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ICE CRYSTAL ORIENTATION DISTRIBUTIONS IN LARGE ICE MASSES (ABSTRACT)

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Flow behavior of large ice sheets is affected mainly by c-axis orientation fabric, and the fabric formation is caused by the anisotropic characteristics in the plastic deformation property of ice crystal. There are three processes involved in fabric formation; *i.e.* crystal rotation (AZUMA and HIGASHI, 1985), recrystalization and polygonization.

Two types of crystal fabric development with depth have been observed in deep polar ice cores. Type A shows crystal fabric changes from a random distribution near the surface to vertical cluster development with depth under vertical compression and to a strong single maximum pattern near the bottom under simple shear deformation (Camp Century, Dye 3, GRIP and Byrd ice cores). Type B shows fabric changes from a random distribution near the surface to a large girdle development with depth, where the c-axis direction is almost perpendicular to the uniaxial tensile strain axis along the ice flow direction (Mizuho and Vostok ice cores). To estimate vertical compressive strain, ε and uniaxial tensile strain, γ, the following equations were assumed:

$$\varepsilon=-\ln (y/H), \quad \gamma=-2 \ln (y/H),$$

where y is height from the bottom and H is ice thickness.

For Type A cores, the c-axis lies mainly along the vertical core direction with depth and a single maximum fabric appears at depth for about $\varepsilon=150\%$, except for Byrd core samples which shows single maximum fabric appearance for about $\varepsilon=80\%$. For Type B cores, crystal fabrics developments with an increase in γ are quite similar to each other.

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