Englacial ice properties and processes revealed by borehole geophysics on surge-type glaciers, Svalbard,
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Background
Funding has already been secured to support a hot-water drilling programme based on one or more surge-type glaciers in Svalbard (likely Paulabreen and/or a tributary of Bakaninbreen) for 2 – 3 years from summer 2013. The drilling will form part of the “Calving Rates and Impact on Sea Level” (CRIOS) research programme, led by Prof. Doug Benn based at the University Centre in Svalbard (UNIS). The general aims of the hot-water drilling project are to record the physical properties, dynamics, and hydrology of a glacier that is approaching its surge phase, identified from known cyclicity and on the basis of thickening accumulation areas revealed by remote sensing images. This component of the drilling programme will focus, at least in the first instance, on englacial ice properties and processes using a suite of borehole-based tools. Foremost amongst these will be optical televiewing (OPTV – see image below) of the interior of the glacier, supplemented by sonic and electrical logging, all of the required instrumentation for which has already been acquired and is available in-house at the Centre for Glaciology, Aberystwyth University.

Aim and objectives
The aim of the PhD project would be determined by the successful candidate, but it would likely involve investigating the englacial glaciology of a polythermal surge-type glacier during the late stages of its quiescent phase (and - tantalizingly – potentially into its surge phase).

Addressing this aim might involve one or more of the following objectives, all of which are available as options:

- To characterize the ‘snapshot’ and ‘time-varying’ internal structure of the glacier(s) concerned. This will be achieved by borehole-based OPTV logging\(^ {1,3}\).
- To measure the rates and styles of englacial and subglacial ice deformation through the lifetime of the project at the glacier(s) concerned. This will be achieved by repeat borehole inclinometry and the installation of englacial tilt cells\(^ {4,5}\).
- To characterize the ‘snapshot’ and ‘time-varying’ internal acoustic structure of the glacier(s) concerned. This will be achieved by borehole-based sonic logging\(^ 6\).
- To investigate temporal variations in subglacial/englacial hydrological linkages at the glacier(s) concerned. This will be achieved by borehole-based thermal and electrical logging\(^ {7,8}\).

Person specification

Essential
- An undergraduate degree of 2(i) class or higher in a relevant Earth science subject.
- The desire and ability to undertake glaciological fieldwork in Svalbard.
- Strong quantitative and/or analytical skills.

Desirable
- Some glaciological training and/or experience.
- A valid driving licence.

Further information
For further information please email Bryn Hubbard (byh@aber.ac.uk). For application forms and procedures, please go to the Institute’s relevant web page (http://www.aber.ac.uk/en/iges/prospective/postgraduate/) and the University’s relevant web page (http://www.aber.ac.uk/en/postgrad/howtoapply/).

Your application form needs to be accompanied by two references (although these can be sent separately following the form if time is tight) and a research proposal, typically of a few sides of A4.
Please feel free to work away from the outline provided above to construct your specific proposal.
References


