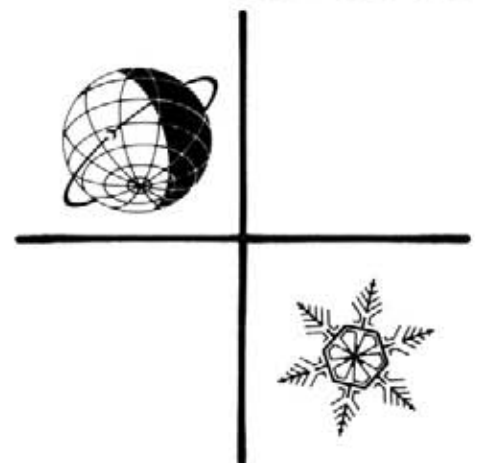


GLACIOLOGICAL
DATA

this issue:

**GLACIOLOGICAL
FIELD STATIONS
PART 1**

World Data Center A
for
Glaciology
Snow and Ice



FEBRUARY 1979

WORLD DATA CENTER A
National Academy of Sciences
2101 Constitution Avenue, N.W.
Washington, D.C., U.S.A., 20418

World Data Center A consists of the Coordination Office

and seven Subcenters:

World Data Center A
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University of Colorado
Boulder, Colorado, U.S.A. 80309
[Telephone: (303) 492-5171]

Meteorology (and Nuclear Radiation):

World Data Center A: Meteorology
National Climatic Center
Federal Building
Asheville, North Carolina, U.S.A. 28801
[Telephone: (704) 258-2850]

Oceanography:

World Data Center A: Oceanography
National Oceanic and Atmospheric
Administration
Washington, D.C., U.S.A. 20235
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Rockets and Satellites:

World Data Center A: Rockets and
Satellites
Goddard Space Flight Center
Code 601
Greenbelt, Maryland, U.S.A. 20771
[Telephone: (301) 982-6695]

Rotation of the Earth:

World Data Center A: Rotation
of the Earth
U.S. Naval Observatory
Washington, D.C., U.S.A. 20390
[Telephone: (202) 254-4023]

Solar-Terrestrial Physics (Solar and
Interplanetary Phenomena, Ionospheric
Phenomena, Flare-Associated Events,
Geomagnetic Variations, Magnetospheric
and Interplanetary Magnetic Phenomena,
Aurora, Cosmic Rays, Airglow):

World Data Center A
for Solar-Terrestrial Physics
Environmental Data and Information
Service, NOAA
Boulder, Colorado, U.S.A. 80303
[Telephone: (303) 499-1000, Ext. 6467]

Solid-Earth Geophysics (Seismology,
Tsunamis, Gravimetry, Earth Tides,
Recent Movements of the Earth's
Crust, Magnetic Measurements,
Paleomagnetism and Archeomagnetism,
Volcanology, Geothermics):

World Data Center A
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Boulder, Colorado, U.S.A. 80303
[Telephone: (303) 499-1000, Ext. 6521]

NOTES:

1. World Data Centers conduct international exchange of geophysical observations in accordance with the principles set forth by the International Council of Scientific Unions. WDC-A is established in the United States under the auspices of the National Academy of Sciences.
2. Communications regarding data interchange matters in general and World Data Center A as a whole should be addressed to: World Data Center A, Coordination Office (see address above).
3. Inquiries and communications concerning data in specific disciplines should be addressed to the appropriate subcenter listed above.

REPORT GD-4

GLACIOLOGICAL FIELD STATIONS

PART 1

Compiled by
Robert Vivian
Institut de Geographie Alpine
Rue Maurice Gignoux
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France

FEBRUARY 1979

U.S. Department of Commerce
National Oceanic and Atmospheric Administration
Environmental Data and Information Service
Boulder, Colorado 80303 U.S.A.

DESCRIPTION OF DATA CENTERS

WDC-A, Glaciology is one of three international data centers serving the field of glaciology under the guidance of the International Council of Scientific Unions Panel on World Data Centres. It is part of the World Data Center System created by the scientific community in order to promote worldwide exchange and dissemination of geophysical information and data. WDC-A endeavors to be promptly responsive to inquiries of the scientific community and to provide data and bibliographic services in exchange for copies of publications or data by the participating scientists.

The addresses of the three WDCs for Glaciology and of a related Permanent Service are:

World Data Center A
INSTAAR
University of Colorado
Boulder, Colorado, U.S.A. 80309

World Data Center B
Molodezhnaya 3
Moscow 117 296, USSR

World Data Center C
Scott Polar Research Institute
Lensfield Road
Cambridge, CB2 1ER, England

Permanent Service on the Fluctuations of Glaciers
Section on Hydrology and Glaciology
Research Institute on Hydraulics and Soil Mechanics
Federal Institute of Technology
Voltastrasse 24
8044 Zürich, Switzerland

The World Data Centers follow the guidelines established by the International Council of Scientific Unions Third Consolidated Guide to International Data Exchange through the World Data Centres, 1973. The following description from the Guide details the form of the data accepted by the WDCs.

General. WDCs are prepared to accept raw, analyzed, or published data, including photographs. It is suggested that researchers submitting data to the WDCs do so in a form which will be intelligible to other users. Researchers should be aware that the WDCs are prepared to organize and store data which may be too detailed or bulky for inclusion in published works. It is understood that such data which are submitted to the WDCs will be made available according to guidelines set down by the ICSU Panel on WDCs in the Guide to International Data Exchange. Such material will be available to researchers as copies from the WDC at cost, or if it is not practical to copy the material, it can be consulted at the WDC. In all cases the person receiving the data will be expected to respect the usual rights, including acknowledgment, of the original investigator.

Fluctuations of Glaciers. The Permanent Service will be responsible for receiving data on the fluctuations of glaciers and will also receive such data as are generated by the International Hydrological Decade Project on Variations of Existing Glaciers. The types of data which should be sent to the Permanent Service are detailed in UNESCO/IASH (1969) Variations of Existing Glaciers: A Guide to International Practices for Their Measurement. These data should be sent through national correspondents in time to be included in the regular reports of the Permanent Service every 4 years (1964-68, 1968-72, etc.).

Projects of the International Hydrological Decade. In addition to the above, the International Hydrological Decade, 1965-74, sponsored an Inventory of Seasonal and Perennial Snow and Ice Masses, as well as a project on the Combined Heat, Ice and Water Balances at Selected Glacier Basins. A Temporary Technical Secretariat (UNESCO) for World Glacier Inventory is now operated by the Permanent Service on the Fluctuations of Glaciers.

In order that the WDCs may serve as information centers, researchers and institutions are requested:

To send WDCs reprints of all published papers and public reports which contain glaciological data or data analysis; one copy should be sent to each WDC or, alternatively, three copies to one WDC for distribution to the other WDCs.

To notify WDCs of changes in operations involving international glaciological projects, including termination of previously existing stations or major experiments, commencement of new experiments, and important changes in mode of operation.

FOREWORD

Information on data collection activities in glaciological science is a necessary complement to data sets themselves and to published results based on data interpretation. This issue marks a first effort by the Data Center to assemble such information for glaciological field stations. The questionnaire was developed by Professor Robert Vivian, Director of the Institut de Géographie Alpine, Université de Grenoble, during his stay as visiting scientist with the WDC in 1977, and he undertook subsequently to collate and summarize the results. While the lists are undoubtedly not exhaustive, we believe that they provide a useful interim guide to facilities and organizations involved in field research relating to glaciers and ice caps. At a later date it may be desirable to publish a supplement with additions and corrections.

It is currently planned that Glaciological Data number 5 will contain results of a WDC Workshop on Snow Cover and Sea Ice Mapping and Glaciological Data number 6, a survey of related map products. The planned issue on snow cover, including a bibliography, has been delayed due to staffing problems relating to computer data entry of bibliographic items. This issue is now scheduled to appear as number 7.

Roger G. Barry
Director
World Data Center A for Glaciology
(Snow and Ice)

PREFACE

We wish to thank all respondents for their efforts in completing and returning the glaciological field station questionnaires. In cases where we received responses from different scientists for the same station, we have combined the questionnaires into one. We have not tabulated results such as types of research and data collected, because there are stations for which no responses have been received (the Antarctic stations of McMurdo, Amundsen-Scott South Pole, Syowa, Dumont d'Urville, Vostok, Mirnyy, Molodezhnaya, Novolazarevskaya, for example). Page limitations disallowed our reproducing the maps which accompanied many of the responses, but citations to these maps have been added to the questionnaires.

We extend grateful thanks to Professor Robert Vivian for the conception and implementation of the original questionnaire during his stay as visiting scientist with the WDC. The map was drafted by Marilyn Joel, Institute of Arctic and Alpine Research.

Marilyn J. Shartran
Managing Editor

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INTRODUCTION

In October, 1977, a questionnaire was circulated to all glaciologists belonging to the International Glaciological Society, and to various national and international organizations concerned with snow and ice. The objective of this questionnaire was to assess the worldwide mechanisms used for glaciological research, with particular reference to glaciological field stations. It sought responses to the following questions:

Where are the centers of glaciological studies, and how are they regionally distributed?

What is the type of activity, and what are the resources of staff and materials at their disposal?

In terms of the different problems in glaciological science, what problems are studied at each station and when did these studies begin?

The final points concerned the documentation:

What data are collected and in what form do they exist?

What publications describe the research undertaken and tabulate results?

The need for such documentation to complement other inventory activities such as those of the Permanent Service on the Fluctuation of Glaciers and the UNESCO Temporary Technical Secretariat for World Glacier Inventory has long been apparent. The World Data Centers for Glaciology can provide a valuable service in organizing this information. Glaciologists will appreciate knowing what field research is carried out in different regions and from which organizations they can obtain data relating to the various parameters studied at these glaciological stations.

On the basis of the responses received, which undoubtedly do not represent all organizations and facilities, 56 stations are located in the Northern Hemisphere, compared with only 11 in the Southern Hemisphere. The locations of the stations are indicated on the map on page 3 for part 1 (part 2, page 103). The key to the map is on pages 4 and 5 for part 1 (part 2, pages 104 and 105). The numbering is also the order used for station details in the remainder of this report. It will be seen that the stations are grouped by country or geographical region.

Fourteen countries are concerned with the management of glaciological stations, distributed as follows:

Argentina	1	Kenya	1
Australia	1	New Zealand	4
Austria	1	Norway	16
Canada	3	Sweden	1
France	6	Switzerland	1
Great Britain	4	U.S.A.	12
Japan	6	U.S.S.R.	10

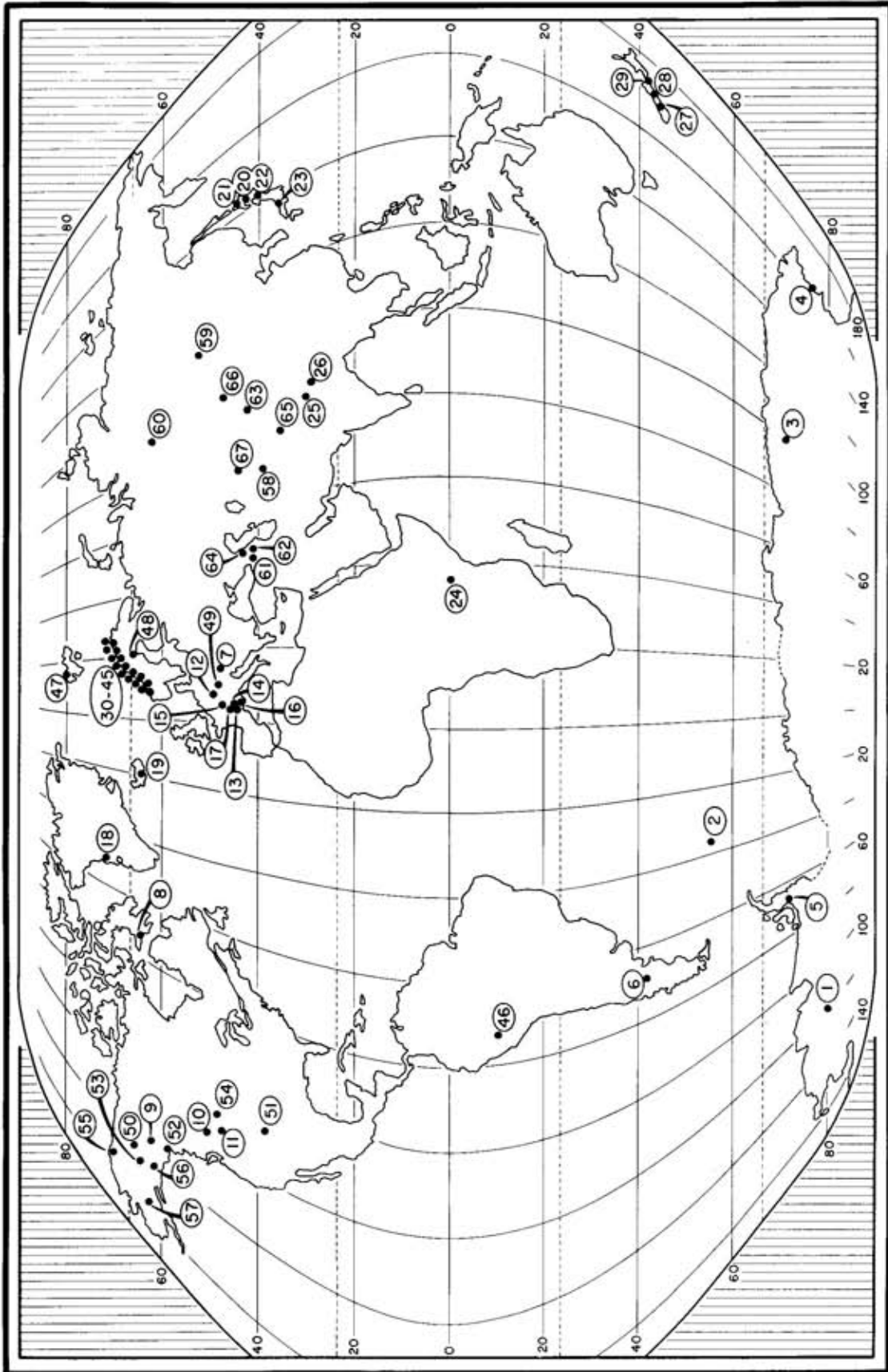
The geographical sectors where glaciological stations are concentrated are naturally associated with the great mountain chains of the world and with the polar and subpolar regions:

Americas (15)	Western Cordillera	8
	Andes	2
	Arctic Canada and Greenland	5
Africa (1)		
Western Europe (27)	Scandinavia (Spitsberg)	20
	Alps	7
U.S.S.R. (10)	Altai	1
	Caucasus	3
	Pamirs	3
	Tien Shan	2
	Urals	1
Asia (6)	Himalayas	2
	Japan	4
New Zealand (4)		
Antarctic (5)		

Although the information provided is not exhaustive, it is hoped that it will serve as a useful outline of field research in glaciology. The inventory and the bibliographies that are included with the appropriate station descriptions can hopefully be completed and updated in the future. Communications correcting or supplementing the information provided will be welcomed by World Data Center A for Glaciology (Snow and Ice).

