Geophysical Research Abstracts,
Vol. 10, EGU2008-A-08937, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-08937
EGU General Assembly 2008

Application of digital optical televiewing to ice-mass boreholes

A. Bryn Hubbard (1), B. Samuel Roberson (1), C. Denis Samyn (2)

(1) Institute of Geography and Earth Sciences, Aberystwyth University, UK, (2) DSTE, UL Bruxelles, Belgium (byh@aber.ac.uk)

Recently developed for use in mineral exploration, digital Optical Televiewing (dOPTV) provides a continuous, orientated 360º true colour optical image of a borehole wall, recorded as rows of up to 720 pixels. Here, each row represents 1 mm depth along the borehole orientated NESWN around the borehole wall – thereby providing images at a resolution of $\sim$0.6 mm in the horizontal (in a borehole of diameter 130 mm) and 1 mm in the vertical. As well as providing far more detail than ice surface radar and traditional borehole TV video or acoustic televiewers, the uniform 360º image, allied to true orientation, allows the dip and strike of each planar structure that intersects the borehole wall to be calculated from the amplitude of its sinusoidal trace on the OPTV log. An additional very useful by-product of this analysis is the ability to invert the wall log to recreate an orientated image of the core. Core sections whose orientation is not known can thereby be orientated through comparison with the inverted OPTV image of that section.

Glaciological applications of dOPTV therefore potentially include providing: (i) Orientated images of the apparent core for the complete borehole; (ii) borehole stratigraphy, including identification and counting of primary stratification and marker horizons; (iii) identification of foliation/fracture generations intersected by the core, and (iv) identification and characterization of ice facies/voids/debris intersected by the core.

Here, we report results from the first application globally of dOPTV in an ice mass; from Tsanfleuron Glacier, Switzerland. We present the raw log of a 20 m-deep bore-

hole as well as inverted images of the reconstructed core. We also identify and analyse the physical character and structure of several intersecting features, including ice stratification and foliation. The technique has great potential for the *in situ* analysis of deep ice boreholes, including the forthcoming IPY-related NEEM borehole.