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Borehole and Ice Feature Annotation Tool (BIFAT): A program for the automatic and manual annotation of glacier borehole images

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We present a stand-alone software platform, Borehole and Ice Feature Annotation Tool (BIFAT), for the examination, annotation and analysis of glacier borehole images. This tool aids in the lengthy and often subjective process of annotating layers and other features in optical and acoustic glacier borehole televiewer logs. Since these view 360° around the full circumference of an exploratory borehole, intersecting planes are reconstructed on the televiewer image as sinusoids, the amplitude and phase of which can be used to calculate, respectively, the dip and direction of dip of each of these planes. The program suite aids in the annotation and examination of such planes, as well as a number of other features, including clusters and inclusions. BIFAT also provides an automatic layer detection option to aid and speed up the often lengthy process of identifying planar features in glacier borehole images, and a semi-automatic inclusion detection tool.

The software shows promising results in rock borehole images and in the detection of planar layers in line-scan ice core images. We describe the capability and operation of BIFAT, and illustrate its application with reference to the automatic identification and annotation of sections from optical televiewer (OPTV) borehole logs from a variety of ice masses including Roi Baudouin, Dronning Maud Land, Antarctica and Tsanfleuron Glacier, Switzerland. The software is freely available for download from http://users.aber.ac.uk/byh/iceoptv.