

## **On the influence of recrystallization on snow fabric and microstructure: study of a snow profile in Central East Antarctica**

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Temperature gradient metamorphism affects the Antarctic snowpack up to 5 meters depth, which lead to a recrystallization of the ice grains by sublimation of ice and deposition of water vapor. By this way, it is well known that the snow microstructure evolves (geometrical changes). Also, a recent study shows an evolution of the snow fabric, based on a cold laboratory experiment.

Both fabric and microstructure are required to better understand mechanical behavior and densification of snow, firn and ice, given polar climatology. The fabric of firn and ice has been extensively investigated, but the publications by Stephenson (1967, 1968) are to our knowledge the only ones describing the snow fabric in Antarctica.

In this context, our work focuses on snow microstructure and fabric in the first meters depth of the Antarctic ice sheet, where temperature gradients driven recrystallization occurs. Accurate details of the snow microstructure are observed using micro-computed tomography. Snow fabrics were measured at various depths from thin sections of impregnated snow with an Automatic Ice Texture Analyzer (AITA).

A definite relationship between microstructure and fabric is found and highlights the influence of metamorphism on both properties. Our results also show that the metamorphism enhances the differences between the snow layers properties. Our work stresses the significant and complex evolution of snow properties in the upper meters of the ice sheet and opens the question of how these layer properties will evolve at depth and may influence the densification.