Robert Vivian
 Institut de Géographie Alpine
 Rue Maurice Gignoux
 38031 Cedex, Grenoble
 France

GLACIOLOGICAL FIELD STATIONS



KEY TO MAP

1. Antarctica - Byrd Station
2. Antarctica - Hodges Glacier Hut
3. Antarctica - Mawson, Casey Stations
4. Antarctica - Scott Base, Vanda Station
5. Antarctica - Spartan Glacier Station
6. Argentina - Mascardi-Tronador Station
7. Austria - Station Hintereis
8. Canada - Gee Lake Station
9. Canada - Icefield Ranges Research Project
10. Canada - Peyto Glacier Station
11. Canada - Wedgemount Lake
12. France - Argentière (Mt. Blanc)
13. France - Centre d'Etudes Nucleaires de Grenoble
14. France - Centre Technique du Génie Rural, des Eaux et des Forêts
15. France - Chalet Clos de l'Ours, Laboratoire de Cosmique, Observatoire Vallot, Cabane Tacul
16. France - Chambeyron, Fouillouse
17. France - Val Thorens-Chavière
18. Greenland - Scottish Universities Research Hut
19. Iceland - Satellite Monitoring of Changes of Glaciers of Iceland
20. Japan - Moshiri
21. Japan - Toikanbetsu
22. Japan - Tomakomai
23. Japan - Tsurugisawa-goya
24. Kenya - Alliance
25. Nepal - Hidden Valley
26. Nepal - Lhajung
27. New Zealand - Carrick
28. New Zealand - Dart Glacier Hut
29. New Zealand - Ivory Glacier Hut
30. Norway - Ålfoten
31. Norway - Blåisen
32. Norway - Cainhavarre
33. Norway - Engabreen

34. Norway - Erdalsbreen
35. Norway - Folgefonni
36. Norway - Gråsubreen
37. Norway - Hellstugubreen
38. Norway - Høgtuvbreen
39. Norway - Nigardsbreen
40. Norway - Okstindsjøen Station
41. Norway - Østre Memurubre
42. Norway - Storsteinsfjell
43. Norway - Trollbergdalsbreen
44. Norway - Tūnsbergdalsbreen
45. Norway - Vesledalsbreen
46. Peru - Quelccaya
47. Spitsbergen - Forskningsstasjonen på Svalbard
48. Sweden - Tarfala Research Station
49. Switzerland - Eidgenössische Institut für Schnee- und Lawinenforschung
50. USA - Gulkana Glacier
51. USA - Institute of Arctic and Alpine Research
52. USA - Juneau Icefield Research Program (JIRP) Stations
53. USA - Mt. Wrangell
54. USA - Sperry Chalet Field Project
55. USA - University of Buffalo Brooks Range Camp
56. USA - Variegated Glacier
57. USA - Wolverine Glacier
58. USSR - Abramov Glacier
59. USSR - Aktru glaciers
60. USSR - Bol'shaya Khadata, Obruchev and IGAN Glaciers
61. USSR - Dzhankuat Glacier
62. USSR - Gergeti Glacier
63. USSR - Karabatkak Glacier
64. USSR - Marukh Glacier
65. USSR - Medvezhy Glacier
66. USSR - Shumsky Glacier
67. USSR - Zentralnyi Tuyuksu Glacier

ANTARCTICA
BYRD STATION

A. GEOGRAPHICAL LOCATION.

- 1) Country Antarctica
- 2) Name of station Byrd Station
- 3) Locality Marie Byrd Land Ice Sheet
- 4) Latitude: 80° S Longitude: 120° W Elevation(m) 1550
- 5) Mountain range _____
- 6) Drainage basin _____
- 7) Name of director _____
- 8) Name of parent organization National Science Foundation
Address 1800 G Street
Washington, D.C. USA
Telephone number _____
- 9) Date of establishment of the station 1956
- 10) Distance from the end of the road (in kilometers or hours of walking)
1500 km
Other means of access: planes, float planes, helicopter, boat, etc.
airplane
Boarding point McMurdo Station
- 11) Distance between the station and the glaciers studied 0 km

B. DESCRIPTION OF THE STATION (INCLUDE A MAP IF AVAILABLE).

- 1) Number of buildings no longer useable
 - a) Total floor space _____
 - b) Details: e.g. Laboratories _____
Dormitories _____
Number of beds _____
Kitchens, dining rooms _____
Workshops _____

Cold rooms _____
Generator source _____

- 2) Major research activities of the station (please check and rank in order of importance)
- a) Glaciology _____ 1 _____
 - b) Snow studies _____ 2 _____
 - c) Hydrology _____
 - d) Climatology _____ 5 _____
 - e) Geophysics _____ 3 _____
 - f) Geomorphology _____
 - g) Botany, biology _____
 - h) Quaternary history _____ 4 _____

C. CALENDAR TIMING OF ACTIVITIES OF THE STATION.

- 1) Period of record _____ 1956-1973 _____
- 2) Yearly utilization period _____ all year _____
- 3) Type of utilization (teaching, research, level of students involved) _____
research _____
- 4) Number of researchers: Summer _____ 3 _____ Winter _____ 0 _____
- 5) Number of technicians: Summer _____ 4 _____ Winter _____ 2 _____
- 6) List of station personnel (and speciality). ATTACH LIST.
- 7) Other laboratories working temporarily at the station on joint/separate projects _____

D. MAIN TYPES OF RESEARCH AND DATA COLLECTED.

Put "O" for ongoing research, "P" for previous studies. Indicate period of records. (Add appropriate details.)

- 1) Glaciological research:
 - a) Name/UNESCO inventory number of glacier(s) _____ Antarctic ice sheet _____
 - b) Fluctuations (terminal position, surface, mass balance) _____
 - c) Dynamics, movement _____ P _____
 - d) Studies of surface _____ P _____
 - e) Studies of deep ice (coring) _____ P _____
 - f) Subglacial studies (access type) _____
 - g) Ice Chemistry and physics _____ P _____
 - h) Remote sensing _____ P _____
- 2) Snow study:
 - a) Snow cover _____ P _____
 - b) Avalanches _____
- 3) Hydrology:
 - a) Discharges _____ P _____
 - b) Ice cover percentage _____
 - c) Sub glacial hydrology _____
 - d) Ice surface feature _____ P _____
 - e) Lacustrine hydrology _____ 8 _____

- 4) Climatology:
 a) Proximity to glacier 0 km
 b) Parameters standard station measurements and radio soundes in summer
- 5) Geophysics:
 a) Radio-echo sounding method P
 b) Magnetic surveys; electromagnetism _____
- 6) Earth science (including area surrounding station)
 a) Geology _____
 b) Tectonics _____
 c) Glacial geomorphology _____
- 7) Botany - biology (including area surrounding station)
 a) Pollen analysis _____
 b) Micro bacterial fauna _____
 c) Flora _____
 d) Fossil woods (C^{14} dating) _____
 e) Timberline _____
 f) Lichenometry _____
- 8) Quaternary history:
P.O. From ice core stratigraphy

E. DATA AVAILABILITY.

- 1) Tabulations _____
 Published reports _____
 Unpublished reports _____
- 2) Data files (tape, cards, satellite transmissions) _____

- 3) Address from which data are available _____

- 4) Other information _____

F. MAIN PUBLICATIONS (ATTACH LIST).

G. OTHER COMMENTS.

References

- Dewart, G.; Whillans, I.M. (1970) Geophysical and glaciological studies along the Byrd Station Strain Net, 1969-70. Antarctic Journal of the United States, v. 5(4), pp. 111-112.
- Dewart, G.; Whillans, I.M.; Brecher, H.H. (1975) Analysis of the Byrd Station Net, Antarctica. Ohio State University Research Foundation. Institute of Polar Studies. Report no. 48, (1974), 49 pp.
- Whillans, I.M. (1970) Ice sheet dynamics in Marie Byrd Land. Ice, (33), p. 13.
- Whillans, I.M. (1972) Ice sheet dynamics near Byrd Station. Antarctic Journal of the United States, v. 7(4), pp. 111.
- Whillans, I.M. (1973) State of equilibrium of the West Antarctic inland ice sheet. Science, v.182(4111), pp. 476-479.
- Whillans, I.M.; Thompson, L.G. (1974) Glaciological studies along the Byrd Station Strain Network. Antarctic Journal of the United States, v. 9(4), pp. 167-168.
- Whillans, I.M. (1975) Effect of inversion winds on topographic detail and mass-balance on inland ice sheets. Journal of Glaciology, v.14(70), pp. 85-90.
- Whillans, I.M. (1975) Mass-balance and ice flow along the Byrd Station Strain Network, Antarctica. Ph.D. dissertation, Ohio State University, 141 pp.
- Whillans, I.M. (1975) The surface mass-balance of Marie Byrd Land, Antarctica: Data interpretation and application. Ohio State University Research Foundation, Institute of Polar Studies. Report no. 51, 86 pp.
- Whillans, I.M. (1976) Radio-echo layers and the recent stability of the West Antarctic ice sheet. Nature, v.264(5582), pp. 152-155.
- Whillans, I.M. (1978) Surface mass balance variability near Byrd Station, Antarctica, and its importance to ice core stratigraphy. Journal of Glaciology, v.20(83), pp. 301-310.
- Whillans, I.M. (In press) The equation of continuity and its application to the ice sheet near Byrd Station, Antarctica. Journal of Glaciology.
- Whillans, I.M. (In press) Ice movement. In: Robin, G. de Q., ed., Cambridge workshop monograph. Isotopic and temperature profiles in polar ice sheets, 1973.

ANTARCTICA
HODGES GLACIER HUT

A. GEOGRAPHICAL LOCATION.

- 1) Country South Georgia
- 2) Name of station Hodges Glacier Hut
- 3) Locality Cumberland Bay
- 4) Latitude: 54°16'S Longitude: 36°32'W Elevation(m) 333 m a.s.l.
- 5) Mountain range Located ½ km west of Mt. Hodges. Not part of specific range.
- 6) Drainage basin Hodges Basin
- 7) Name of director jointly: Dr. C.W.M. Swithinbank and Dr. J.S.G. McCulloch
- 8) Name of parent organization Joint Project of British Antarctic Survey and Institute of Hydrology
Address British Antarctic Survey, Madingley Road, Cambridge CB3 0ET, England
Institute of Hydrology, Maclean Building, Crowmarsh Gifford, Wallingford,
Telephone number (UK)BAS: 0223 61188. IH: 0491 38800. OX1 8BB, England.
- 9) Date of establishment of the station Measurements begun Mar.72, terminated Mar.77.
- 10) Distance from the end of the road (in kilometers or hours of walking)
3 km walk from British Antarctic Survey Base at King Edward Point.
Other means of access: planes, float planes, helicopter, boat, etc. Seasonal
Ship access to King Edward Point. Occasional helicopter access courtesy R.N.
Boarding point There is no scheduled public transport to South Georgia.
- 11) Distance between the station and the glaciers studied 200 metres.

B. DESCRIPTION OF THE STATION (INCLUDE A MAP IF AVAILABLE).

- 1) Number of buildings One 2
- a) Total floor space approx 20 m
- b) Details: e.g. Laboratories 1 work/sleeping room
Dormitories see above
Number of beds 3 bunks
Kitchens, dining rooms 1 kitchen
Workshops see above

Cold rooms None
Generator source None

- 2) Major research activities of the station (please check and rank in order of importance)
- a) Glaciology 1
 - b) Snow studies 1
 - c) Hydrology 1
 - d) Climatology 1
 - e) Geophysics _____
 - f) Geomorphology 5 of minor importance.
 - g) Botany, biology _____
 - h) Quaternary history _____
- } of equal importance as parts of combined Heat, Ice and Water Balances project.

C. CALENDAR TIMING OF ACTIVITIES OF THE STATION.

- 1) Period of record Begun March 1972, Terminated March 1977.
- 2) Yearly utilization period Station manned 12 months/year during period of record.
- 3) Type of utilization (teaching, research, level of students involved) _____
Research only
- 4) Number of researchers: Summer currently 0 Winter currently 0
- 5) Number of technicians: Summer currently 0 Winter currently 0
- 6) List of station personnel (and speciality). ATTACH LIST.
- 7) Other laboratories working temporarily at the station on joint/separate projects _____
None

D. MAIN TYPES OF RESEARCH AND DATA COLLECTED.

Put "O" for ongoing research, "P" for previous studies. Indicate period of records. (Add appropriate details.)

- 1) Glaciological research:
 - a) Name/UNESCO inventory number of glacier(s) Hodges Glacier
South Georgia
 - b) Fluctuations (terminal position, surface, mass balance) Meteorology (P) 1972-7
Mass Budget (P) 1972-7. Surface Elevation (P) 1974, 1977. Terminal Position (P)
 - c) Dynamics, movement Surface movement (P) 1973-74 and 1975-77. [1974, 1977.
 - d) Studies of surface Albedo (P) 1972-6 (various dates)
 - e) Studies of deep ice (coring) -
 - f) Subglacial studies (access type) -
 - g) Ice Chemistry and physics Multi-annual O^{18}/O^{16} isotope sample obtained Mar. 1977
 - h) Remote sensing Occasional vertical air photographs (during early Ablation season only) 1972-7. (P)
- 2) Snow study:
 - a) Snow cover Snow cover of entire basin studied 1972-7 (P)
 - b) Avalanches Avalanche redistribution of stored water equivalent. Winters
- 3) Hydrology: 1972-6 (P).
 - a) Discharges Hourly surface discharge from entire basin monitored for summers
 - b) Ice cover percentage Ablation seasons 1972-6 (P) 1972-6 (P).
 - c) Sub glacial hydrology -
 - d) Ice surface feature -
 - e) Lacustrine hydrology -

- 4) Climatology: Within 150 m of snout (continuous 1972-7 (P)).
 a) Proximity to glacier _____
 b) Parameters Wind run, wind direction, temperature, humidity, net radiation,
- 5) Geophysics: shortwave radio precipitation. Frequent daily observations to
 a) Radio-echo sounding method - [calibrate instruments.]
 b) Magnetic surveys; electromagnetism -
-
- 6) Earth science (including area surrounding station)
 a) Geology (P)
 b) Tectonics -
 c) Glacial geomorphology (P)
- 7) Botany - biology (including area surrounding station)
 a) Pollen analysis -
 b) Micro bacterial fauna -
 c) Flora -
 d) Fossil woods (C¹⁴ dating) -
 e) Timberline -
 f) Lichenometry -
- 8) Quaternary history:
For outline of regional quaternary history see:
CLAPPERTON, C.M. 1971 Geomorphology of Stromness Bay - Cumberland Bay Area,
South Georgia. British Antarctic Survey Scientific
Reports. No. 70.

E. DATA AVAILABILITY.

- 1) Tabulations See tabulation for ice and heat budgets during summer 1973/74.
 Published reports none
 Unpublished reports Details of fieldwork undertaken in:
Seasonal glaciology reports of British Antarctic Survey. South Georgia.
- 2) Data files (tape, cards, satellite transmissions) _____
None
-
- 3) Address from which data are available
British Antarctic Survey, Madingley Road, Cambridge, CB3 0ET, England.
-
- 4) Other information
Data abstraction currently in progress.

F. MAIN PUBLICATIONS (ATTACH LIST). None published.

G. OTHER COMMENTS.

Hodges Glacier Basin was the site of an International Hydrological Decade "special station" for the study of combined Heat, Ice and Water Balances 1972-7.
Station employed 3 researchers 1972-4 and 1 researcher 1974-7.
Hodges Glacier Hut lies within 3 km of King Edward Point where the British Antarctic Survey maintains a multidisciplinary scientific base.

ANTARCTICA
MAWSON, CASEY STATIONS

A. GEOGRAPHICAL LOCATION.

- 1) Country Antarctica
- 2) Name of station Mawson, Casey
- 3) Locality East Antarctica
- 4) Latitude: _____ Longitude: _____ Elevation(m) _____
- 5) Mountain range _____
- 6) Drainage basin East Antarctic
- 7) Name of director _____
- 8) Name of parent organization Australian National Antarctic Research Expeditions
c/o Antarctic Division
Address 568 St. Kilda Road
Melbourne, Vic. 3094
Australia
Telephone number (03) 510271
- 9) Date of establishment of the station 1954
- 10) Distance from the end of the road (in kilometers or hours of walking) _____
Other means of access: planes, float planes, helicopter, boat, etc.
ship
Boarding point Mawson Harbour
- 11) Distance between the station and the glaciers studied _____
0-600 km

B. DESCRIPTION OF THE STATION (INCLUDE A MAP IF AVAILABLE).

- 1) Number of buildings _____
 - a) Total floor space _____
 - b) Details: e.g. Laboratories _____
Dormitories _____
Number of beds _____
Kitchens, dining rooms _____
Workshops _____

Cold rooms _____
Generator source _____

- 2) Major research activities of the station (please check and rank in order of importance)
- a) Glaciology _____ X _____
 - b) Snow studies _____ X _____
 - c) Hydrology _____
 - d) Climatology _____
 - e) Geophysics _____ X _____
 - f) Geomorphology _____
 - g) Botany, biology _____ X _____
 - h) Quaternary history _____

C. CALENDAR TIMING OF ACTIVITIES OF THE STATION.

- 1) Period of record _____
- 2) Yearly utilization period _____
- 3) Type of utilization (teaching, research, level of students involved) _____

- 4) Number of researchers: Summer _____ Winter _____
- 5) Number of technicians: Summer _____ Winter _____
- 6) List of station personnel (and speciality). ATTACH LIST.
- 7) Other laboratories working temporarily at the station on joint/separate projects _____

D. MAIN TYPES OF RESEARCH AND DATA COLLECTED.

Put "O" for ongoing research, "P" for previous studies. Indicate period of records. (Add appropriate details.)

- 1) Glaciological research:
 - a) Name/UNESCO inventory number of glacier(s) _____
 - b) Fluctuations (terminal position, surface, mass balance) _____ 0 _____
 - c) Dynamics, movement _____ 0 _____
 - d) Studies of surface _____ 0 _____
 - e) Studies of deep ice (coring) _____ p _____
 - f) Subglacial studies (access type) _____
 - g) Ice Chemistry and physics _____
 - h) Remote sensing _____ 0 _____
- 2) Snow study:
 - a) Snow cover _____
 - b) Avalanches _____
- 3) Hydrology:
 - a) Discharges _____
 - b) Ice cover percentage _____
 - c) Sub glacial hydrology _____
 - d) Ice surface feature _____
 - e) Lacustrine hydrology _____

- 4) Climatology:
 - a) Proximity to glacier _____
 - b) Parameters _____
- 5) Geophysics:
 - a) Radio-echo sounding method 0 _____
 - b) Magnetic surveys; electromagnetism 0 _____
- 6) Earth science (including area surrounding station)
 - a) Geology 0 _____
 - b) Tectonics _____
 - c) Glacial geomorphology _____
- 7) Botany - biology (including area surrounding station)
 - a) Pollen analysis _____
 - b) Micro bacterial fauna _____
 - c) Flora _____
 - d) Fossil woods (C^{14} dating) _____
 - e) Timberline _____
 - f) Lichenometry _____
- 8) Quaternary history:

E. DATA AVAILABILITY.

- 1) Tabulations _____

Published reports available (limited)

Unpublished reports _____
- 2) Data files (tape, cards, satellite transmissions) _____

- 3) Address from which data are available _____

Antarctic Division

568 St. Kilda Rd.

Melbourne, Vic 3004 Australia
- 4) Other information _____

F. MAIN PUBLICATIONS (ATTACH LIST).

G. OTHER COMMENTS.

ANTARCTICA
SCOTT BASE, VANDA STATION

A. GEOGRAPHICAL LOCATION.

These field stations also support other scientific programs.

