Geophysical Research Abstracts, Vol. 7, 02240, 2005
SRef-ID: 1607-7962/gra/EGU05-A-02240

Field and laboratory investigations into basal ice formation by freeze-on of supercooled water

S.J. Cook, D.A. Knight, P.G. Knight and R.I. Waller

SIMPLE Research Group, School of Earth Sciences and Geography, Keele University, Staffordshire, ST5 5BG, United Kingdom.

Several studies have suggested that glaciohydraulic supercooling is responsible for the generation of thick sequences of debris-rich basal ice at temperate glaciers. However, some recent studies have argued that even where physical conditions allow supercooling to occur, the process may not be responsible for observed sequences of basal ice. This study presents results of field observations in Iceland and laboratory simulations of the supercooling process in order to investigate the potential of glaciohydraulic supercooling to form distinctive basal ice facies at temperate glaciers, and thereby to test the significance of this process in basal ice formation. Fieldwork at the Svínafellsjökull and Skaftafellsjökull glaciers, southern Iceland, has identified several features indicative of the action of glaciohydraulic supercooling, and also a range of visually distinct basal ice facies. By freezing supercooled water in a cold laboratory we have produced some ice facies similar to those observed in the field in regions of the glaciers where supercooling is active. It is uncertain as yet whether glaciohydraulic supercooling could explain the formation of all of the basal ice facies observed. It is envisaged that further investigation of the field and laboratory ice facies could provide a set of diagnostic characteristics for recognition of the supercooling process in the field, and also a means by which to reconstruct the nature of the subglacial environment at temperate glaciers.