



## **Detecting the subglacial conditions at Store Glacier, West Greenland, using a combined seismic-radar survey**

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As part of the research project RESPONDER, we performed two combined radar-seismic surveys to identify the bed conditions and suitable drilling locations at Store Glacier, a marine-terminating glacier in West Greenland. The two sites at 30 (Low Site) and 60 km (High Site) upstream of the snout of the glacier are thought to be part of the same subglacial drainage system but have different conditions both at the surface and at the base. As the ice-bed contact in the seismic data was sometimes difficult to identify we used the radar (Ground Penetrating Radar) data for confirmation.

At the Low Site in the ablation zone, the surface is icy and crevassed. The five 2 to 3 km long seismic profiles show a large subglacial trench (width 2 km, depth 350 m) orientated in flow direction. The basal conditions vary with patches water, whether or not present in saturated sediments or exclusively at the base, both at the along-flow and across-flow profiles but they appear mainly at the sloping sides of the trench. The NE side of the trench contains a 100 to 150 m thick stratified sequence of softer, less consolidated sediments.

At the High Site at equilibrium line, the surface is snowy with two frozen supra-glacial lakes. The two seismic profiles show less topography but have a similar patchy character. Despite thicker ice the ice-bed contact is much clearer visible in the seismic data which we contribute to a better coupled snowstreamer. The 5 km along-flow profile has a flat base consisting of sediments. A clear single englacial reflection following the shape of the base can be seen at 85% depth of the ice column, possibly the Holocene-Wisconsin transition. At the 1.7 km across-flow profile there is a 130 m rise of the bed from S to N. Judging by the strength of the basal reflection the sediments at the northern side are softer than at the southern side.