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Atmospheric Chemistry and Physics Discussions

Interactive comment on "First Odin sub-mm retrievals in the tropical upper troposphere: ice cloud properties" *by* P. Eriksson et al.

P. Eriksson et al.

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Dong Wu gives some comments and suggestions for further consideration. We will here try to explain the unclear points.

The EOS MLS and CloudSat missions (and to some extent also Odin-SMR) constitute highly important steps forward when it comes to satellite measurements of cloud ice. We will revise our abstract and introduction to ensure that no doubts on this point remain.

Several comments by Dong Wu deal with the relative merits of using either mm and sub-mm wavelengths. The comments are basically correct, but we would like to make some clarifications. Some of our argumentation in the abstract and introduction is already elaborated in a reply to Cory Davis. We have not made any claims that sub-mm

has a smaller influence of particle shape than mm, just that it is small for sub-mm. Further, our discussion was not limited to limb sounding. We considered also the possibility to perform the measurements in down-looking geometry, but this was unfortunately not stated explicitly. Advantages of using a down-looking instrument include better horizontal resolution and simplicity to obtain a high swath width. The shorter path lengths in down-looking geometry, and then saturation first at higher IWP, should increase the relative importance of sub-mm. Anyhow, unbalanced comments will be removed, and both abstract and introduction will be made clearer.

Odin-SMR has in fact receivers with both a +45 and -45 deg polarisation response, but this is not of importance here and the present notation will be changed.

We will clarify why the image sideband can here be neglected. It can be mentioned here that Odin-SMR has an intermediate frequency of 3.9 GHz. The two sidebands have thus a relative difference in frequency of about 1.5 %, and the difference in scattering between the two bands is then only about 6 % (assuming Rayleigh scattering). More important is that Odin-SMR is operated in a single sideband mode, where the nominal contribution from the sideband is below 2 %.

The southwest-northeast strips in Figures 9 and 10 are caused by the selected "shading" in Matlab. The results will be plotted in a "checkerboard" manner to avoid this unlucky visual effect.

The text will be changed to resolve the remaining minor issues.

Interactive comment on Atmos. Chem. Phys. Discuss., 6, 8681, 2006.