



Changes in the thermal regime of the polythermal Midre Lovénbreen, Svalbard

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In the spring of 2006, an extensive Ground Penetrating Radar (GPR) survey of the tongue of the polythermal glacier Midre Lovénbreen (north-western Spitsbergen), was carried out. The primary aim of this work was to locate the boundary between the cold snout and the temperate core of the glacier. This work was originally carried out as a precursor to a proposed major field campaign to investigate the nature of hydrological 'breakthrough' events, in which significant volumes of water, stored in the temperate interior of the glacier, escape through the cold surrounding margins in the summer, when pressures are sufficiently high.

However, in addition to defining the cold/temperate boundary, the findings of this survey indicate that the downglacier margin of the cold/temperate boundary has retreated a significant distance upglacier since the last extensive survey of the glacier by J. Moore and J. Kohler in May 1998 (unpublished data; cf. Rippin *et al.*, 2003). Over the same period, Midre Lovénbreen has experienced continuously negative mass balance, lowering and marginal retreat.

Here, we: (i) present the main findings from our GPR survey; (ii) propose reasons for such a major change in the thermal structure of Midre Lovénbreen; and (iii) discuss the potential implications of such thermal changes for the dynamics of the glacier and the drainage of subglacial and englacial water from the glacier.