatter-plot of 0.67 vs 2.1 micron radiances for non zero dark surfaces, we do not expect much of the differences. In contrast, bright surfaces will make the retrieved pdfs substantially broader and are hardly appropriate for retrievals. (2) Yes, we do not expect either any problems for SHDOM to simulate brightness temperature for more realistic temperature-height distribution. We will do this when we begin retrievals from the airborne scanning radiometer data that we have measured during the Brazil campaign in 2004. The results will be reported elsewhere. (3) The assumption of a constant number concentration is, perhaps, better for convective clouds than a

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constant extinction coefficient used in our simple model. However, this paper is just a prove-of-concept for cloud side remote sensing and changing the original microphysical assumptions wouldn't substantially effect the Bayesian retrieval algorithm proposed here. (4) This is a very good suggestion and we are in process of implementing it in the code. [The two figures (similar to Fig. 7 in the paper (pg. 7332) but for only one realization rather than for 20 ones as in Fig. 7) will be sent to you by separate email. The left panel is for horizontally constant reff while the right one is for variable one (Gaussian fluctuation with 20% stand. deviation). We see that it doesn't change the structure though, as expected, made the distributions broader.] Also, as recommended by Rev. 2, we have just read two papers (Rosenfeld and Lensky, 1998, and Freud et al., 2005) on horizontal fluctuations of reff. These papers confirmed that reff is a "quite robust parameter for a given environment and cloud depth." This will be more discussed in an accompanied paper Vanderlei Martins as the leading author.

Interactive comment on Atmos. Chem. Phys. Discuss., 6, 7207, 2006.

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