- 1) Country Antarctica
- 2) Name of station Scott Base, Vanda Station
- 3) Locality McMurdo Sound, South Victoria land, Antarctica
- 4) Latitude: 78° 50' S Longitude: 166° 40' E Elevation(m) sea level
- 5) Mountain range Royal Society Range and Transantarctic Mountains
- 6) Drainage basin East Antarctic Ice Sheet
- 7) Name of director Mr. R.B. Thompson
- 8) Name of parent organization Antarctic Division, Department of Scientific and Industrial Research.
Address All correspondence to: Mr. P.H. Robinson, Geology Department
Victoria University of Wellington,
Private Bag, Wellington, N.Z.
Telephone number 721-000 (Geology)
- 9) Date of establishment of the station 1957
- 10) Distance from the end of the road (in kilometers or hours of walking)
Other means of access: planes, float planes, helicopter, boat, etc.
Planes and boat
Boarding point Christchurch, New Zealand
- 11) Distance between the station and the glaciers studied 100 miles, flown by
helicopter (U.S. Navy VXE - 6 Squadron)

B. DESCRIPTION OF THE STATION (INCLUDE A MAP IF AVAILABLE).

- 1) Number of buildings 10
 - a) Total floor space _____
 - b) Details: e.g. Laboratories summer and 'wet' labs
Dormitories 4
Number of beds 60
Kitchens, dining rooms 1 kitchen and 1 diningroom
Workshops 3

Cold rooms none
Generator source 4 generators

- 2) Major research activities of the station (please check and rank in order of importance)
- a) Glaciology 4
 - b) Snow studies 6
 - c) Hydrology 5
 - d) Climatology 2
 - e) Geophysics 5
 - f) Geomorphology 2
 - g) Botany, biology 4
 - h) Quaternary history 3
 - i) Geology 1

C. CALENDAR TIMING OF ACTIVITIES OF THE STATION.

- 1) Period of record September to February: Austral Summer
- 2) Yearly utilization period all year-wintering over
- 3) Type of utilization (teaching, research, level of students involved) Research-combined efforts of Geology Survey, Hydrology Division and University (MSc, PhD students and faculty)
- 4) Number of researchers: Summer (variable) 50 Winter
- 5) Number of technicians: Summer (variable) 5 Winter 3
- * 6) * List of station personnel (and speciality) ATTACH LIST.
- 7) Other laboratories working temporarily at the station on joint/separate projects U.S. Antarctic Research Program (NSF); Australian National Antarctic Research Expeditions; Japan Antarctic Research Expeditions; Italian and French Antarctic Expeditions.

D. MAIN TYPES OF RESEARCH AND DATA COLLECTED.

Put "O" for ongoing research, "P" for previous studies. Indicate period of records. (Add appropriate details.)

- 1) Glaciological research:
 - a) Name/UNESCO inventory number of glacier(s) Unknown--Taylor Glacier
 - b) Fluctuations (terminal position, surface, mass balance) 0
 - c) Dynamics, movement 0
 - d) Studies of surface 0
 - e) Studies of deep ice (coring)
 - f) Subglacial studies (access type) 0
 - g) Ice Chemistry and physics 0
 - h) Remote sensing
- 2) Snow study:
 - a) Snow cover 0
 - b) Avalanches
- 3) Hydrology:
 - a) Discharges 0
 - b) Ice cover percentage 0
 - c) Sub glacial hydrology
 - d) Ice surface feature 0
 - e) Lacustrine hydrology 0 and P

- 4) Climatology: 0 and P
 - a) Proximity to glacier 10 miles (Vanda Station) NZARP
 - b) Parameters _____
- 5) Geophysics:
 - a) Radio-echo sounding method P- SPRI and NSARP and 0
 - b) Magnetic surveys; electromagnetism Gravity survey of entire glacier, linking up with radio echo sounding methods done by previous teams--P
- 6) Earth science (including area surrounding station)
 - a) Geology Basic geological mapping of the entire region -- 0
 - b) Tectonics Measured seismic activity -- 0
 - c) Glacial geomorphology Mapping Quaternary deposits -- P and 0
- 7) Botany - biology (including area surrounding station)
 - a) Pollen analysis on Permian geology -- P
 - b) Micro bacterial fauna 0
 - c) Flora 0
 - d) Fossil woods (C¹⁴ dating) 0
 - e) Timberline _____
 - f) Lichenometry 0
- 8) Quaternary history:

0 and P. Work by many scientific bodies of international status, piecing together the Quaternary glacial and volcanic history of Antarctica and the transantarctic mountains

E. DATA AVAILABILITY.

- 1) Tabulations _____
 Published reports Hydrology and Lands and Survey Reports
 Unpublished reports: All scientific programs are reported to Antarctic Division DSIR, Christchurch, New Zealand
- 2) Data files (tape, cards, satellite transmissions) _____

- 3) Address from which data are available Publications Officer, Antarctic Division, D.S.I.R., P.O. Box 2110, Christchurch, New Zealand

- 4) Other information Antarctic Research Centre, Geology Department, Victoria University of Wellington, Private Bag, Wellington New Zealand

F. MAIN PUBLICATIONS (ATTACH LIST). Numerous, to be found in most journals (lists available from above address)

G. OTHER COMMENTS.

C. 6. * Personnel at this field station varies each year.

ANTARCTICA

SPARTAN GLACIER STATION

A. GEOGRAPHICAL LOCATION.

- 1) Country British Antarctic Territory
 - 2) Name of station Spartan Glacier
 - 3) Locality on the Eastern edge of Alexander Island, Antarctic Peninsula
 - 4) Latitude: 71° 03' S Longitude: 68° 23' W Elevation(m) 262
 - 5) Mountain range Planet Heights
 - 6) Drainage basin Spartan Glacier
 - 7) Name of director Dr. R. M. Laws
 - 8) Name of parent organization British Antarctic Survey
- Address Madingley Road, Cambridge CB3 0ET
England
- Telephone number Cambridge 61188
- 9) Date of establishment of the station January 1972
 - 10) Distance from the end of the road (in kilometers or hours of walking)
no road
Other means of access: planes, float planes, helicopter, boat, etc.
sloping airstrip on glacier surface near huts
Boarding point Rothera Base 67° 34'S, 68° 07'W
 - 11) Distance between the station and the glaciers studied none

B. DESCRIPTION OF THE STATION (INCLUDE A MAP IF AVAILABLE).

- 1) Number of buildings Two situated in the centre of the glacier on snow
 - a) Total floor space 12 m²
 - b) Details: e.g. Laboratories one, very small
Dormitories one in 6 m² living hut
Number of beds two
Kitchens, dining rooms none
Workshops none 20

Cold rooms none
Generator source none permanent

- 2) Major research activities of the station (please check and rank in order of importance)
- a) Glaciology 1
 - b) Snow studies 3
 - c) Hydrology 3
 - d) Climatology 2
 - e) Geophysics
 - f) Geomorphology
 - g) Botany, biology
 - h) Quaternary history

C. CALENDAR TIMING OF ACTIVITIES OF THE STATION.

- 1) Period of record Jan. 1972 to Oct. 1974 (full record), 1969 to 1976 (part record)
- 2) Yearly utilization period early September through to early June
- 3) Type of utilization (teaching, research, level of students involved) research only
- 4) Number of researchers: Summer 1 Winter 1
- 5) Number of technicians: Summer 1 Winter 1
- 6) List of station personnel (and speciality). ATTACH LIST.
- 7) Other laboratories working temporarily at the station on joint/separate projects none

D. MAIN TYPES OF RESEARCH AND DATA COLLECTED.

Put "O" for ongoing research, "P" for previous studies. Indicate period of records. (Add appropriate details.)

- 1) Glaciological research:
 - a) Name/UNESCO inventory number of glacier(s) Spartan Glacier
 - b) Fluctuations (terminal position, surface, mass balance) 0 Sept. 1969 to
 - c) Dynamics, movement P Sept 1969 to
 - d) Studies of surface P Sept 1969 to
 - e) Studies of deep ice (coring) none
 - f) Subglacial studies (access type) none
 - g) Ice Chemistry and physics none
 - h) Remote sensing airbourne radio-echo sounding 1969/70, 1971/72, 1975
surface borne radio-echo sounding 1972
- 2) Snow study:
 - a) Snow cover 0 Sept 1969 to
 - b) Avalanches none
- 3) Hydrology:
 - a) Discharges P summers of 1972/73 and 1973/74
 - b) Ice cover percentage 90%
 - c) Sub glacial hydrology none
 - d) Ice surface feature none
 - e) Lacustrine hydrology none

References

Jamieson, A.W.; Wager, A.C. (In press) Ice, water and energy balance at Spartan Glacier, Alexander Island. British Antarctic Survey Bulletin.

Wager, A.C.; Jamieson, A.W. (1977) Energy exchange at a glacier surface. Journal of Glaciology, v.18(78), pp. 47-55.

Wager, A.C. (In press) Mapping the depth of a valley glacier by radio-echo sounding. British Antarctic Survey Bulletin.

Past Personnel

1969, 1972	A.C. Wager	Glacier heat and mass balance, radio echo sounding.
1973	A.W. Jamieson	Glacier heat and mass balance, movement studies.
1973, 1974	J.F. Bishop	Glacier heat and mass balance, movement studies.
1974, 1975	J.W.L. Walton	Movement studies.
1974, 1975	G. Tourney	Movement studies, mass balance.
1973, 1974	R. Tindley	Mechanic and general assistant.
1973	S. Hobbs	Mechanic and general assistant.
1971, 1972	M.R. Pearson	Glacier heat and mass balance, movement studies.
1971, 1972	I.H. Rose	Glacier heat and mass balance, movement studies.
1974	P. Lennon	Movement studies, mass balance.
1969, 1970	G. Kistruck	Movement studies, mass balance.

ARGENTINA
MASCARDI-TRONADOR STATION

A. GEOGRAPHICAL LOCATION.

- 1) Country Argentina
- 2) Name of station Mascardi-Tronador
- 3) Locality San Carlos de Bariloche, Rio Negro
- 4) Latitude: 41° 10' S Longitude: 71° 50' W Elevation(m) 845
- 5) Mountain range Northern Patagonian Andes
- 6) Drainage basin Upper Rio Manso
- 7) Name of director Dr. Jorge Rabassa
- 8) Name of parent organization Fundacion Bariloche, Department
of Natural Resources and Energy
Address C.C. 138
8400 San Carlos de Bariloche
- Telephone number 2-2533 TX 015752 AR
- 9) Date of establishment of the station June 1969
- 10) Distance from the end of the road (in kilometers or hours of walking)
The road passes in front of the station.
Other means of access: planes, float planes, helicopter, boat, etc.
Boat by lake Mascardi
Boarding point
- 11) Distance between the station and the glaciers studied
To Mt. Tronador : 20 km
To Mt. Bonete : 5 km

B. DESCRIPTION OF THE STATION (INCLUDE A MAP IF AVAILABLE).

- 1) Number of buildings 2
 - a) Total floor space 70 m²
 - b) Details: e.g. Laboratories 1
Dormitories 2
Number of beds 3
Kitchens, dining rooms yes
Workshops 24

Cold rooms _____
Generator source 220v, alt; 2 1/2 kw

- 2) Major research activities of the station (please check and rank in order of importance)
- a) Glaciology 2
 - b) Snow studies 7
 - c) Hydrology 1
 - d) Climatology 3
 - e) Geophysics _____
 - f) Geomorphology 4
 - g) Botany, biology 6
 - h) Quaternary history 5

CALENDAR TIMING OF ACTIVITIES OF THE STATION.

- 1) Period of record June 1969 up to the present
- 2) Yearly utilization period all through the year
- 3) Type of utilization (teaching, research, level of students involved) _____
Research-Graduate students in residence for field studies
- 4) Number of researchers: Summer variable Winter 1
- 5) Number of technicians: Summer variable Winter 1
- 6) List of station personnel (and speciality). ATTACH LIST.
- 7) Other laboratories working temporarily at the station on joint/separate projects _____
Department of Water Resources, Hidronor S.A.
Water and Electricity Board (AEE)
Argentina Institute of Limnology (INALI)

MAIN TYPES OF RESEARCH AND DATA COLLECTED.

Put "O" for ongoing research, "P" for previous studies. Indicate period of records. (Add appropriate details.)

- 1) Glaciological research:
 - a) Name/UNESCO inventory number of glacier(s) Rio Manso Glacier, Castaño Overo Glacier, Alerce Glacier, Frias Glacier, Bonete South Glacier (O)
 - b) Fluctuations (terminal position, surface, mass balance) _____
Terminal position, surface 0
 - c) Dynamics, movement P
 - d) Studies of surface 0 and P
 - e) Studies of deep ice (coring) no
 - f) Subglacial studies (access type) no
 - g) Ice Chemistry and physics no
 - h) Remote sensing no
- 2) Snow study:
 - a) Snow cover 0 - snow pillow at 1400 m.a.s.l.
 - b) Avalanches no
- 3) Hydrology:
 - a) Discharges 0
 - b) Ice cover percentage 0
 - c) Sub glacial hydrology 0
 - d) Ice surface feature 0
 - e) Lacustrine hydrology 0 25 _____

- 4) Climatology: two complete meteorological stations
 a) Proximity to glacier #1: 15 km; #2: 5 km
 b) Parameters see below
- 5) Geophysics:
 a) Radio-echo sounding method no
 b) Magnetic surveys; electromagnetism no
- 6) Earth science (including area surrounding station)
 a) Geology 0 and P
 b) Tectonics P
 c) Glacial geomorphology 0 and P
- 7) Botany - biology (including area surrounding station)
 a) Pollen analysis 0 University of Arizona at Tucson
 b) Micro bacterial fauna P
 c) Flora 0 and P
 d) Fossil woods (C^{14} dating) 0 University of Arizona at Tucson
 e) Timberline 0 and P
 f) Lichenometry 0
- 8) Quaternary history:
 Various previous studies in geology, geomorphology, vulcanology;
 on going research on neoglacial fluctuations
- 4b) Parameters: precipitation, temperature, humidity, atmospheric pressure, wind velocity, evaporation, insolation.

E. DATA AVAILABILITY.

- 1) Tabulations Data bank for upper Rio Manso Basin
 Published reports Anales Parques Nacionales, 1977, in press.
 Unpublished reports Fundacion Bariloche, Yearly Reports.
- 2) Data files (tape, cards, satellite transmissions)
 Tapes and cards, data stored at computer center, Fundacion Bariloche
- 3) Address from which data are available Fundacion Bariloche
 C.C. 138
 8400 Bariloche
- 4) Other information

F. MAIN PUBLICATIONS (ATTACH LIST).

G. OTHER COMMENTS.

AUSTRIA
STATION HINTEREIS

GEOGRAPHICAL LOCATION.

- 1) Country AUSTRIA
 - 2) Name of station STATION HINTEREIS
 - 3) Locality HINTEREISFERNER
 - 4) Latitude: 46°47'47" N Longitude: 10°45'48" E Elevation(m) 3026
 - 5) Mountain range OETZTAL ALPS
 - 6) Drainage basin ROFENTAL
 - 7) Name of director Dr.MICHAEL KUHN
 - 8) Name of parent organization _____
- Address INSTITUT FUER METEOROLOGIE UND GEOPHYSIK
SCHOEPFSTRASSE 41
A 6020 INNSBRUCK , AUSTRIA
- Telephone number AUSTRIA: 05222/33601/273
- 9) Date of establishment of the station SUMMER 1966
 - 10) Distance from the end of the road (in kilometers or hours of walking)
15km from the end of the road(6hours of walking)
Other means of access: planes, float planes, helicopter, boat, etc.
- Boarding point _____
- 11) Distance between the station and the glaciers studied _____

DESCRIPTION OF THE STATION (INCLUDE A MAP IF AVAILABLE).

- 1) Number of buildings 1
 - a) Total floor space _____ 40 m²
 - b) Details: e.g. Laboratories _____
Dormitories _____
Number of beds _____ 8
Kitchens, dining rooms _____
Workshops _____ 27

Cold rooms _____
Generator source 1.5 kW temporarily

- 2) Major research activities of the station (please check and rank in order of importance)
- a) Glaciology 1
 - b) Snow studies 4
 - c) Hydrology 3
 - d) Climatology 2
 - e) Geophysics _____
 - f) Geomorphology _____
 - g) Botany, biology _____
 - h) Quaternary history _____

CALENDAR TIMING OF ACTIVITIES OF THE STATION.

- 1) Period of record Since 1966
- 2) Yearly utilization period intermittent, year round
- 3) Type of utilization (teaching, research, level of students involved) _____
field work, research
- 4) Number of researchers: Summer 8 Winter 2
- 5) Number of technicians: Summer _____ Winter _____
- 6) List of station personnel (and speciality). ATTACH LIST.
- 7) Other laboratories working temporarily at the station on joint/separate projects _____

MAIN TYPES OF RESEARCH AND DATA COLLECTED.

Put "O" for ongoing research, "P" for previous studies. Indicate period of records. (Add appropriate details.)

- 1) Glaciological research:
 - a) Name/UNESCO inventory number of glacier(s) J46H: 127 - 130
 - b) Fluctuations (terminal position, surface, mass balance) _____
Since 1952 mass balance studies
 - c) Dynamics, movement since 1932, Precision survey since 1965
 - d) Studies of surface Heat balance intermittent since 1952
 - e) Studies of deep ice (coring) _____
 - f) Subglacial studies (access type) _____
 - g) Ice Chemistry and physics _____
 - h) Remote Sensing 1975
- 2) Snow study:
 - a) Snow cover Automatic camera since 1971
 - b) Avalanches _____
- 3) Hydrology:
 - a) Discharges Stream gauge 1957-1959
 - b) Ice cover percentage _____
 - c) Sub glacial hydrology _____
 - d) Ice surface feature 28
 - e) Lacustrine hydrology _____

- 4) Climatology:
 - a) Proximity to glacier Main station 1 km away, 2-3 substations on ice
 - b) Parameters Pressure, temperature, wind, humidity, global radiation
- 5) Geophysics:
 - a) Radio-echo sounding method _____
 - b) Magnetic surveys; electromagnetism _____
- 6) Earth science (including area surrounding station)
 - a) Geology _____
 - b) Tectonics _____
 - c) Glacial geomorphology _____ ^p
- 7) Botany - biology (including area surrounding station)
 - a) Pollen analysis _____ ^p
 - b) Micro bacterial fauna _____
 - c) Flora _____
 - d) Fossil woods (C¹⁴ dating) _____
 - e) Timberline _____
 - f) Lichenometry _____
- 8) Quaternary history:

DATA AVAILABILITY.

