Atmospheric Chemistry and Physics Discussions

Interactive Comment

Interactive comment on "Evaluation of radar multiple scattering effects in Cloudsat configuration" by A. Battaglia et al.

Anonymous Referee #1

Received and published: 9 October 2006

Major comments

This paper dealt with the multiple scattering effects (MS) for 95 GHz spaceborne cloud radar, Cloudsat, by using Monte Carlo simulations. For this purpose, they relied on Cloud Resolving Model. The authors discussed the relation between LDR and MS and showed the LDR could be used to detect high MS area. They also used data obtained during the Wakasa-bay experiments to support this conclusion. The subject and presentation materials sound. My major concern is as follows. The large non-sphericity also produces large LDR, which is apparently not taken into account for the estimation in the CRM simulations. The LDR is usually recognized to be an indicator of non-sphericity and we should descriminate between the two. As a result, detection of MS using high LDR is not convincing.

Full Screen / Esc

Printer-friendly Version

Interactive Discussion

Discussion Paper

EGU

Minor comments P. 2. How do they treat the range issue when multiple scattering effects are taken into account in radar reflectivity? That is, the radar pulse takes longer time to return to the receiver when MS occurred. Are there any such effects considered?

P. 2-5, What are the assumed size distributions of particles in the cold/warm, rain and melting layer in CRM? It might be helpful to create a table.

P. 5 When the (MS) is considered in the estimation of reflectivity for CloudSat, which value is assumed for sea surface reflection at 95GHz? The enhancement of 79dB due to MS is extremely high and needs some justification.

P. 9 LDR for large non-spherical particle might have a potential to produce LDR$>$-5dB. LDR due to MS may also be comparable but the use of LDR in order to detect MS seems to be ambiguous. I wonder this is still due to the artifact. What is the minimum detectable threshold for Airborne cloud radar used for Wakasa-bay experiment? The large LDR signal seems to correspond to small dBZe, especially at around surface echo and 10.68UTC, and also at 2.5km and 10.78UTC (in Fig.13). This can also be found in Fig.14.

Since Cloudsat does not have a function of LDR, the study of spaceborne LDR is just the theoretical consideration for future mission and these should be clearly stated in the text, though theoretical estimation is quite interesting.

Interactive comment on Atmos. Chem. Phys. Discuss., 6, 8125, 2006.

Full Screen / Esc

Printer-friendly Version

Interactive Discussion

Discussion Paper

EGU