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

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Received and published: 12 November 2009

We are indebted to the reviewer for suggesting we revisit the question of the prismatic pyramidal – prismatic facet angle. The reason for quoting an approximate value ($\theta \sim 14^\circ$) was that too few measurements were made. This in turn followed because we selected for analysis only crystals having a small shoulder-to-face ratio, mostly $q/p<0.05$ (see Fig. 1 for a definition of $q$ and $p$).

We subsequently went back to the SEM to collect more images, increased the $q/p$ criterion to $\sim 0.2$, and extrapolated values to $q/p=0$, as shown in Fig. 1. As the figure shows (and to our surprise), the $\theta \sim 14^\circ$ facet is very much in the minority. More common is the well-known, $28^\circ$ (101bar1) facet. We are in the process of making more measurements of this type, with the aim of characterizing confidence intervals.

If more measurements support the presence of a statistically significant, $\theta \sim 14^\circ$ facet, we believe it would correspond to Miller-Bravais indices (202bar1). This facet has not, to our knowledge, been reported in connection with vapor-deposited ice growth, but it has been observed in ice crystals grown in aqueous antifreeze solutions derived from fish (Knight et al, 1991; Houston et al, 1998).

We have devised a speculative, two-step model for the role of growth strands in facilitating growth of the prismatic facet. In the model, a series of (101bar1) facets forms on a pristine prismatic surface, collectively forming the pattern we have identified as trans-prismatic strands (Fig. 2). In the second step, troughs collect vapor-deposited ice, forming a new prismatic surface. We hope to explore this hypothesis in future SEM work; in particular, ridge and trough angles of 180-2$\times$28=124 degrees may be resolvable using stereoscopic imaging. Would it be useful to add a description of this model to the paper?


Interactive comment on Atmos. Chem. Phys. Discuss., 9, 20739, 2009.
Fig. 1.

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\theta = 9.5 \times \frac{q}{p} + 28
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\theta = 20 \times \frac{q}{p} + 14
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Fig. 2.