- 1) Tabulations _____ } Mass balance, climate
 - Published reports _____
 - Unpublished reports _____
- 2) Data files (tape, cards, satellite transmissions) _____
- 3) Address from which data are available M. Kuhn
 - Institut für Meteorologie und Geophysik
 - Schöpfstrasse 41, A-6020 Innsbruck, Austria
- 4) Other information _____

MAIN PUBLICATIONS (ATTACH LIST).

OTHER COMMENTS.

The glaciological and hydrological investigations of W. Ambach
in the area of Kesselwandferner and Hintereisferner and of
O. Reinwarth on nearby Vernagtferner are not
included in this questionnaire nor in the publication
list.

References

- Dreiseitl, E. (1973) Witterungsklimatologie von Vent und Massenbilanz des Hintereisferners 1955-1971. Ein Beitrag zur Meteorologie der Gletscher. (Weather and climatology at Vent and the mass balance of Hintereisferner 1955-1971. A contribution to the meteorology of glaciers.) Dissertation, University of Innsbruck, Austria, 81 pp.
- Dreiseitl, E. (1976) Zur Berechnung der Eisablation. (Calculation of ice ablation.) Zeitschrift für Gletscherkunde und Glazialgeologie, v.XII(1), pp. 75-78.
- Hoinkes, H.; Dreiseitl, E.; Howorka, F.; Lauffer, I.; Queck, H.; Schneider, W.; Slupetzky, H. (1967) Combined water, ice and heat budget investigations in the Austrian Alps, carried out during the International Hydrological Decade, 1964 to 1966. Final Report, UNESCO Contract NS/2803/65, 89 pp. (mimeographed).
- Hoinkes, H. (1967) Gletscherschwankungen und Wetter in den Alpen. (Glacier variations and weather in the Alps.) 9. Internat. Tagung für Alpine Meteorologie in Brig und Zermatt, September 1966. Veröffentlichen der Schweizer Meteorologische Zentralanstalt, no. 4, pp. 9-24, Zürich.
- Hoinkes, H.; Wendler, G. (1967) Die Berechnung des Strahlungsanteils an der Ablation im Gebiet des Hintereis- und Kesselwandferners (Ötztaler Alpen) im Sommer 1958. (Calculation of radiation levels on ablation in the region of the Hintereis- and Kesselwandferner (Ötztal Alps) in summer 1958.) 9. Internat. Tagung für Alpine Meteorologie in Brig und Zermatt, September 1966. Veröffentlichen der Schweizer Meteorologische Zentralanstalt, no. 4, pp. 43-45, Zürich.
- Hoinkes, H. (1967) Austria (National Report). Annals of the IGY, v.XLI, Glaciology, pp. 63-65.
- Hoinkes, H. (1968) Glacier Variation and Weather. Journal of Glaciology, v.7(49), pp. 3-19.
- Hoinkes, H.; Wendler, G. (1968) Der Anteil der Strahlung an der Ablation von Hintereis- und Kesselwandferner. (Level of radiation on ablation in Hintereis- and Kesselwandferner.) Archiv für Meteorologie, Geophysik und Bioklimatologie, series B, v.16, pp. 195-236.
- Hoinkes, H. (1968) Glaciology in the International Hydrological Decade. Presidential address. Commission of Snow and Ice, IUGG General Assembly, Bern, 1967. International Association of Scientific Hydrology. (IASH-AIHS) Publication, no. 79, pp. 7-16.
- Hoinkes, H.; Howorka, F.; Schneider, W. (1968) Glacier mass budget and mesoscale weather in the Austrian Alps 1964 to 1966. IUGG General Assembly, Bern, 1967. International Association of Scientific Hydrology. (IASH-AIHS) Publication, no. 79, pp. 241-254.
- Hoinkes, H. (1969) Surges of the Vernagtferner in the Ötztal Alps since 1599. Canadian Journal of Earth Sciences, v.6(4), pp. 853-861.

Hoinkes, H. (1970) Ergebnisse des glazial-meteorologisch-hydrologischen IHD-Programmes im Rofental bei Vent 1964-1968. (Results of the glacial-meteorological-hydrological IHD programs in Rofental bei Vent 1964-1968.) Osterr. Wasserwirtschaft, v.22(5/6), pp. 101-113.

Hoinkes, H. (1970) Methoden und Möglichkeiten von Massenhaushaltsstudien auf Gletschern. Ergebnisse der Messreihe Hintereisferner (Ötztaler Alpen) 1953-1968. (Methods and potentialities of mass balance studies on glaciers. Results from a series of measurements on the Hintereisferner (Ötztal Alps) 1953-1968.) Zeitschrift für Gletscherkunde und Glazialgeologie, v.VI, pp. 37-90.

Hoinkes, H. (1971) Über Beziehungen zwischen der Massenbilanz des Hintereisferners (Ötztaler Alpen, Tirol) und Beobachtungen der Klimastation Vent. (The relationship between the mass balance of the Hintereisferner (Ötztal Alps, Tyrol) and observations at the weather station Vent.) Annalen der Meteorologie, New Series, no. 5, pp. 259-264.

Hoinkes, H.; Dreiseitl, E.; Wagner, H.P. (1974) Mass balance of Hintereisferner and Kesselwandferner 1963/64 to 1972/73 in relation to the climatic environment. Preliminary results of the combined water, ice and heat balances project in the Rofental. IHD-activities in Austria 1965-1974. Report of the International Conference on the Results of the IHD, 2-14 September, 1974, in Paris, pp. 42-53, Vienna.

Hoinkes, H.; Steinacker, R. (1975) Zur Parametrisierung der Beziehung Klima Gletscher. (Parameterization of the relationship between climate and glaciers.) Rivista Italiana di Geofisica, Torino, v.1, pp. 97-104.

Hoinkes, H.; Lässer, A.; Patzelt, G. (1975) Die Vergletscherung der Zillertaler Alpen, ihre Veränderungen und ihr Einfluss auf die Hydrologie. (The glaciation of the Zillertal Alps, their changes and their influence on the hydrology.) In: Hochwasser- und Lawinenschutz in Tirol. Published by Land Tirol, Innsbruck, pp. 321-334.

Hoinkes, H.; Steinacker, R. (1975) Hydrometeorological implications of the mass balance of Hintereisferner, 1952-53 to 1968-69. International Association of Hydrological Sciences. (IAHS-AISH) Publication, no. 104, pp. 144-149.

Kuhn, M. (1976) Recent glaciological work in Austria. Ice, no. 50, pp. 2-6.

Kuhn, M. (1977) Recent glaciological work in Austria. Ice, no. 54, pp. 2-4.

Lang, H. (1966) Hydrometeorologische Ergebnisse aus Abflussmessungen im Bereich des Hintereisferners (Ötztaler Alpen) in den Jahren 1957-1959. (Hydrometeorological results of drainage measurements in the region of Hintereisferner (Ötztal Alps) from 1957-1959.) Archiv für Meteorologie, Geophysik und Bioklimatologie, series B, v.14, pp. 280-302.

Lang, H.; Patzelt, G. (1971) Die Volumenänderung des Hintereisferners (Ötztaler Alpen) im Vergleich zur Massenänderung im Zeitraum 1953-1964. (Volume changes in the Hintereisferner (Ötztal Alps) compared with mass changes in the period 1953-1964.) Zeitschrift für Gletscherkunde, v. VII(1-2), pp. 39-55.

Markl, G. Massenhaushaltswerte von Hintereisferner und Kesselwandferner 1968/69 - 1974/75. (Mass balance values from Hintereisferner and Kesselwandferner 1968/69 - 1974/75.) Zeitschrift für Gletscherkunde und Glazialgeologie, v.XI(2), pp. 271-272.

Queck, H. (1966) Massenhaushaltsstudien am Kesselwandferner (Ötztaler Alpen). (Mass balance studies on Kesselwandferner (Ötztal Alps). Dissertation, University of Innsbruck, Austria, 124 pp.

Rott, H. (1977) Analyse der Schneeflächen auf Gletschern der Tiroler Zentralalpen aus Landsat-Bildern. (Analysis of snow patches on glaciers in the central Tyrol mountains from Landsat images.) Zeitschrift für Gletscherkunde und Glazialgeologie, v.XII(1), pp. 1-28.

Schneider, W. (1967) Über Beziehungen zwischen den Massenhaushalten der Gletscher und der allgemeinen Zirkulation. (The relationship between the mass balance of the glacier and general circulation.) Dissertation, University of Innsbruck, Austria, 93 pp.

Schneider, H. (1970) Die Grundlagen der Vermessungen am Kesselwandferner (Ötztaler Alpen) und die Bewegung dieses Gletschers in den Haushaltsjahren 1965/66, 1966/67 und 1967/68. (Basis of the measurements on Kesselwandferner (Ötztal Alps) and the fluctuations of these glaciers in the budget years 1965/66, 1966/67 and 1967/68.) Dissertation, University of Innsbruck, Austria, 186 pp.

Schneider, H. Die Karte des Kesselwandfernens 1971 und die Grundlagen der Vermessungen. (Map of Kesselwandferner, 1971 and the basis of the measurements.) Zeitschrift für Gletscherkunde und Glazialgeologie, v.XI(2), pp. 229-244.

Siogas, L. (1977) Die Windverhältnisse an der Station Hintereis (3026 m) in den Ötztaler Alpen. (Wind at the Hintereis station (3,026 meters) in the Ötztal Alps.) Archiv für Meteorologie, Geophysik und Bioklimatologie, series B, v.25, pp. 79-89.

Siogas, L. (1977) Die Luftdruckreihe Vent 1935-1970. Eine Analyse des jahres- und tagesperiodischen sowie des aperiodischen Schwankungsverhaltens an einer inneralpinen Talstation im Vergleich zu anderen Stationen des Alpenraumes. (Atmospheric pressure measurements in Vent 1935-1970. An analysis of yearly and daily as well as irregular fluctuations at an interior mountain valley station compared with other stations in the Alps.) Dissertation, University of Innsbruck, Austria, 150 pp.

Wendler, G. (1967) Die Vergletscherung in Abhängigkeit von Exposition und Höhe und der Gebietsniederschlag im Einzugsgebiet des Pegels Vent in Tirol. (The glaciation with respect to exposure, height and precipitation in the drainage area of Pegels Vent in Tyrol.) Archiv für Meteorologie, Geophysik und Bioklimatologie, series B, v.15, pp. 260-273.

CANADA
GEE LAKE STATION

A. GEOGRAPHICAL LOCATION.

- 1) Country Canada
 - 2) Name of station Gee Lake
 - 3) Locality Baffin Island, N.W.T.
 - 4) Latitude: 69° 50'N Longitude: 72° 02'W Elevation(m) 500m
 - 5) Mountain range _____
 - 6) Drainage basin Sam Ford River
 - 7) Name of director Roger LeB. Hooke
 - 8) Name of parent organization University of Minnesota
- Address Department of Geology and Geophysics
University of Minnesota
Minneapolis, MN 55455 USA
- Telephone number 612-376-7282
- 9) Date of establishment of the station 1969 (moved 12km N in 1976)
 - 10) Distance from the end of the road (in kilometers or hours of walking)
160km
- Other means of access: planes, float planes, helicopter, boat, etc.
Charter aircraft on snow mobile (in season)
- Boarding point Frobisher Bay or Clyde River
- 11) Distance between the station and the glaciers studied _____
200m

B. DESCRIPTION OF THE STATION (INCLUDE A MAP IF AVAILABLE).

- 1) Number of buildings 0
 - a) Total floor space 35m²
 - b) Details: e.g. Laboratories cold room in ice tunnel
Dormitories 2 pyramid tents
Number of beds 4 to 6
Kitchens, dining rooms 1
Workshops 33 0

Cold rooms 1
Generator source 1.7, 3.0, & 5.0 kw generators

- 2) Major research activities of the station (please check and rank in order of importance)
- a) Glaciology 1
 - b) Snow studies _____
 - c) Hydrology _____
 - d) Climatology _____
 - e) Geophysics 4
 - f) Geomorphology 2
 - g) Botany, biology _____
 - h) Quaternary history 3

C. CALENDAR TIMING OF ACTIVITIES OF THE STATION.

- 1) Period of record What does this mean?
- 2) Yearly utilization period Late May through late July
- 3) Type of utilization (teaching, research, level of students involved) _____
Research, some graduate student work
- 4) Number of researchers: Summer 2-4 Winter 0
- 5) Number of technicians: Summer 1-3 Winter 0
- 6) List of station personnel (and speciality). ATTACH LIST.
- 7) Other laboratories working temporarily at the station on joint/separate projects Cooperative arrangement with Glaciology Division, Dept. of Environment, Ottawa, Canada

D. MAIN TYPES OF RESEARCH AND DATA COLLECTED.

Put "O" for ongoing research, "P" for previous studies. Indicate period of records. (Add appropriate details.)

- 1) Glaciological research:
 - a) Name/UNESCO inventory number of glacier(s) Barnes Ice Cap
 - b) Fluctuations (terminal position, surface, mass balance) 0
 - c) Dynamics, movement 0
 - d) Studies of surface _____
 - e) Studies of deep ice (coring) 0
 - f) Subglacial studies (access type) _____
 - g) Ice Chemistry and physics 0
 - h) Remote sensing _____
- 2) Snow study:
 - a) Snow cover _____
 - b) Avalanches _____
- 3) Hydrology:
 - a) Discharges _____
 - b) Ice cover percentage _____
 - c) Sub glacial hydrology _____
 - d) Ice surface feature _____
 - e) Lacustrine hydrology _____

- 4) Climatology:
 - a) Proximity to glacier _____
 - b) Parameters _____
- 5) Geophysics:
 - a) Radio-echo sounding method _____
 - b) Magnetic surveys; electromagnetism _____
- 6) Earth science (including area surrounding station)
 - a) Geology _____ P
 - b) Tectonics _____
 - c) Glacial geomorphology _____ P
- 7) Botany - biology (including area surrounding station)
 - a) Pollen analysis _____
 - b) Micro bacterial fauna _____
 - c) Flora _____
 - d) Fossil woods (C^{14} dating) _____
 - e) Timberline _____
 - f) Lichenometry _____
- 8) Quaternary history:

E. DATA AVAILABILITY.

- 1) Tabulations _____
 - Published reports _____ X
 - Unpublished reports _____
- 2) Data files (tape, cards, satellite transmissions) _____

- 3) Address from which data are available _____

- 4) Other information _____

F. MAIN PUBLICATIONS (ATTACH LIST).

G. OTHER COMMENTS.

References

- Baker, R.W. (In press) The influence of ice crystal size on the creep of polycrystalline ice. Journal of Glaciology.
- Hooke, R. LeB.; Dahlin, B.B.; Kauper, M.T. (1972) Creep of ice containing dispersed fine sand. Journal of Glaciology, v.11(63), pp. 327-336.
- Hooke, R. LeB. (1973) Structure and flow in the margin of the Barnes Ice Cap, Baffin Island, N.W.T., Canada. Journal of Glaciology, v.12(66), pp. 423-438.
- Hooke, R. LeB. (1973) Flow near the margin of the Barnes Ice Cap, and the development of ice-cored moraines. Geological Society of America. Bulletin, v. 84, pp. 3929-3948.
- Hooke, R. LeB. (1975) University of Minnesota ice drill. In: Splettstoesser, J., ed., Ice-Core Drilling. Proceedings of a Symposium, University of Nebraska, Lincoln, 28-30 August, 1974, University of Nebraska Press, pp. 47-57.
- Hooke, R. LeB. (1976) Pleistocene ice at the base of the Barnes Ice Cap, Baffin Island, N.W.T., Canada. Journal of Glaciology, v.17(75), pp. 49-60.
- Hooke, R. LeB. (1976) Near-surface temperatures in the superimposed ice zone and lower part of the soaked zone of polar ice sheets. Journal of Glaciology, v.16(74), pp. 302-304 (extended abstract).
- Hooke, R. LeB. (1977) Basal temperatures in polar ice sheets: A qualitative review. Quaternary Research, v.7(1), pp. 1-13.
- Hooke, R. LeB.; Hudleston, P.J. (In press) The origin of foliation and its development in the marginal zones of polar glaciers. Journal of Glaciology.
- Hooke, R. LeB.; Koci, B.R. (In press) Temperature measurements on the Barnes Ice Cap, Baffin Island, Canada, and on Sukkertoppen Iskappe, Greenland. [Letter]. Journal of Glaciology.
- Hooke, R. LeB.; Alexander, E.C. (In preparation) Heat flow near the margin of the Barnes Ice Cap, Baffin Island, N.W.T., Canada.
- Hudleston, P.J. (1976) Recumbent folding in the base of the Barnes Ice Cap, Baffin Island, Northwest Territories, Canada. Geological Society of America. Bulletin, v. 84, v.87, pp. 1684-1692.
- Hudleston, P.J. (1977) Similar folds, recumbent folds, and gravity tectonics in ice and rocks. Journal of Geology, v.85, pp. 113-122.
- Hudleston, P.J. (1977) Progressive deformation and development of fabric across zones of shear in glacial ice. In: Saxena and Bhattacharji, eds., Energetics of Geological Processes; Festschrift for Hans Ramberg. Springer Verlag.
- Parker, G. (1975) Meandering of supraglacial melt streams. Water Resources Research, v.11, pp. 551-552 (plus microfiche).

