



The Subglacial Access and Fast Ice Research Experiment (SAFIRE): 3. Englacial and subglacial conditions revealed by seismic reflection data on Store Glacier, West Greenland.

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Basal conditions have a profound influence on the dynamics of outlet glaciers. As part of the SAFIRE research programme, we carried out a seismic survey on Store Glacier, a tidewater glacier terminating in Uummanaq Fjord in West Greenland (see joint abstracts by Christoffersen et al. and Doyle et al. for details). At the survey site the ice moves 700m/a making the terrain crevassed and bumpy. Despite the rough terrain we collected two 1.5 km long survey lines parallel and perpendicular to the ice flow direction using a 300m snow streamer and explosives as a source. The seismic data reveal an ice thickness of about 620m and 20 to 30m of subglacial sediment on the upstream side of the area thinning in the downstream direction. From polarity reversals seen along the ice-bed contact we speculate that the sediments have varying degrees of water content. The ice itself has several englacial reflections parallel and close to the bed. At approximately 475m depth, a clear single englacial reflection is observed in the parallel survey line. Thermistor data installed at this location show a clear increase in ice temperature starting at this depth. We speculate that the observed englacial reflection is caused by a change in crystal orientation fabric allowing greater ice deformation below this depth causing increased strain heating.