

Interactive comment on “Ice supersaturations and cirrus cloud crystal numbers” by M. Krämer et al.

Anonymous Referee #3

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This paper is dealing with a really important issue. The high supersaturation in the upper troposphere may play a large role in climate research. The authors have done a good job with data and analysis.

Specific commends:

1) Ice crystal measurements may not be adequate: At higher temperatures, the 30- μm detection limit is too low, and it is not convincing that there is no shattering. These short falls are not fatal, since the main conclusions at lower temperatures will not be altered. The authors are encouraged to rewrite this section and point out that a) the 30- μm limit is close to be adequate at the lowest temperatures, and shattering at those temperatures can only increase *Nice* and therefore will not be in conflict with the conclusions, and b) at higher temperature the missing large particles and shattering can both be important.

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2) Line 20, p21102 to Line 7, p21103 and Figure 5. The way of choosing Nice and Rice separately (Figure 5) is a bit awkward. Why not plotting Nice*Rice instead and choose Min, Middle, and Max values of Nice*Rice directly?

3) There is no clear mentioning of time resolutions. It is implied that 1-s data are used in Figures 1 and 2. I will be a bit surprised if this is the case, since to my knowledge both FISH and OJSTER are fairly noisy at 1 Hz and low water mixing ratios. The way authors treat the data (lines 10-15, p21096) suggests that the combined precision (RHice and RHice, enh) is better than 7%. Is this possible at 1 Hz?

4) Lines 15-16, p21090: Since actual uz was not measured (actually, uz history has to be known), the authors do not show a cause of high supersaturation, but a possible explanation.

Minor comments

1) Line 23, p21092: artifact;

2) Lines 3-7, p21093. The description is not accurate.

3) Figure 2. Changing % to ratio for consistency.

4) Line 21, p21096: observed data point; should be observed data points used in this analysis;?

5) Line 18, p21102: define uz; here.

6) Figure 4: Legend is missing.

Interactive comment on Atmos. Chem. Phys. Discuss., 8, 21089, 2008.

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