CANADA

ICEFIELD RANGES RESEARCH PROJECT

A. GEOGRAPHICAL LOCATION.

- 1) Country Yukon Territory, Canada
 - 2) Name of station Icefield Ranges Research Project
 - 3) Locality Mile 1054, Alaska Highway via Whitehorse, Yukon, Canada
 - 4) Latitude: 61° 01' N Longitude: 138° 24' W Elevation(m) 770 Meters
 - 5) Mountain range St. Elias Mountains
 - 6) Drainage basin Yukon River & Pacific Ocean
 - 7) Name of director Dr. Walter A. Wood, Chairman, Project Advisory Comm.
 - 8) Name of parent organization Arctic Institute of North America
- Address University Library Tower
2920 24th Avenue N.W.
Calgary, Alberta Canada T2N 1N4
- Telephone number 403-284-3387
- 9) Date of establishment of the station 1961
 - 10) Distance from the end of the road (in kilometers or hours of walking)
no access roads available
Other means of access: planes, float planes, helicopter, boat, etc.
Ski-wheel equipped aircraft & helicopter
Boarding point Base Station at location cited above
 - 11) Distance between the station and the glaciers studied 25-150 km

B. DESCRIPTION OF THE STATION (INCLUDE A MAP IF AVAILABLE).

- 1) Number of buildings 10
 - a) Total floor space Approximately 4,000 sq. feet (all bldgs)
 - b) Details: e.g. Laboratories 2 buildings devoted to Library & Lab
Dormitories 6-8 4 man cabins space.
Number of beds 36
Kitchens, dining rooms Kitchen & Dining Hall in Mess Hall
Workshops Yes, for light maintenance of station and
aircraft.

Cold rooms None
Generator source 5 kw with backup

- 2) Major research activities of the station (please check and rank in order of importance)
- a) Glaciology yes
 - b) Snow studies yes
 - c) Hydrology yes
 - d) Climatology yes
 - e) Geophysics yes
 - f) Geomorphology yes
 - g) Botany, biology yes
 - h) Quaternary history _____
- The IRRP is an inter-and multi disciplinary program seeking answers to all facets of the total environment of a high mountain region.

C. CALENDAR TIMING OF ACTIVITIES OF THE STATION.

- 1) Period of record Station maintained year round
- 2) Yearly utilization period Most active season, April - August
- 3) Type of utilization (teaching, research, level of students involved)
Field research by senior investigators and graduate students
Also support personnel equipped with secondary education
- 4) Number of researchers: Summer 40 Winter 4 - 8
- 5) Number of technicians: Summer Variable Winter 2
- 6) List of station personnel (and speciality). ATTACH LIST.
- 7) Other laboratories working temporarily at the station on joint/separate projects Investigators represent a wide range of mountain and polar oriented institutions. Most of them at the college or university level.

D. MAIN TYPES OF RESEARCH AND DATA COLLECTED.

Put "O" for ongoing research, "P" for previous studies. Indicate period of records. (Add appropriate details.)

- 1) Glaciological research:
 - a) Name/UNESCO inventory number of glacier(s) Glacier inventory of Canadian St. Elias Mts completed 1977, Alaska excluded.
 - b) Fluctuations (terminal position, surface, mass balance) "O"
 - c) Dynamics, movement "O"
 - d) Studies of surface "O"
 - e) Studies of deep ice (coring) "O" to depths of 300-500 meters.
 - f) Subglacial studies (access type) As opportunity permits.
 - g) Ice Chemistry and physics "P"
 - h) Remote sensing No
- 2) Snow study:
 - a) Snow cover "O"
 - b) Avalanches No
- 3) Hydrology:
 - a) Discharges "P"
 - b) Ice cover percentage Hydrologic traverses for mass balance assessment
 - c) Sub glacial hydrology "P"
 - d) Ice surface feature "O" (Studies of Glacier regime)
 - e) Lacustrine hydrology _____

- 4) Climatology:
 - a) Proximity to glacier Seasonal and year round semi-automatic weather stations.
 - b) Parameters Within boundaries of St. Elias Mts.
- 5) Geophysics:
 - a) Radio-echo sounding method Robin (SPRI) Echo sounder & Canadian counts
 - b) Magnetic surveys; electromagnetism None part
- 6) Earth science (including area surrounding station)
 - a) Geology "p"
 - b) Tectonics None
 - c) Glacial geomorphology "0"
- 7) Botany - biology (including area surrounding station)
 - a) Pollen analysis "p"
 - b) Micro bacterial fauna "p"
 - c) Flora "0"
 - d) Fossil woods (C¹⁴ dating) "p"
 - e) Timberline "p"
 - f) Lichenometry "p"
- 8) Quaternary history:

In a general sense, yes. A number of PhD theses have been devoted to interpretation of quaternary events..

E. DATA AVAILABILITY.

- 1) Tabulations See IRRP Scientific Results Vol. 1-4 Published by American Geographical Society & Arctic Institute of North America and on file at World Data Centers A, B and C. More than 150 publications in recognized Scientific Journals.
- 2) Data files (tape, cards, satellite transmissions) _____
- 3) Address from which data are available Arctic Institute of No. America see Paragraph A-8
- 4) Other information Specific information desired can be obtained by addressing the Project Director (See A-7) at P.O. Box EEE, Southampton, N. Y. 11968 or the Arctic Institute of No. America (see above)

F. MAIN PUBLICATIONS (ATTACH LIST).

See above.

G. OTHER COMMENTS.

CANADA
PEYTO GLACIER STATION

A. GEOGRAPHICAL LOCATION.

- 1) Country Canada
 - 2) Name of station Peyto Glacier
 - 3) Locality Rocky Mts.
 - 4) Latitude: 51° 40' N Longitude: 116° 35' W Elevation(m) 2220m
 - 5) Mountain range Rockies
 - 6) Drainage basin N. Saskatchewan River
 - 7) Name of director Dr. G.J. Young
 - 8) Name of parent organization Glaciology Division
- Address Inland Waters, Environment Canada
Ottawa, Ont., K1A 0E7 Canada
- Telephone number 819 997 2469
- 9) Date of establishment of the station 1969
 - 10) Distance from the end of the road (in kilometers or hours of walking)
5 km, 2 hours
Other means of access: planes, float planes, helicopter, boat, etc.
helicopter
Boarding point Banff or Lake Louise
 - 11) Distance between the station and the glaciers studied Station is at the glacier margin.

B. DESCRIPTION OF THE STATION (INCLUDE A MAP IF AVAILABLE).

- 1) Number of buildings 3
 - a) Total floor space 20m²
 - b) Details: e.g. Laboratories _____
Dormitories _____
Number of beds 4
Kitchens, dining rooms 1
Workshops _____ 1
- 40

Cold rooms _____
Generator source _____

- 2) Major research activities of the station (please check and rank in order of importance)
- a) Glaciology 1
 - b) Snow studies 4
 - c) Hydrology 2
 - d) Climatology 3
 - e) Geophysics _____
 - f) Geomorphology _____
 - g) Botany, biology _____
 - h) Quaternary history _____

C. CALENDAR TIMING OF ACTIVITIES OF THE STATION.

- 1) Period of record 1965-present
- 2) Yearly utilization period May-Sept. inclusive
- 3) Type of utilization (teaching, research, level of students involved) _____
Research. Occasional teaching--all grades of students
- 4) Number of researchers: Summer 1-2 Winter _____
- 5) Number of technicians: Summer 1-2 Winter _____
- 6) List of station personnel (and speciality). ATTACH LIST. personnel work from _____
- 7) Other laboratories working temporarily at the station on joint/separate Ottawa.
projects _____

D. MAIN TYPES OF RESEARCH AND DATA COLLECTED.

Put "O" for ongoing research, "P" for previous studies. Indicate period of records. (Add appropriate details.)

- 1) Glaciological research:
 - a) Name/UNESCO inventory number of glacier(s) Peyto
 - b) Fluctuations (terminal position, surface, mass balance) _____
0 1965-present
 - c) Dynamics, movement _____
 - d) Studies of surface _____
 - e) Studies of deep ice (coring) _____
 - f) Subglacial studies (access type) _____
 - g) Ice Chemistry and physics _____
 - h) Remote sensing _____
- 2) Snow study:
 - a) Snow cover 0 1965-present
 - b) Avalanches _____
- 3) Hydrology:
 - a) Discharges 0 1965-present
 - b) Ice cover percentage 0 1965-present
 - c) Sub glacial hydrology _____
 - d) Ice surface feature _____
 - e) Lacustrine hydrology _____

- 4) Climatology:
 - a) Proximity to glacier 100m
 - b) Parameters 0 temp. P-see publication attached
- 5) Geophysics:
 - a) Radio-echo sounding method _____
 - b) Magnetic surveys; electromagnetism _____
- 6) Earth science (including area surrounding station)
 - a) Geology _____
 - b) Tectonics _____
 - c) Glacial geomorphology _____
- 7) Botany - biology (including area surrounding station)
 - a) Pollen analysis _____
 - b) Micro bacterial fauna _____
 - c) Flora _____
 - d) Fossil woods (C^{14} dating) _____
 - e) Timberline _____
 - f) Lichenometry _____
- 8) Quaternary history:

E. DATA AVAILABILITY.

- 1) Tabulations _____

Published reports see attached plus references

Unpublished reports _____
- 2) Data files (tape, cards, satellite transmissions) _____

Most IHD data on cards

- 3) Address from which data are available _____

see above address

- 4) Other information _____

F. MAIN PUBLICATIONS (ATTACH LIST). See bibliography in enclosed publication.

G. OTHER COMMENTS.

References

- Young, G.J. (1976) A portable profiling snow gauge - Results of field tests on glaciers. 44th Western Snow Conference. Proceedings, pp. 7-11.
- Young, G.J. (1976) An approach to glacier mass-balance analysis utilizing terrain characterization. Environment Canada. Inland Waters Directorate. Scientific Series, no. 60. Ottawa, Canada. 37 pp.
- Young, G.J.; Stanley, A.D. (1976) Canadian glaciers in the International Hydrological Decade Program, 1965-1974 - no. 3. Ram River Glacier, Alberta - Summary of measurements. Environment Canada. Inland Waters Directorate. Scientific Series, no. 70. Ottawa, Canada. 56 pp.
- Young, G.J.; Stanley, A.D. (1976) Canadian glaciers in the International Hydrological Decade Program, 1965-1974 - no. 4. Peyto Glacier, Alberta - Summary of measurements. Fisheries and Environment Canada. Inland Waters Directorate. Scientific Series, no. 71. Ottawa, Canada. 70 pp.
- Young, G.J. (1977) Glacier outburst floods. Paper presented at the Canadian Hydrology Symposium 1977 - FLOODS, Edmonton, Alberta, August 29-31, 1977. Fisheries and Environment Canada. Inland Waters Directorate. Glaciology Division. 12 pp.
- Young, G.J. (1977) The seasonal and diurnal regime of a glacier-fed stream; Peyto Glacier, Alberta. Paper presented at the Alberta Watershed Research Program Symposium, Edmonton, Alberta, August 31-September 2, 1977. Fisheries and Environment Canada. Inland Waters Directorate. Glaciology Division. 18 pp.
- Young, G.J. (1977) Relations between mass-balance and meteorological variables on Peyto Glacier, Alberta 1967-1974. Presented at Symposium on Dynamics of Temperate Glaciers and Related Problems, Fourth European Geophysical Society Meeting, Munich, Germany, September 6-9, 1977. Fisheries and Environment Canada. Inland Waters Directorate. Glaciology Division. Ottawa, Canada. 22 pp.
- Young, G.J.; Arnold, K.C. (1977) Orthophotomaps of glaciers: An evaluation of an automated method applied to Peyto Glacier, Alberta. Presented at Symposium on Dynamics of Temperate Glaciers and Related Problems, Fourth European Geophysical Society Meeting, Munich, Germany, September 6-9, 1977. Fisheries and Environment Canada. Inland Waters Directorate. Glaciology Division. Ottawa, Canada. 17 pp.
- Young, G.J.; Glaciology Division (1977) Report on the influence of glaciers on the hydrology of streams affecting the proposed Alcan pipeline route. Submitted to Fisheries and Environment Canada. Inland Waters Directorate. Pacific Region. Vancouver, B.C. 65 pp.

CANADA
WEDGEMOUNT LAKE

A. GEOGRAPHICAL LOCATION.

- 1) Country Canada
- 2) Name of station Field camp only
- 3) Locality Wedgemount Lake, Garibaldi Park, British Columbia, Canada
- 4) Latitude: 50° 09' 35" N Longitude: 122° 48' 30" W Elevation(m) 1860
- 5) Mountain range Pacific Ranges of the Coast Mountains of the
- 6) Drainage basin Wedgemount Creek of the Lillooet River Basin of the Fraser River
- 7) Name of director Nil Drainage system _____
- 8) Name of parent organization Karl E. Ricker Ltd. & Brit.Col. Inst. Technology
3369 Craigend, West Vancouver, B.C. Canada V7V 3G1
Address _____

Telephone number 604-926-5933 or 604-688-6821
- 9) Date of establishment of the ~~station~~ Observations 1965
- 10) Distance from the end of the road (in kilometers or hours of walking)
3.5 to 4 km; 3 hours (and 1200 metre elevation difference)
Other means of access: planes, float planes, helicopter, boat, etc.
- Boarding point Alta or Green Lake are closest but Squamish or Vancouver are the closest source of aircraft for hire.
- 11) Distance between the station and the glaciers studied _____
1 km

Map: Canada, 1:50,000 scale topographic map, NTS 92J/2.

B. DESCRIPTION OF THE STATION (INCLUDE A MAP IF AVAILABLE).

- 1) Number of buildings 1 alpine hut for public use--does not have any
 - a) Total floor space 18-20 m² sophisticated facilities
 - b) Details: e.g. Laboratories _____
Dormitories _____
Number of beds _____
Kitchens, dining rooms _____
Workshops _____

Cold rooms _____
Generator source backpack carried "Honda" is used.

- 2) Major research activities of the station (please check and rank in order of importance)
- a) Glaciology 2 _____ --Ricker, Waddington, Tupper
 - b) Snow studies _____
 - c) Hydrology _____
 - d) Climatology _____
 - e) Geophysics 2 _____ --Waddington
 - f) Geomorphology 2 _____ --Ricker
 - g) Botany, biology _____
 - h) Quaternary history 2 _____ --Ricker
 - i) Photogrammetry methods 1 _____ --Tupper
 - j) Physical Limnology 3 _____ --proglacial lake--Tupper, Ricker

C. CALENDAR TIMING OF ACTIVITIES OF THE STATION.

- 1) Period of record 1928 (first survey photos); 1965-present=fieldwork period
- 2) Yearly utilization period 2 to 3 long weekends/summer
- 3) Type of utilization (teaching, research, level of students involved) _____
Survey and photogrammetric instruction at BCIT (first and second year technical survey students) Research - private and self supported
- 4) Number of researchers: Summer 2 to 3 Winter 2 to 3
- 5) Number of technicians: Summer 1 intermittent Winter 1 intermittent
- 6) List of station personnel (and speciality). ATTACH LIST.
- 7) Other laboratories working temporarily at the station on joint/separate projects Dept. Geophysics, Univ. of British Columbia (E. Waddington)
- 6) Karl Ricker: Geomorphology, Quaternary history; Bill Tupper: Photogrammetry; and Ed Waddington: Geophysics

D. MAIN TYPES OF RESEARCH AND DATA COLLECTED.

Put "O" for ongoing research, "P" for previous studies. Indicate period of records. (Add appropriate details.)

- 1) Glaciological research:
 - a) Name/UNESCO inventory number of glacier(s) Wedgemount Glacier (& lake); Armchair glacier
 - b) Fluctuations (terminal position, surface, mass balance) 0 Wedgemount (terminal position, surface)
 - c) Dynamics, movement 0
 - d) Studies of surface _____
 - e) Studies of deep ice (coring) _____
 - f) Subglacial studies (access type) 0
 - g) Ice Chemistry and physics 0 (physics)
 - h) Remote sensing 0
- 2) Snow study:
 - a) Snow cover _____
 - b) Avalanches _____
- 3) Hydrology:
 - a) Discharges _____
 - b) Ice cover percentage _____
 - c) Sub glacial hydrology _____
 - d) Ice surface feature _____
 - e) Lacustrine hydrology 0 Wedgemount Lake

- 4) Climatology:
 - a) Proximity to glacier _____
 - b) Parameters _____
- 5) Geophysics:
 - a) Radio-echo sounding method _____ 0
 - b) Magnetic surveys; electromagnetism _____
- 6) Earth science (including area surrounding station)
 - a) Geology) Geological Survey of Canada has already carried out this on a _____
 - b) Tectonics) _____ reconnaissance basis
 - c) Glacial geomorphology _____ 0; periglacial features-0; Pedology--0
- 7) Botany - biology (including area surrounding station)
 - a) Pollen analysis _____
 - b) Micro bacterial fauna _____
 - c) Flora _____ Dendrochronology -- 0
 - d) Fossil woods (C¹⁴ dating) _____
 - e) Timberline _____
 - f) Lichenometry 0 on Wedgemount and Armchair Glaciers (not very successful)
- 8) Quaternary history:

_____ Moraines of entire Wedgemount Creek Basin--Late Pleistocene to Recent.

E. DATA AVAILABILITY.

- 1) Tabulations _____

Published reports 2 in Canadian Alpine J. of popular interest style.
 Unpublished reports Department of Geophysics, UBC; manuscripts by K. Ricker;
 Unpublished maps - Survey Department, British Columbia Institute of Technology
- 2) Data files (tape, cards, satellite transmissions) _____

_____ on conventional paper in survey notebooks; chronologic sequence of photographs
- 3) Address from which data are available _____

_____ will not be released in "raw" form; by publication (or reports to
 _____ Glaciology Division, Canadian Dept. of Fisheries and Environment, Ottawa
 _____ on an "ad hoc" basis)
- 4) Other information _____

_____ See copies of "Ice" for summaries of fieldwork; 1977 summary not yet submitted.

F. MAIN PUBLICATIONS (ATTACH LIST). Canadian Alpine Journal, 1976 and 1977 volumes

G. OTHER COMMENTS.

_____ Popular hiking area about 150 km N of Vancouver, BC. Research is strictly a hobby
 _____ with no deadlines to meet, and outside funding has been minimal to Dept. of
 _____ Geophysics for testing of new radar pulse apparatus on glacier.

