# Canadian Glaciologists in Antarctica, 1999-2002

***Report to the Glaciology Working Group***
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**Summary:**

During the period 1999-2002, Canadian Glaciologists have been involved in a number of Antarctic research projects These projects include field programs, remote sensing, computer modeling, and instrumentation design/manufacture

Through the efforts of the Canadian Committee on Antarctic Research (CCAR), the profile of Antarctic research in Canada increasing. Through the Canadian Polar Commission (CPC) listserver, CCAR disseminates information of interest to Canadian Antarctic researchers. In March of 2001, CCAR hosted a workshop titled "Subglacial Lake And Deep Ice Exploration Canadian Expertise And International Opportunities" The intent of the workshop was to bring together Canadian scientists interested or working on research related to Lake Vostok. Technology, environmental science, and modeling were identified as fields where Canadians might focus their efforts. Additionally, Canada is in a position to provide logistical support and relatively inexpensive access to a number of analogue environments for testing purposes.

The multidisciplinary "Students On Ice" project continues with great success. This program gives secondary school students an opportunity to experience Antarctica first-hand. A glaciology component is included.

Following is a summary of the activities of Canadian glaciologists on Antarctic matters over the period 1999-2002.

**Collaborations with institutions:**

***USA:***

- Desert Research Insititute (D Gratton)
- Jet Propulsion Laboratory (L Gray)
- University of California at Berkeley (E Blake)
- Ice Core Drilling Services (E Blake)
- University of Washington (B Narod)

***New Zealand:***

- Antarctic Research Centre, Victoria University of Wellington (P Holme)

***United Kingdon:***

- British Antarctic Survey (L Gray)

**Research in Progress:**

***Sea Ice:***

- structure of sea ice in McMurdo Sound (S Jones)

***Dry Valleys:***

- interaction of solar radiation and albedo on the hydrologic response (mass balance, runoff, etc) of glaciers and the importance of measurement scale (D

Gratton)
- sedimentology of ancicnt glacial deposits of the Sirius Group (P Holme)

***Remote Sensing:***
- using RADARSAT to map ice flow using interferometric techniques (L Gray)

***Ice Cores**:*
- comparative statistical analysis of ice core records from Antarctica, Greenland, and Arctic Canada (D Fisher)
- design and testing of a precision borehole temperature probe (8 Narod)

***Modeling**:*
- using the East Antarctic Ice Sheet as an analogue for the North Martian Ice Cap (D Fisher)

***Subglacial Lakes**:*
- development of technology for penetration and sampling of sub glacial lakes (E. Blake)
- Canadian Deep Ice Project (CDIP) -an informal multidisciplinary group of scientists interested in extreme environments associated with deep ice and ice covered water bodies

**Popularization in progress:**
- "Students On Ice Expeditions" educational tour of sub-Antarctic islands and Antarctic Peninsula for 1OO Canadian high school students, 2000-2001 and 2001-2002 (G Green, greeen@studentsonicecom)

**Existing funding initiative:**
- Canadian Arctic-Antarctic Exchange Program (operated by the Polar Continental Shelf Project, Natural Resources Canada)
- Canadian Antarctic Research Foundation (CCAR initiative)

**Commercial Activity:**
- Icefield Instruments Inc. of Whitehorse, Yukon built an intermediate-depth ice coring drill for the US Ice Core Drilling Services (ICDS). Icefield has earlier built a drill for the Australian Antarctic Program This drill is used on the US portion of the ITASE project (E Blake)
- Design, manufacture, and testing of a high absolute-accuracy borehole temperature probe (8 Narod)

**Appendix: Scientific publications 1999-2002:**

Blake, E Wand Price, B (2002) A proposed sterile sampling system for Antarctic subglacial lakes. Mem Natl. Inst Polar Res., Spec Issue

Jones, SJ., and Hill, BT., 2001. Structure of sea ice in McMurdo Sound Antarctica Annals of Glaciology, Vol.33, p 5-12

Joughin, I., L Gray, R. Bindschadler , S Price, D Morse, C Hulbe, K Mattar and C.

Werner 1999: Tributaries of West Antarctic Ice Streams Revealed by RADARSAT Interferometry, Science, 286, 283--286.

Gray, A.L., N Short, KE Mattar and KCJezek 2001. Velocities and Ice Flux of the Filchner Ice Shelf and its Tributaries determined from Speckle Tracking Interferometry Canadian Journal of Remote Sensing, Vol. 27, No 3, p 193-206

Gray L, N Short, B Bindschadler, I. Joughin, L Padman, P Vornberger, and A Khananian in press: RADARSAT Interferometry for Antarctic Grounding Zone Mapping, accepted for publication Annals of Glaciology, 2002

Fisher D A, "High resolution rnult-proxy-clirnate records from ice cores, tree rings,corals and doumentary sources; reconstructions and eigen vectors; results and significance", in Press in HOLOCENE out in 2002

Siegert M J and Fisher D A, in press ICARUS, ," A terrestrial analogy for Martian 'accublation zones' revealed by airborne ice-penetrating radar from the East Antarctic Ice Sheet'"