Atmos. Chem. Phys. Discuss., 8, S9435–S9437, 2008
www.atmos-chem-phys-discuss.net/8/S9435/2008/

Atmospheric Chemistry and Physics Discussions

Interactive comment on "Large surface radiative forcing from surface-based ice crystal events measured in the High Arctic at Eureka" *by* G. Lesins et al.

Anonymous Referee #3

Received and published: 24 November 2008

Review of "Large surface radiative forcing from surface-based ice crystal events measured in the High Arctic at Eureka"; by Lesins, Bourdages, Duck, Drummond, Eloranta, and Walden.

Overview:

This is an interesting lidar-based study of suspended ice-crystals occurring in layers below approximately 1 km in the high Arctic in regions of significant topography. The layers are deduced to have a significant surface infrared radiative forcing locally, and are determined to be caused primarily by snow blowing from the local topographic features (with heights similar to that of the snow layers). In this way, these blowing snow

Full Screen / Esc
Printer-friendly Version
Interactive Discussion
Discussion Paper

layers are unlikely to be of major importance for the surface radiative budget of the high Arctic because of the limited orography there. However, their study is important as it serves as an important warning about interpreting local observations of suspended crystals as being evidence of in-situ ice crystal nucleation. This caveat should perhaps be made more explicit – at present the title highlights the radiative forcing but it might be useful to include the term "blowing snow" in the title.

I think that it will be of interest to the readers of Atmospheric Chemistry and Physics subject to some minor revision.

Major points:

1. That observers are able to determine the occurrence of the suspended crystals more frequently than the lidar is interesting. Is there any evidence that it is the very weakest events that are being missed by the lidar, or just the shallowest ones? Some idea of what the observer is actually noting might be helpful (is it the scintillation associated with individual reflections from crystals, or more the hazing up of the sky?).

On this note, it would be interesting to see if there are cases the observers don’t see and the lidar does see (i.e. false negatives).

2. A breakdown of the layer height statistics would be interesting.

3. For the case studies it would be useful to see the meteorology (Figs. 13-16) presented during the case descriptions in section 4, rather than them being relegated to the discussion.

Minor points:

1. P17693, Line 15, change to "...many of the ice crystals reside at a..."

2. Define IC column in caption for Table 3.

3. P17698, Line 13, "substantially warmer"

ACPD

8, S9435–S9437, 2008

4. Why is the case study 21 March 2007 outside the range of the statistics given in Tables 2/3. Is there a good reason not to include March cases in these statistics?

5. P17701, line 8-10 is repetitious of line 10 P17697.

6. Difficult to read the small text on Figure 3.

7. For the MODIS images, it might be useful to use arrows to point to the streaks of interest.

Interactive comment on Atmos. Chem. Phys. Discuss., 8, 17691, 2008.

ACPD

8, S9435–S9437, 2008

Interactive Comment