H. _____ For Glacier of Tchorkazan Valley, see Report by Dr. S. Ommanney to International
 _____ Hydrological Decade. _____

FRANCE
ARGENTIÈRE (MT. BLANC)

A. GEOGRAPHICAL LOCATION.

- 1) Country France
- 2) Name of station Argentièrre (Mt. Blanc)
- 3) Locality Argentièrre
- 4) Latitude: _____ Longitude: _____ Elevation(m) 8200m
- 5) Mountain range Mt. Blanc
- 6) Drainage basin Glacier d'Argentièrre (Arve, Arveyron d'Argentièrre)
- 7) Name of director R. Vivian
- 8) Name of parent organization Institut de Géographie Alpine
(LA 185 du CNRS)
Address rue Maurice-Gignoux
38031 Grenoble, France
- Telephone number (76) 44 66 76
- 9) Date of establishment of the station 1967
- 10) Distance from the end of the road (in kilometers or hours of walking)
1 h 30
Other means of access: planes, float planes, helicopter, boat, etc.
Telepherique de Chautier (cable car)
Boarding point Argentièrre moraine
- 11) Distance between the station and the glaciers studied 0 km
subglacial site

B. DESCRIPTION OF THE STATION (INCLUDE A MAP IF AVAILABLE).

- 1) Number of buildings _____ subglacial laboratories
 - a) Total floor space _____
 - b) Details: e.g. Laboratories 2
Dormitories 1 Solle de Survie
Number of beds 0
Kitchens, dining rooms 0
Workshops 1

Cold rooms 0
Generator source electricity 24v 220v 380v

- 2) Major research activities of the station (please check and rank in order of importance)
- a) Glaciology 1
 - b) Snow studies 3
 - c) Hydrology 2
 - d) Climatology 2
 - e) Geophysics _____
 - f) Geomorphology 4
 - g) Botany, biology 5
 - h) Quaternary history 6

C. CALENDAR TIMING OF ACTIVITIES OF THE STATION.

- 1) Period of record since 1968
- 2) Yearly utilization period all year
- 3) Type of utilization (teaching, research, level of students involved) _____
thesis level
- 4) Number of researchers: Summer 4 Winter 4
- 5) Number of technicians: Summer 2 Winter 1
- 6) List of station personnel (and speciality). ATTACH LIST.
- 7) Other laboratories working temporarily at the station on joint/separate projects _____
Norwich
Biologie Végétale (Lyon II)
- 6) R. Vivian, G. Boequet, A. Thomas, and students.

D. MAIN TYPES OF RESEARCH AND DATA COLLECTED.

Put "O" for ongoing research, "P" for previous studies. Indicate period of records. (Add appropriate details.)

- 1) Glaciological research:
 - a) Name/UNESCO inventory number of glacier(s) _____
 - b) Fluctuations (terminal position, surface, mass balance) _____
0
 - c) Dynamics, movement 0
 - d) Studies of surface 0
 - e) Studies of deep ice (coring) 0
 - f) Subglacial studies (access type) 0
 - g) Ice Chemistry and physics 0
 - h) Remote sensing P
- 2) Snow study:
 - a) Snow cover 0
 - b) Avalanches _____
- 3) Hydrology:
 - a) Discharges 0
 - b) Ice cover percentage 0
 - c) Sub glacial hydrology 0
 - d) Ice surface feature 0
 - e) Lacustrine hydrology 48

FRANCE

CENTRE D'ETUDES NUCLEAIRES DE GRENOBLE

A. GEOGRAPHICAL LOCATION.

- 1) Country France
- 2) Name of station Centre d'Etudes Nucleaires de Grenoble
- 3) Locality Grenoble
- 4) Latitude: _____ Longitude: _____ Elevation(m) _____
- 5) Mountain range _____
- 6) Drainage basin _____
- 7) Name of director _____
- 8) Name of parent organization _____
C.E.A.-C.E.N.G.
Address Laboratoire A.S.P.
85 X
38041 Grenoble Cedex
- Telephone number (76) 97 41 11
- 9) Date of establishment of the station _____
- 10) Distance from the end of the road (in kilometers or hours of walking) _____
Other means of access: planes, float planes, helicopter, boat, etc.
Boarding point _____
- 11) Distance between the station and the glaciers studied _____

B. DESCRIPTION OF THE STATION (INCLUDE A MAP IF AVAILABLE).

- 1) Number of buildings _____
 - a) Total floor space _____
 - b) Details: e.g. Laboratories _____
Dormitories _____
Number of beds _____
Kitchens, dining rooms _____
Workshops _____ 50 _____

Cold rooms _____
Generator source _____

- 2) Major research activities of the station (please check and rank in order of importance)
- a) Glaciology _____
 - b) Snow studies _____
 - c) Hydrology _____
 - d) Climatology _____
 - e) Geophysics _____
 - f) Geomorphology _____
 - g) Botany, biology _____
 - h) Quaternary history _____

C. CALENDAR TIMING OF ACTIVITIES OF THE STATION.

- 1) Period of record _____
- 2) Yearly utilization period _____
- 3) Type of utilization (teaching, research, level of students involved) _____

- 4) Number of researchers: Summer 3 Winter 6
- 5) Number of technicians: Summer _____ Winter _____
- 6) List of station personnel (and speciality). ATTACH LIST.
- 7) Other laboratories working temporarily at the station on joint/separate projects _____

D. MAIN TYPES OF RESEARCH AND DATA COLLECTED.

Put "O" for ongoing research, "P" for previous studies. Indicate period of records. (Add appropriate details.)

- 1) Glaciological research:
 - a) Name/UNESCO inventory number of glacier(s) _____
 - b) Fluctuations (terminal position, surface, mass balance) _____
 - c) Dynamics, movement _____
 - d) Studies of surface _____
 - e) Studies of deep ice (coring) _____
 - f) Subglacial studies (access type) _____
 - g) Ice Chemistry and physics _____
 - h) Remote sensing _____
- 2) Snow study:
 - a) Snow cover _____
 - b) Avalanches 0 _____
- 3) Hydrology:
 - a) Discharges _____
 - b) Ice cover percentage _____
 - c) Sub glacial hydrology _____
 - d) Ice surface feature _____
 - e) Lacustrine hydrology _____

References

- Alouges, A.; Baudoin, A.; Bonnefoy-Claudet, J.; Perroud, P.; Pontier, L.; Sirou, F. (1973) Etude aerienne du manteau neigeux et des glaciers par thermographie et photographie fausses couleurs. Premiers resultats experimentaux. (Aerial study of snow cover and glaciers with false color photography and thermography; first experimental results.) Paper presented at the meeting of la Section de Glaciologie de la Societe Hydrotechnique de France at Cerafer, Domaine Universitaire de St Martin d'Heres, 22-23 February, 1973.
- Bon Mardion, G.; Coche, G.; Eybert-Berard, A.; Jourdan, P.; Perroud, P.; Rey, L. (1974) Mesures dynamiques dans l'avalanche. Premiers resultats experimentaux. (Dynamic measurements of avalanches; first experimental results.) Paper presented at the meeting of la Section de Glaciologie de la Societe Hydrotechnique de France, Paris, 7 and 8 March, 1974.
- Bon Mardion, G.; Eybert-Berard, A.; Guelff, C.; Perroud, P.; Rey, L. (1975) Mesures dynamiques dans l'avalanche. Resultats experimentaux de la saison de neige 1973-1974. (Dynamic measurements of avalanches; experimental results from the 1973-74 snow season.) Paper presented at the Symposium International de St Vincent (Region Autonome de la Valee d'Aoste, Italy) 23-26 February, 1975.
- Bon Mardion, G.; Eybert-Berard, A.; Guelff, C.; Perroud, P.; Mura, R. (CTGREF); Rey, L. (CEN-Meteo) (1976) La dynamique des avalanches d'apres les resultats des experiences de declenchement artificiel au Lautaret. (Avalanche dynamics after artificial release at Lautaret.) Presented to Societe Hydrotechnique de France, Paris, 17-19 March, 1976.
- De Montmollin, V. (1977) Analyse theorique bidimensionnelle du balayage du manteau neigeux par une onde de choc aerienne faible. (Theoretical two-dimensional analysis of a snow cover swept by a weak aerial shock wave.) Analyse du declenchement des avalanches de neige fraiche. (Analysis of avalanche release in fresh snow.) Presented to Societe Hydrotechnique de France, St Martin d'Heres, 3-4 March, 1977.
- Eybert-Berard, A.; Mura, R. (CTGREF); Perroud, P.; Rey, L. (CEN-Meteo) (1977) La dynamique des avalanches. Resultats experimentaux du Col du Lautaret. Annee 1976. (Avalanche dynamics; experimental results at Lautaret Pass, 1976.) Presented to the Societe Hydrotechnique de France, St Martin d'Heres, 3-4 March, 1977.

FRANCE
CENTRE TECHNIQUE DU GÉNIE RURAL, DES EAUX ET DES FORÊTS

A. GEOGRAPHICAL LOCATION.

- 1) Country France
 - 2) Name of station CTGREF Nivologie
 - 3) Locality Grenoble
 - 4) Latitude: 45 Longitude: _____ Elevation(m) _____
 - 5) Mountain range Alpes Occidentales
 - 6) Drainage basin _____
 - 7) Name of director de Crecy
 - 8) Name of parent organization Ministère Agriculture
- Address CTGREF Nivologie
BP 114 38402 St. Martin D'Herès
- Telephone number (76) 54-00-72
- 9) Date of establishment of the station _____
 - 10) Distance from the end of the road (in kilometers or hours of walking) _____
Other means of access: planes, float planes, helicopter, boat, etc.
Boarding point _____
 - 11) Distance between the station and the glaciers studied _____

See the annual report

B. DESCRIPTION OF THE STATION (INCLUDE A MAP IF AVAILABLE).

- 1) Number of buildings _____
 - a) Total floor space _____
 - b) Details: e.g. Laboratories _____
Dormitories _____
Number of beds _____
Kitchens, dining rooms _____
Workshops _____ 53 _____

Technical Center for Water and Forest
Centre Technique du Génie Rural,
des Eaux et des Forêts
(C.T.G.R.E.F.)
B.P. 114 38402 GRENOBLE
FRANCE

ANNUAL REPORT I.G.S.

1. GLACIERS

Supervised glaciers

For many years, a number of French glaciers were supervised by the Forest and Water Administration. About 16 years ago, many observations were stopped. We are now organizing an aerial survey for 20 glaciers. Every three years, aerial pictures are collected for the following glaciers:

Mont Blanc range - 1 Tour - 2 Argentières - 3 Mer de Glace - 4 Bossons -
5 Taconnaz - 6 Bionnassay - 7 Tré-la-Tête

Vanoise range - 8 Sources de l'Isère - 9 Sources de l'Arc - 10 Mulinet -
11 Grand Méan - 12 Evettes - 13 Arnès - 14 Gebroulaz

Oisans range - 15 Pilatte - 16 Chardon - 17 Selle - 18 Glacier blanc -
19 Glacier noir - 20 Sarennes.

Mass balance

Since 1948, the mass balance of the small cirque glacier of Sarennes (about 1 km²) has been calculated. The 75-76 season was characterized by very little accumulation (33 cm water equivalent) and great ablation (240 cm water equivalent, 207 ice ablation). This is one of the worst mass balance readings for Sarennes.

2. SNOW STUDIES

In the two experimental snow fields of Col de Porte and Autrans, we are trying to understand the interaction of forest/snow cover. More than 200 snow sticks are randomly placed in the Autrans forest (Vercors) and twice a week, data are collected. Mathematical analysis is then used to separate different parameters.

Snow pressure is measured on various types of anti-avalanche structures. Wind effect is also studied for better snow control.

3. AVALANCHES

At Lautaret, artificial avalanche release continues and much data is recorded (in collaboration with the Laboratory of Special Physical Application).

The exploitation of the "powder snow avalanche model" (water model, with Mecafllu) continues. Pressure and density profiles are measured. A mathematical model (with C.T.G.R.E.F. ANTONY) for powder snow avalanches is operational. The morphological profiles and the snow heights are introduced, and the principal parameters are obtained (V, D, h).

FRANCE

CHALET CLOS DE L'OURS, LABORATOIRE DE COSMIQUE,
OBSERVATOIRE VALLOT, CABANE TACUL

A. GEOGRAPHICAL LOCATION.

- 1) Country France A:Chalet Clos de l'Ours(1000m);B:Laboratoire de Cosmique
- 2) Name of station Chamonix / (3600m); C:Observatoire Vallot(4200m); D:Cabane Tacul
- 3) Locality Chamonix (2100m)
- 4) Latitude: _____ Longitude: _____ Elevation(m) _____
- 5) Mountain range Mont Blanc Area
- 6) Drainage basin Arve
- 7) Name of director Professor Louis Lliboutry
- 8) Name of parent organization Centre National de la Recherche Scientifique (CNRS)
Laboratoire de Glaciologie du CNRS
Address 2, Rue Très Cloîtres
38031 Grenoble Cedex

Telephone number (76) 42 05 27
- 9) Date of establishment of the station _____
- 10) Distance from the end of the road (in kilometers or hours of walking)
A: 0 km; B: 1 hour; C: 8 hours; D: 2 hours
Other means of access: planes, float planes, helicopter, boat, etc.
B,C, and D: helicopter
Boarding point _____
- 11) Distance between the station and the glaciers studied _____
A: 1 to 5 kilometers; B,C and D: on the glacier

B. DESCRIPTION OF THE STATION (INCLUDE A MAP IF AVAILABLE).

- 1) Number of buildings One building for each location A,B,C,D
 - a) Total floor space A: 150 m²; B: 120 m²; C: 30 m²; D: 15 m²
 - b) Details: e.g. Laboratories _____
Dormitories A: 8; B: 20; C: 10; D: 6
Number of beds _____
Kitchens, dining rooms A and B
Workshops -i.d^o-

Cold rooms One at Clos de l'Ours
Generator source line

- 2) Major research activities of the station (please check and rank in order of importance)
- a) Glaciology 1
 - b) Snow studies _____
 - c) Hydrology _____
 - d) Climatology 3
 - e) Geophysics 2
 - f) Geomorphology _____
 - g) Botany, biology _____
 - h) Quaternary history _____

C. CALENDAR TIMING OF ACTIVITIES OF THE STATION.

- 1) Period of record All the year, but not regular, following the needs of experiments
- 2) Yearly utilization period _____
- 3) Type of utilization (teaching, research, level of students involved) _____
Research and teaching (students for 3rd cycle)
- 4) Number of researchers: Summer _____ Winter _____
- 5) Number of technicians: Summer _____ Winter _____
- 6) List of station personnel (and speciality). ATTACH LIST.
- 7) Other laboratories working temporarily at the station on joint/separate projects _____

D. MAIN TYPES OF RESEARCH AND DATA COLLECTED.

Put "O" for ongoing research, "P" for previous studies. Indicate period of records. (Add appropriate details.)

- 1) Glaciological research:
 - a) Name/UNESCO inventory number of glacier(s) Glacier du Tour, d'Argentiere, Mer de Glace et Glacier des Bossons
 - b) Fluctuations (terminal position, surface, mass balance) 0 velocities, cross profiles
 - c) Dynamics, movement 0
 - d) Studies of surface 0
 - e) Studies of deep ice (coring) P
 - f) Subglacial studies (access type) _____
 - g) Ice Chemistry and physics 0
 - h) Remote sensing _____
- 2) Snow study:
 - a) Snow cover 0
 - b) Avalanches _____
- 3) Hydrology:
 - a) Discharges 0
 - b) Ice cover percentage _____
 - c) Sub glacial hydrology _____
 - d) Ice surface feature _____ P
 - e) Lacustrine hydrology 56(a)

- 4) Climatology: 0
 - a) Proximity to glacier On and near the glaciers
 - b) Parameters Temperature, wind velocity, solar radiation, ice melting
- 5) Geophysics:
 - a) Radio-echo sounding method _____
 - b) Magnetic surveys; electromagnetism _____
 - C: seismic sounding- 0 _____
 - D: gravimetric surveys- 0 _____
- 6) Earth science (including area surrounding station)
 - a) Geology _____
 - b) Tectonics _____
 - c) Glacial geomorphology _____
- 7) Botany - biology (including area surrounding station)
 - a) Pollen analysis _____
 - b) Micro bacterial fauna _____
 - c) Flora _____
 - d) Fossil woods (C^{14} dating) _____
 - e) Timberline _____
 - f) Lichenometry _____
- 8) Quaternary history:

E. DATA AVAILABILITY.

- 1) Tabulations _____

Published reports _____

Unpublished reports _____
- 2) Data files (tape, cards, satellite transmissions) _____

- 3) Address from which data are available _____

Laboratoire de Glaciologie du CNRS

2, rue TrésCloîtres

Grenoble 38031 Cedex
- 4) Other information _____

F. MAIN PUBLICATIONS (ATTACH LIST). List attached

G. OTHER COMMENTS.

In fact the field station of Chamonix (3 hours by road from Grenoble) is only a station to carry out the work on different glaciers; the real station is located in Grenoble.

