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Comment

Interactive comment on “Scanning electron microscopy and molecular dynamics of surfaces of growing and ablating hexagonal ice crystals” by W. C. Pfalzgraff et al.

Anonymous Referee #1

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Overall I enjoyed reading this paper, I found the results interesting, and I recommend that the paper be published.

On page 20747, the line "Figures 3e-h, taken" should read (I believe) Figures 4e-h.

The SEM pictures of ice crystals were excellent, but I feel the science content was a bit thin. For example, in Figure 1, the prismatic pyramidal facets were described as having an angle of " $\sim 14^\circ$ " degrees with respect to the prism facets. The authors fail to elaborate much on this. How accurately was this angle measured? Can the authors supply an error bar for the measurement? Was there much crystal-to-crystal variation? The normal pyramidal angle is 28° degrees, as seen in direct crystal measurements and

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from halo observations; do the authors ever see this angle? Can the authors comment on what facets (Miller indices) result in the ~ 14 degree facets? I feel that observing a new ice crystal facet would be a significant result, as much as (for example) a new solid phase of ice. But the observations would have to be clean. I do not get the impression that the present data really nail this new facet down. If the authors are confident that they are seeing a new, never-before-seen ice crystal facet, they should support this claim better.

Aside from the possible new facet, the authors also report some observations of "growth strands". It would be great if the authors provided some model, even a qualitative one, that could explain these strands. One problem with ice growth is that the literature is already full of unexplained observations.

The molecular dynamics results were not so interesting, in my opinion. Much has been done on this in the past, and the authors did not seem to add much or put their model in context with the older literature. The statement "One prismatic edge is clearly in evidence" was a bit strong – I would say "perhaps in evidence" would be more accurate. I did not see that the molecular dynamics related at all to the SEM pictures; the scale difference was just too great.

In spite of its faults, I do believe the paper presents interesting work and should be published.

Interactive comment on Atmos. Chem. Phys. Discuss., 9, 20739, 2009.

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