

Can we detect fast fabric changes in glaciers and ice sheets remotely?

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The orientation of crystals in ice, the fabric, influences the flow of ice masses because of the anisotropic properties of a single ice crystals.

Only ice cores provide direct means to determine the evolution of the fabric with depth. This information is however limited to a single location. Geophysical methods like radar and seismic are also sensitive to fabric orientation, as dielectric and acoustic properties are also anisotropic.

Evidence is presented that it is possible to detect and map changes in fabric orientation with these methods, if they occur over short distances in depth, i.e. fast changes.

A study at Colle Gnifetti, Valais Alps, is laid out that utilizes two closely-neighbouring existing boreholes, an ice core, and the combination of geophysical techniques to investigate the possibility to detect fast fabric changes remotely from the glacier surface.