References

- Admirat, P.; Grenier, J.C. (1975) Humidite relative critique des sels hygroscopiques aux temperatures negatives. Experience et interpretation. (Critical relative humidity of hygroscopic salts to negative temperatures.) Journal de Recherches Atmospheriques, v. 9(3), pp. 97-105.
- Briat, M.; Boutron, C.; Lorius, C. (1974) Chlorine and sodium content of east Antarctica firn samples. Journal de Recherches Atmospheriques, pp. 895-901.
- Duval, P. (1976) Lois du fluage transitoire ou permanent de la glace polycristalline pour divers etats de contrainte. (Laws of transitory or permanent creep of polycrystalline ice under diverse states of constraint.) Annales de Geophysique, v. 32(4), pp. 335-350.
- Gillet, F. (1975) Instruments and methods. Steam hot-water and electrical thermal drills for temperate glaciers. Journal of Glaciology, v.14(70), pp. 171-179.
- Gillet, F.; Donnou, D.; Ricou, G. (1976) A new electrothermal drill for coring in ice. In: Spettstoesser, J.F., ed., Ice-Core Drilling, University of Nebraska Press, pp. 19-27.
- Haltenorth, H.; Klinger, J. (1977) Solubility of hydrofluoric acid in ice in single crystals. Solid State Communications, v.21, pp. 533-535.
- Klinger, J. (1975) Thermal conductivity of ice doped with helium. Solid State Communications, v.16, pp. 961-963.
- Klinger, J. (1975) Low-temperature heat conduction in pure, monocrystalline ice. Journal of Glaciology, v.14(72), pp. 517-528.
- Lliboutry, L. (1974) Etudes glaciologiques au glacier de Saint-Sorlin. (Glaciological studies at glacier de Saint-Sorlin.) Zeitschrift für Gletscherkunde und Glazialgeologie, v.X, pp. 225-231.
- Lliboutry, L.; Echevin, M. (1974) Mesure des bilans annuels en zone d'accumulation. (Annual mass balance in the accumulation zone.) Zeitschrift für Gletscherkunde und Glazialgeologie, v.X, pp. 71-88.
- Lliboutry, L. (1975) Loi de glissement d'un glacier sans cavitation. (Law of sliding in a glacier without cavitation.) Annales de Geophysique, v.2, pp. 207-226.
- Lliboutry, L. (1975) La catastrophe de Yungay (Perou). (Yungay (Peru) catastrophe.) Symposium Neiges et Glaces, Moscou, International Association of Hydrological Sciences (IAHS-AIHS). Publication, v. 104, pp. 353-363.
- Lliboutry, L. (1975) Le cryocinegraphe peut-il deceler de petits mouvements par saccades des glaciers? (Can the cryocinegraph detect small irregular glacier movements?) Hydrological Sciences Bulletin, v. 20, pp. 365-366.
- Lliboutry, L.; Briat, M.; Creseveur, M.; Pourchet, M. (1976) 15m deep temperatures in the glaciers of Mont Blanc (French Alps). Journal of Glaciology, v.16(74), pp. 197-203.

- Lliboutry, L. (1976) Physical processes in temperate glaciers. Journal of Glaciology, v.16(74), pp. 151-158.
- Lliboutry, L. (1976) Les glaciers de Bellecote. (The glaciers of Bellecote.) Travaux Scientifiques du Parc de la Vanoise, v.VII, pp. 9-24.
- Lorius, C.; Delmas, R. (1975) Geochimie des calottes polaires: Aspects atmospheriques et climatiques. (Geochemistry of polar caps: atmospheric and climatic aspects.) Journal de Physique. Colloque C8 supplement no. 12, pp. C8-C37.
- Lorius, C.; Briat, M. (1976) Teneur en elements traces dans la glace: Variations temporelles liees a l'activite humaine et au climat. (Percentage of trace elements in ice: Temporal variations tied to human activity and climate.) Societe Hydro-technique de France. XIV Journees de l'Hydraulique, Paris. 8 pp.
- Martin, S. (1974) Correlation bilans de masse annuels-facteurs meteorologiques dans les Grandes-Rousses. (Correlation between annual mass balance and meteorological factors in the Grandes Rousses.) Zeitschrift fur Gletscherkunde und Glazialgeologie, v. x, pp. 89-100.
- Martin, S. (1975) Wind regimes and heat exchange on glacier de Saint-Sorlin. Journal of Glaciology, v.14(70), pp. 91-105.
- Petit, J.R.; Duval, P. (1976) La thermoluminescence de la glace; les effets de la deformation plastique. (Thermoluminescence of ice; effects on plastic deformation.) Solid State Communications, v.19, pp. 475-477.
- Poggi, A. (1975) Micrometeorologie et transferts air-sol. (Micrometeorology and air-soil transfer.) Laboratoire de Glaciologie du C.N.R.S., 115 pp.
- Poggi, A. (1975) Bilan thermique en zone d'ablation du glacier Ampere. (Iles Kerguelen). (Thermal balance in the ablation zone of glacier Ampere. (Iles Kerguelen.)) These de Doctorat d'Etat, University of Science and Medicine in Grenoble, 132 pp.
- Poggi, A. (1976) Contribution a l'etude de la couche limite au voisinage immediat de la surface du glacier Ampere (Iles Kerguelen). Une contribution francaise a la decennie hydrologique internationale. (Contribution to the study of the layer limit in the immediate vicinity of the surface of glacier Ampere (Iles Kerguelen); a French contribution to the International Hydrological Decade.) Annales de Geophysique, v.32(4), pp. 351-372.
- Poggi, A. (1977) Introduction a la micrometeorologie. (Introduction to micrometeorology.) Masson et Cie, 148 pp.
- Poggi, A. (1977) Heat balance in the ablation area of the Ampere Glacier. (Kerguelen Islands). Journal of Applied Meteorology, v.16(1), pp. 48-55.
- Raynaud, D. (1977) Impermeabilite de la glace des inlandsis. (Impermeability of ice in Iceland.) La Recherche, no. 74, pp. 81-84.
- Reynaud, L. (1975) Mouvements de glacier en surface sur une courte echelle de temps. (Glacier movements at the surface on a short time scale.) Hydrological Sciences Bulletin, v. 20, pp. 329-339.

Vallon, M.; Petit, J.R.; Fabre, B. (1976) Study of an ice core to the bedrock in the accumulation zone of an alpine glacier. Journal of Glaciology, v.17(75), pp. 13-28.

FRANCE
CHAMBEYRON, FOUILLOUSE

A. GEOGRAPHICAL LOCATION.

- 1) Country France, Alpes du Sud, Haute vallée Ubaye
- 2) Name of station Chambeyron, Fouillouse.
- 3) Locality Fouillouse. 04
- 4) Latitude: _____ Longitude: _____ Elevation(m) 1850 m
- 5) Mountain range Massif du Chambeyron
- 6) Drainage basin Ubaye
- 7) Name of director Gabert
- 8) Name of parent organization Institut Géographie AIX en Provence et
Laboratoire Géomorphologie CNRS Caen.
Address 29 Avenue R. Schuman, AIX en Provence 13100
- _____
- _____
- Telephone number 59.29.00
- 9) Date of establishment of the station 1965 and 1975
- 10) Distance from the end of the road (in kilometers or hours of walking)
2 to 4 hours depending on the points of observation
Other means of access: planes, float planes, helicopter, boat, etc.
- _____
- Boarding point _____
- _____
- 11) Distance between the station and the glaciers studied cfr 10
- _____
- _____

B. DESCRIPTION OF THE STATION (INCLUDE A MAP IF AVAILABLE).

- 1) Number of buildings Walk to the appropriate equipment from chalets CAF and
 - a) Total floor space _____ Grand Randonnees.
 - b) Details: e.g. Laboratories _____
Dormitories _____
Number of beds possibility of 40 places
Kitchens, dining rooms 1 per chalet
Workshops _____ 60 _____

Cold rooms _____
Generator source _____

- 2) Major research activities of the station (please check and rank in order of importance)
- a) Glaciology 3
 - b) Snow studies _____
 - c) Hydrology _____
 - d) Climatology _____
 - e) Geophysics _____
 - f) Geomorphology 1
 - g) Botany, biology _____
 - h) Quaternary history 2

C. CALENDAR TIMING OF ACTIVITIES OF THE STATION.

- 1) Period of record 10 years for some observations; 2 for others.
- 2) Yearly utilization period _____
- 3) Type of utilization (teaching, research, level of students involved) _____
measurement of periglacial and glacial phenomena
masters students of researchers at CNRS
- 4) Number of researchers: Summer 5-10 Winter 0
- 5) Number of technicians: Summer 3-5 Winter 0
- 6) List of station personnel (and speciality). ATTACH LIST.
- 7) Other laboratories working temporarily at the station on joint/separate projects Cartographie géomorphologique

D. MAIN TYPES OF RESEARCH AND DATA COLLECTED.

Put "O" for ongoing research, "P" for previous studies. Indicate period of records. (Add appropriate details.)

- 1) Glaciological research:
 - a) Name/UNESCO inventory number of glacier(s) _____
 - b) Fluctuations (terminal position, surface, mass balance) _____
Movement of glaciers and rock glaciers
 - c) Dynamics, movement Dynamics of the fronts of rock glaciers
 - d) Studies of surface _____
 - e) Studies of deep ice (coring) _____
 - f) Subglacial studies (access type) _____
 - g) Ice Chemistry and physics _____
 - h) Remote sensing _____
- 2) Snow study:
 - a) Snow cover _____
 - b) Avalanches _____
- 3) Hydrology:
 - a) Discharges _____
 - b) Ice cover percentage _____
 - c) Sub glacial hydrology _____
 - d) Ice surface feature _____
 - e) Lacustrine hydrology _____

- 4) Climatology:
 - a) Proximity to glacier _____
 - b) Parameters _____
- 5) Geophysics:
 - a) Radio-echo sounding method _____
 - b) Magnetic surveys; electromagnetism _____
- 6) Earth science (including area surrounding station)
 - a) Geology _____
 - b) Tectonics _____ neo-tectonic since the end of the Quaternary
 - c) Glacial geomorphology Present since the Quaternary
- 7) Botany - biology (including area surrounding station)
 - a) Pollen analysis _____
 - b) Micro bacterial fauna _____
 - c) Flora _____
 - d) Fossil woods (C¹⁴ dating) _____
 - e) Timberline _____
 - f) Lichenometry its utilization is envisaged
- 8) Quaternary history:

Study of quaternary and historic heritage (glacial and periglacial)

E. DATA AVAILABILITY.

- 1) Tabulations

Published reports Cartographie Géomorphologique. Colloque de BRNO 1976

Unpublished reports A publication will appear in the Bulletin of the Laboratoire de geomorphologie CNRS de Caen.
- 2) Data files (tape, cards, satellite transmissions) _____
- 3) Address from which data are available Laboratoire Geomorphologie CNRS
Université de Caen
14000 France
- 4) Other information Station observations of temperature measurement and the congelifluction movement of soils. Measurement of rock glacier fronts. Photographs since 1965.

F. MAIN PUBLICATIONS (ATTACH LIST).

A special issue of the Bulletin of the Laboratory of Caen is in preparation.

G. OTHER COMMENTS.

FRANCE
VAL THORENS-CHAVIÈRE

A. GEOGRAPHICAL LOCATION.

- 1) Country France
- 2) Name of station Val Thorens-Chavière
- 3) Locality St. Martin de Belleville Savoie
- 4) Latitude: _____ Longitude: _____ Elevation(m) 2300m
- 5) Mountain range Vanoise
- 6) Drainage basin Iser-Doron des Bellevilles
- 7) Name of director R. Vivian
- 8) Name of parent organization _____
Institut de Géographie Alpine (L.A.no. 185)
Address rue Maurice-Gignoux
38031 Grenoble Cedex
- Telephone number (76) 44-66-74
- 9) Date of establishment of the station 1973
- 10) Distance from the end of the road (in kilometers or hours of walking) _____
Other means of access: planes, float planes, helicopter, boat, etc.
Ski lifts in winter
Boarding point _____
- 11) Distance between the station and the glaciers studied _____
½ hour-1 hour walk

B. DESCRIPTION OF THE STATION (INCLUDE A MAP IF AVAILABLE).

- 1) Number of buildings 1
 - a) Total floor space 40 m²
 - b) Details: e.g. Laboratories 1
Dormitories 1
Number of beds 5
Kitchens, dining rooms _____
Workshops 1

Cold rooms _____
Generator source yes _____

2) Major research activities of the station (please check and rank in order of importance)

- a) Glaciology 1
- b) Snow studies 3
- c) Hydrology 2
- d) Climatology 2
- e) Geophysics _____
- f) Geomorphology 4
- g) Botany, biology 5
- h) Quaternary history 6

(with University of Lyon, Prof. Moiroud)

C. CALENDAR TIMING OF ACTIVITIES OF THE STATION.

- 1) Period of record _____
- 2) Yearly utilization period all year _____
- 3) Type of utilization (teaching, research, level of students involved) _____
Teaching level D.E.A. (thesis) _____
- 4) Number of researchers: Summer 5 Winter 1
- 5) Number of technicians: Summer 1 Winter 1
- 6) List of station personnel (and speciality). ATTACH LIST.
- 7) Other laboratories working temporarily at the station on joint/separate projects _____

D. MAIN TYPES OF RESEARCH AND DATA COLLECTED.

Put "O" for ongoing research, "P" for previous studies. Indicate period of records. (Add appropriate details.)

- 1) Glaciological research:
 - a) Name/UNESCO inventory number of glacier(s) Glaciers de Pécllet et de Chavière
 - b) Fluctuations (terminal position, surface, mass balance) _____
 - c) Dynamics, movement 0
 - d) Studies of surface 0
 - e) Studies of deep ice (coring) _____
 - f) Subglacial studies (access type) _____
 - g) Ice Chemistry and physics 0
 - h) Remote sensing _____
- 2) Snow study:
 - a) Snow cover 0
 - b) Avalanches _____
- 3) Hydrology:
 - a) Discharges 0
 - b) Ice cover percentage 0
 - c) Sub glacial hydrology _____
 - d) Ice surface feature _____
 - e) Lacustrine hydrology 64

- 4) Climatology:
 - a) Proximity to glacier 0
 - b) Parameters temperature, rain
- 5) Geophysics:
 - a) Radio-echo sounding method _____
 - b) Magnetic surveys; electromagnetism _____
- 6) Earth science (including area surrounding station)
 - a) Geology _____
 - b) Tectonics _____
 - c) Glacial geomorphology 0
- 7) Botany - biology (including area surrounding station)
 - a) Pollen analysis _____
 - b) Micro bacterial fauna 0
 - c) Flora _____
 - d) Fossil woods (C¹⁴ dating) 0
 - e) Timberline 0
 - f) Lichenometry _____
- 8) Quaternary history:
 - _____
 - _____
 - _____

E. DATA AVAILABILITY.

- 1) Tabulations _____
 - Published reports _____
 - Unpublished reports _____
- 2) Data files (tape, cards, satellite transmissions) _____
- 3) Address from which data are available _____
 - Institut de Géographie Alpine
 - rue Maurice-Gignoux
 - 38031 Grenoble Cedex
- 4) Other information _____

F. MAIN PUBLICATIONS (ATTACH LIST). Internal reports

G. OTHER COMMENTS.

References

- Bocquet, Gerard (1975) Les temperatures des eaux et leur evolution dans le bassin d'alimentation de la Haute-Romanche (Mesures et essai d'interpretation). (Water temperatures and their evolution in the catchment area of the Haute-Romanche. (Measures and suggested interpretation.)) Revue de Geographie Alpine, v.63(2), pp. 205-224.
- Bocquet, Gerard (1976) Principales caracteristiques chimiques des eaux de ruissellement dans le bassin de la Haute-Romanche. (Principal chemical characteristics of running water in the Haute-Romanche basin.) Revue de Geographie Alpine, v.63(2).
- Bocquet, Gerard; Ricq, J.C. (1977) Measurement of ice movement in subglacial cavities: a new cavitometer beneath the glacier d'Argentiere (Mont Blanc, France). Journal of Glaciology, v.18(78), pp. 137-142.
- Bocquet, Gerard (In press) Etude et surveillance d'un glacier tempere a partir de prises de vues automatiques. (Study and surveillance of a temperate glacier by automatic views.) Revue de Geographie Alpine.
- Clement, R.; Ricq de Bouard, M.; Thomas, A. (1972) Neige coloree sur les Alpes francaises le 9 mars 1972. (Colored snow in the French Alps, 9 March 1972.) La Meteorologie, series V, no. 24, pp. 65-83.
- Ricq de Bouard, M.; Thomas, A. (1973) La neige rouge. (Red snow.) Revue de l'Association Nationale pour l'Etude de la Neige et des Avalanches, no. 3.
- Ricq de Bouard, M.; Thomas, A. (1977) Evolution chimique de la neige au sol. (Chemical changes of snow on the ground.) Actes du Colloque de Grenoble, August and September 1977, International Association of Hydrologic Sciences (IAHS). Publication, no. 118, pp. 248-254.
- Thomas, A. (1969) Le plateau de Saint-Remeze. Essai de geomorphologie karstique. (The Saint-Remeze Plateau; Essay on karstic geomorphology.) DES, Grenoble, pays dactylographies.
- Thomas, A. (1971) Contribution a l'explication de la genese des "coups de gouge" ou "cupules d'erosion". (Contribution to the explanation of the solution hollow.) Comptes Rendus Hebdomadaires des Seances de l'Academie des Sciences, Paris, 19 May, 1971, p. 272, pp. 2521-2523.
- Thomas, A.; Ricq de Bouard, M. (1972) Proprietes chimiques et physico-chimiques du manteau neigeux: methodes et resultats (col de Porte 1969-1971). Application au probleme de l'etude de la pollution dans le triangle grenoblois. (Chemical and physico-chemical properties of snow cover: methods and results (Col de Porte 1969-1971). Application to the problem of the study of pollution in the triangle of Grenoble.) Societe Hydrotechnique de France, Paris, 2-3 March, 1972, 8 pp.
- Thomas, A. (1974) PH et conductivite de l'eau de fusion de la neige: presentation d'un dispositif de mesures avec enregistrement en continu sur le terrain. (PH and conductivity of snow meltwater: description of an apparatus for a continuous field recording instrument.) Societe Hydrotechnique de France, Paris, 7-8 March, 1974, 6 pp.

