Radar Investigations of Ice Stream Margins: Digital Data

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This disk provides a complete catalogue of all data gathered under the project "Internal Stratigraphy and Basal Conditions at the Margins of Active Ice Streams of the Siple Coast, Antarctica" funded by the National Science Foundation grant number OPP-9725882 to the University of Washington. This project was aimed at radar examination of bed reflection characteristics and internal layer geometry in two inter-ice-stream ridges (Engelhardt and Shabtaie) and across margins with adjacent ice streams (south margin of MacAyeal and north margin of Whillans).

A data description is available from the National Snow and Ice Data Center (NSIDC) in a report titled "Radar Investigations of Ice Stream Margins: Data Report" by Nadine Nereson and Charles Raymond. That report is provided on this disk in both pdf and ps formats together with high resolution ps images of all radio echo sounding profiles (in the directory "DATA_REPORT").

The primary purpose of this disk is to provide the raw data in digital form, relevant text information from field books and computer scripts (mostly based on MatLab) that were used for displaying and analyzing the data. The data are divided up into two groups: in directory "RIDGE_DE_1998" are data gathered from a base camp on the north side of Shabtaie Ridge (here called Ridge D/E) giving access to Ridge D/E and the south margin of MacAyeal Ice Stream (here called Ice Stream E); in directory "RIDGE_BC_1998" are data gathered from a base camp on the south side of Engelhardt Ridge (here called Ridge B/C) giving access to Ridge B/C and the north margin of Whillans Ice Stream (here called Ice Stream B). Both data sets are organized similarly. The organization in each case is explained by text in a subdirectory ("RIDGE_DE_1998/doc" and "RIDGE_BC_1998/doc").

The primary data are radar profiles detecting returns from within the ice and its base. We also report differential GPS utilizing a pair of receivers (Garmin GPS100 SRVY II) to contemporaneously profile surface elevation. Base stations were located at markers surveyed with geodetic GPS in collaboration with a group from Byrd Polar Research Center at Ohio State University lead by Ian Whillans. The OSU group gathered much more extensive and accurate GPS survey data than are provided in this report.

The disk contents should enable one to reproduce figures displaying radar data in the data report mentioned above as well as undertake new analysis starting from the raw data. In this regard, it would be useful to visit the University of Washington Glaciology Group web site http://www.geophys.washington.edu/Surface/Glaciology/PROJECTS/radar/, which provides an

overview of radar methods used to collect and reduce the data. The most relevant information is included on this disk (in directory "METHODS") including a copy of a how-to document describing data reduction methods (RESDataAnalysisHowTo.pdf) and associated software (in subdirectory "METHODS/CODE") including routines for converting raw binary data from the recording system (centered on a Tektonix TDS410 digital oscilloscope) to MatLab readable files and basic MatLab scripts for a variety of purposes. It is also possible to proceed with analysis from the MatLab readable files, which are only one step removed from the raw data. The profiles displayed in images are based on data files that have been subjected to demeaning and filtering and would therefore not be appropriate for any analyses directed toward accurate assessment of amplitude and phase without careful consideration. Versions of scripts actually used in the data analysis for products on this disk are found in subdirectories of "RIDGE_DE_1998" and "RIDGE_BC_1998" ("mat_labscripts", "plots", "*_LayerModel"). The scripts found in these directories may differ somewhat from the basic ones (in "METHODS/CODES") in order to adapt to the specifics of the data and purpose of analysis. There are additional scripts in these directories for making specific plots and more extended analysis. The MatLab scripts make use of standard MatLab commands including some commands from the Signal Processing Toolbox.