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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Comparison of cloud statistics from spaceborne lidar systems" *by* S. Berthier et al.

Anonymous Referee #2

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General Comment

This paper introduces a new algorithm for detecting clouds and applies it to three different satellite lidar datasets. The resulting three sets of cloud statistics are then intercompared and discussed. This comparison of the three systems is interesting as it is a way of comparing the performance of the three systems. The relatively small differences in cloud statistics found between the three sets of cloud statistics despite large differences in design and SNR between the instruments is an indication of the robustness of the derived statistics.

Specific comments

Section 2.1.

More discussion of equation (1) and its application is required. What value of n is used? Or, alternately, what is the vertical interval considered? Is the same value of n always used, or does it vary? I assume \" lidar signal \" means the calibrated, attenuated backscatter signal. Is this correct?

The authors say the \"value of F depends on the signal noise\" . Do they mean the value of F that they choose depends on the signal noise?

They say only noise is expected to be present below 19 and 20 km. Do they mean \"between 19 and 20 km\" ?

I don't understand how Figure 1 was derived. Where do the two overlapping sets of curves come from? Are these test data sets where regions of noise and cloud have been determined?

The text mentions LITE and GLAS prototype algorithms for separating aerosol and cloud. The algorithm which is then described is the GLAS algorithm. In the LITE studies which are cited in the references, a very simple threshold technique was used to discriminate between aerosol and cloud. Layers saturating the LITE digitizer when the receiver was set to high gain were assumed to be clouds. Layers which did not saturate the digitizer were assumed to be aerosol.

Section 2.2.

LITE data were acquired and archived at single shot (0.1 second) resolution. Are the LITE results here based on 10-second averages?

Section 4.

The CPDF curves in Figs 4 and 5 are useful for judging the consistency between different datasets, but it is difficult to determine where the inconsistencies are coming from. Adding PDFs would give more insight into the relative strengths and weaknesses.

Unlike one of the other reviewers, I don’t think the limited, or \" targeted \",

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sampling of LITE has much effect on the shape of the derived CPDF curve. It would be an interesting exercise to take CALIPSO observations, sample them in a way similar to LITE and compare the CPDF of the full set of CALIPSO observations vs. the subset.

Interactive comment on Atmos. Chem. Phys. Discuss., 8, 5269, 2008.