- Thomas, A. (1976) Constitution et evolution d'un manteau neigeux en moyenne montagne. L'exemple du Col de Porte (Massif de la Chartreuse). (Constitution and evolution of snow cover on a typical mountain. Col de Porte (Massif de la Chartreuse) as an example.) These de 3e cycle, 7 pl HT, Grenoble, 164 pp.
- Thomas, A. (1977) La neige et son evolution en moyenne montagne. (Snow and its evolution on a typical mountain.) Revue de Geographie Alpine, v.65(1), pp. 91-119.
- Vivian, R. (1960) Le recul recent des glaciers du Haut Arc et de la Haute Isere. (Recent retreat of glaciers in the high arc of the upper Isere.) Revue de Geographie Alpine, v.48, pp. 313-331.
- Vivian, R. (1965) Glaces mortes et morphologie glaciaire. (Dead ice and glacial morphology.) Revue de Geographie Alpine, v.53, pp. 371-403.
- Vivian, R. (1966) La catastrophe du glacier Allalin. (The catastrophe of the Allalin Glacier.) Revue de Geographie Alpine, v.54(1), pp. 97-113.
- Vivian, R.; Ricq, M. (1966) La rencontre des glaciers du Rhone et de l'Isere dans la cluse de Chambery et le val du Bourget. (The junction of glaciers of the Rhone and Isere in the cluse of Chambery and the valley of Bourget.) Revue de Geographie Alpine, v.54(3), pp. 389-415.
- Vivian, R. (1967) Morphologie des marges pro-glaciaires: sur quelques aspects caracteristiques de l'ecoulement des eaux et de ses effets morphologiques dans les marges proglaciaires alpines. (Morphology of proglacial margins; some characteristic aspects of the flow of water and its morphological effect on alpine proglacial margins.) Revue de Geographie Alpine, v. 55, pp. 267-291.
- Vivian, R.; Ricq, M. (1969) Moraine de versant et confluences glaciaires, etudes de morphologie glaciaire sur le plateau de St Nizier entre Drac et Furon. (Lateral moraine and glacial confluences; study of glacial morphology on the plateau of St. Nizier between Drac and Furon.) Revue de Geographie Alpine, v. 57(3), pp. 529-543.
- Vivian, R. (1970) Hydrologie: geographie des temperatures d'un cours d'eau glaciaire nepalais: la Modi Khola. (Hydrology: geography of the temperatures of a Nepalese glacial water course: la Modi Khola.) Revue de Geographie Alpine, v.58(2), pp. 393-397.
- Vivian, R. (1970) Hydrologie et erosion sous-glaciaires. (Hydrology and subglacial erosion.) Revue de Geographie Alpine, v.58(2), pp. 241-265.
- Vivian, R. (1970) La nappe phreatique du glacier d'Argentiere (massif du Mont Blanc). (The phreatic zone of glacier d'Argentiere (massif du Mont Blanc).) Comptes Rendus Hebdomadaires des Seances de l'Academie des Sciences de Paris, series D, v.270, 26 January 1970, pp. 604-606. .
- Vivian, R. (1971) Le laboratoire sous glaciaire d'Argentiere. (The subglacial laboratory of Argentiere.) B.C.G.I., no. 19, series II, 7 pp.

Vivian, R. (1971) Cryoclastie et erosion glaciaire (note transmise par M. Maurice Parde). (Frost shattering and glacial erosion (note transmitted by M. Maurice Parde).) Comptes Rendus Hebdomadaires des Seances de l'Academie des Sciences de Paris, v.272, series D, pp. 2524-2526.

Vivian, R. (1971) Les variations recentes des glaciers dans les Alpes francaises (1900-1970). Possibilites de prevision. (Recent variations of glaciers in the French Alps (1900-1970). Possibility of prediction.) Revue de Geographie Alpine, v.59(2), pp. 229-243.

Vivian, R. (1975) Les glaciers des Alpes Occidentales: Etude geographique (l'emprise de la glaciation et ses fluctuations recentes; le role des eaux; l'amenagement du paysage montagnard par les glaciers). (Glaciers of the Western Alps: geographic study (area of glaciation and recent fluctuations; the role of water; the influence of glaciers on mountain landscape).) These d'Etat Arthaud Editeur; imprimerie Allier; format 21, 29, 7, 420 pp.

Vivian, R.; Bocquet, G. (1972) Glaciolab 72: sept jours d'observations sous un glacier alpin. (Glaciolab 72; seven days of observations under an alpine glacier.) Bollettino del Comitato Glaciologico Italiano, 2nd series, no. 20, pp. 53-63.

Vivian, R.; Bocquet, G. (1973) Subglacial cavitation phenomena under the glacier d'Argentiere, Mt. Blanc, France. Journal of Glaciology, v.12(66), pp. 439-451.

Vivian, R.; Bocquet, G.; Ponson, Cl. (1973) Phenomene de cavitation regressive sous le glacier d'Argentiere, massif du Mont Blanc (note transmise par M. Maurice Parde). (Phenomenon of regressive cavitation under glacier d'Argentiere, massif du Mont Blanc (note transmitted by M. Maurice Parde).) Comptes Rendus Hebdomadaires des Seances de l'Academie des Sciences de Paris, v. 276, series D, 22 January 1973, pp. 485-488.

Vivian, R.; Zumstein, J. (1973) Hydrologie sous-glaciaire au glacier d'Argentiere. (Subglacial hydrology of glacier d'Argentiere.) U.G.G.I.-A.I.H.S. Symposium on the Hydrology of Glaciers, September 1969, International Association of Hydrologic Sciences, IAHS Publication no. 95, pp. 53-64.

Vivian, R. (1976) Glaciers alpins et chronologie holocene. (Alpine glaciers and Holocene chronology.) Bulletin Association Geographique Francaise, Paris, no. 433, pp. 105-118.

GREENLAND
SCOTTISH UNIVERSITIES RESEARCH HUT

A. GEOGRAPHICAL LOCATION.

- 1) Country Greenland
 - 2) Name of station Scottish Universities Research Hut
 - 3) Locality Ubekendt Ejland
 - 4) Latitude: 71° 15' Longitude: 53° 45' Elevation(m) 3
 - 5) Mountain range _____
 - 6) Drainage basin _____
 - 7) Name of director Dr. P.W.F. Gribbon
 - 8) Name of parent organization University of St. Andrews
- Address c/o Dept. of Physics
University, St. Andrews, Fife, Scotland
- Telephone number none
- 9) Date of establishment of the station 1966
 - 10) Distance from the end of the road (in kilometers or hours of walking) _____
- Other means of access: planes, float planes, helicopter, boat, etc.
plane to helicopter/boat to boat
- Boarding point Umanak
- 11) Distance between the station and the glaciers studied _____
15 km

B. DESCRIPTION OF THE STATION (INCLUDE A MAP IF AVAILABLE).

- 1) Number of buildings one
 - a) Total floor space 6 x 3 m
 - b) Details: e.g. Laboratories _____
Dormitories _____
Number of beds _____
Kitchens, dining rooms x
Workshops 69

Cold rooms _____
Generator source _____

- 2) Major research activities of the station (please check and rank in order of importance)
- a) Glaciology _____ 1 _____
 - b) Snow studies _____
 - c) Hydrology _____
 - d) Climatology _____
 - e) Geophysics _____ 2 _____
 - f) Geomorphology _____ 3 _____
 - g) Botany, biology _____ 4 _____
 - h) Quaternary history _____

C. CALENDAR TIMING OF ACTIVITIES OF THE STATION.

- 1) Period of record 1966 to present
- 2) Yearly utilization period 1 month (average)
- 3) Type of utilization (teaching, research, level of students involved) _____
research
- 4) Number of researchers: Summer 2 to 3 Winter _____
- 5) Number of technicians: Summer none Winter none
- 6) List of station personnel (and speciality). ATTACH LIST.
- 7) Other laboratories working temporarily at the station on joint/separate projects _____

D. MAIN TYPES OF RESEARCH AND DATA COLLECTED.

Put "O" for ongoing research, "P" for previous studies. Indicate period of records. (Add appropriate details.)

- 1) Glaciological research:
 - a) Name/UNESCO inventory number of glacier(s) Sermikavsak,
Upernivik Island
 - b) Fluctuations (terminal position, surface, mass balance) _____
0 1961 to 1977 work started by Danes in I.G.Y.
 - c) Dynamics, movement _____
 - d) Studies of surface 0 1961 to 1977
 - e) Studies of deep ice (coring) _____
 - f) Subglacial studies (access type) _____
 - g) Ice Chemistry and physics 0 1967 to 1977
 - h) Remote sensing _____
- 2) Snow study:
 - a) Snow cover _____
 - b) Avalanches _____
- 3) Hydrology:
 - a) Discharges _____
 - b) Ice cover percentage _____
 - c) Sub glacial hydrology _____
 - d) Ice surface feature P 1969
 - e) Lacustrine hydrology _____ 70 _____

- 4) Climatology:
 - a) Proximity to glacier _____ P _____
 - b) Parameters _____
- 5) Geophysics:
 - a) Radio-echo sounding method _____
 - b) Magnetic surveys; electromagnetism _____
- 6) Earth science (including area surrounding station)
 - a) Geology P 1938 to 1975 Prof. H.I. Drever's work on Ubekendt Island, this was _____
 - b) Tectonics _____ the main use of the hut.
 - c) Glacial geomorphology P 1967 _____
- 7) Botany - biology (including area surrounding station)
 - a) Pollen analysis _____
 - b) Micro bacterial fauna _____
 - c) Flora P 1967-68-69 1977 _____
 - d) Fossil woods (C^{14} dating) _____
 - e) Timberline _____
 - f) Lichenometry P 1969 _____
- 8) Quaternary history:

E. DATA AVAILABILITY.

- 1) Tabulations _____

Published reports _____

Unpublished reports _____
- 2) Data files (tape, cards, satellite transmissions) _____

- 3) Address from which data are available _____

- 4) Other information _____

F. MAIN PUBLICATIONS (ATTACH LIST).

3. OTHER COMMENTS.

ICELAND

SATELLITE MONITORING OF CHANGES OF GLACIERS OF ICELAND

A. GEOGRAPHICAL LOCATION.

- 1) Country Iceland
- 2) Name of ~~station~~ project: Satellite Monitoring of Changes of Glaciers of Iceland
- 3) Locality Countrywide
- 4) Latitude: N/A Longitude: N/A Elevation(m) N/A
- 5) Mountain range N/A
- 6) Drainage basin N/A
- 7) Name of project director Dr. Richard S. Williams, Jr.
- 8) Name of parent organization U.S. Geological Survey
EROS Program
Address Mail Stop #730
Reston, Virginia 22092
U.S.A.
Telephone number 703-860-7873
- 9) Date of establishment of the ~~station~~ project 1 August 1977
- 10) Distance from the end of the road (in kilometers or hours of walking)
N/A
Other means of access: planes, float planes, helicopter, boat, etc. N/A
Boarding point N/A
- 11) Distance between the station and the glaciers studied N/A

Example map: Vatnajökull, Iceland, Fall Scene. Satellite Image Map, NASA Landsat-1, 1:500,000, N6359W01723, U.S. Geological Survey, experimental printing, 1976.

B. DESCRIPTION OF THE PROJECT (INCLUDE A MAP IF AVAILABLE). (see enclosed sketch map)

- 1) Number of buildings N/A
 - a) Total floor space _____
 - b) Details: e.g. Laboratories _____
Dormitories _____
Number of beds _____
Kitchens, dining rooms _____
Workshops _____

Cold rooms _____
Generator source _____

- 2) Major research activities of the project (please check and rank in order of importance)
- a) Glaciology 1
 - b) Snow studies _____
 - c) Hydrology 3
 - d) Climatology 4
 - e) Geophysics _____
 - f) Geomorphology 2
 - g) Botany, biology _____
 - h) Quaternary history _____

C. CALENDAR TIMING OF ACTIVITIES OF THE PROJECT.

- 1) Period of record Landsat images (1972-continuing); aerial photos (1944-continuing)
- 2) Yearly utilization period continuing research project MAPS (1844-continuing)
- 3) Type of utilization (teaching, research, level of students involved) _____
Research
- 4) Number of researchers: Summer 1 researcher Winter 1 researcher
- 5) Number of technicians: Summer _____ Winter _____
- 6) List of station personnel (and speciality). ATTACH LIST. (see attached list)
- 7) Other laboratories working temporarily at the station on joint/separate projects See attached list of Icelandic scientists involved in the project

D. MAIN TYPES OF RESEARCH AND DATA COLLECTED.

Put "O" for ongoing research, "P" for previous studies. Indicate period of records. (Add appropriate details.) In Iceland IHD Index Numbers are assigned only to individual outlet glaciers from 6 icecaps and 3 cirque glaciers. Annual measurements are made of the variation in position of the snouts of these outlet and cirque glaciers:

- 1) Glaciological research:
 - a) Name/UNESCO inventory number of glacier(s) Therefore; Vatnajökull (14-34). Langjökull (5-7); Hofsjökull (9-11); Drangajökull(2); Myrdalsjökull-Eyjafjallajökull.
 - b) Fluctuations (terminal position, surface, mass balance) 0/and (12-13) Snæfellsjökull (1)
 - c) Dynamics, movement 0
 - d) Studies of surface 0
 - e) Studies of deep ice (coring) _____
 - f) Subglacial studies (access type) _____
 - g) Ice Chemistry and physics _____
 - h) Remote sensing 0
- 2) Snow study:
 - a) Snow cover _____
 - b) Avalanches _____
- 3) Hydrology:
 - a) Discharges 0 including changes caused by jökulhlaups
 - b) Ice cover percentage 0
 - c) Sub glacial hydrology _____
 - d) Ice surface feature 0
 - e) Lacustrine hydrology 0

- 4) Climatology:
 - a) Proximity to glacier _____
 - b) Parameters _____
- 5) Geophysics:
 - a) Radio-echo sounding method 0 Helgi Björnsson has been carrying out
 - b) Magnetic surveys; electromagnetism radio-echo sounding surveys
using Landsat images as a
guide to traverses. Helgi's
- 6) Earth science (including area surrounding station) research is part of a
 - a) Geology 0 separate yet related project,
 - b) Tectonics 0 however.
 - c) Glacial geomorphology 0
- 7) Botany - biology (including area surrounding station)
 - a) Pollen analysis _____
 - b) Micro bacterial fauna _____
 - c) Flora _____
 - d) Fossil woods (C¹⁴ dating) _____
 - e) Timberline _____
 - f) Lichenometry _____
- 8) Quaternary history:

E. DATA AVAILABILITY.

- 1) Tabulations Raw data in the form of preliminary maps and area measurements
Published reports available as reprints (see list of main publications)
Unpublished reportsSeveral manuscripts in various stages of preparation.
- 2) Data files (tape, cards, satellite transmissions)
Existing aerial photographs (b&w, color, color infrared), previously published
maps; and Landsat images
- 3) Address from which data are available Black & white aerial photos and maps:
Landmalingar Íslands, Laugavegi 178, Reykjavík, Ísland; Landsat images: EROS
Data Center, U.S. Geological Survey, Sioux Falls, South Dakota 57198 U.S.A.;
Published reports: Dr. Richard S. Williams, Jr., U.S. Geological Survey,
- 4) Other information M.S. #730, Reston, Virginia 22092 U.S.A. or Rannsóknarað
Ríkisins, Laugavegi 13, Reykjavík, Ísland.

F. MAIN PUBLICATIONS (ATTACH LIST). See enclosed list.

G. OTHER COMMENTS.

The project, "Satellite Monitoring of Changes of Glaciers of Iceland," is an
informal, binational, cooperative research effort between the U.S. and Iceland.
The objective of the project is to use Landsat images of glaciers of Iceland to
monitor (map and describe) dynamic glaciological phenomena.

References

- Thorarinsson, Sigurdur; Saemundsson, Kristjan; Williams, R.S., Jr. (1973) ERTS-1 image of Vatnajökull: Analysis of glaciological, structural, and volcanic features. Jökull, v.23, pp. 7-17.
- U.S. Geological Survey (1977) Vatnajökull, Iceland, (Fall Scene): Landsat Image Format Series, N6359W01723, Experimental Printing, 1:500,000-scale, U.S. Geological Survey, Reston, Virginia.
- U.S. Geological Survey (1977) Vatnajökull, Iceland (Winter Scene): Landsat Image Format Series, N6359W01723, Experimental Printing, 1:500,000-scale, U.S. Geological Survey, Reston, Virginia.
- Williams, R.S., Jr. (1972) Satellite geological and geophysical remote sensing of Iceland (abstract). In: Proceedings of the Eighth International Symposium on Remote Sensing of Environment, University of Michigan, Ann Arbor, Michigan, pp. 1465-1466.
- Williams, R.S., Jr.; Bödvarsson, A.; Fridriksson, S.; Palmason, G.; Rist, S.; Sigtryggsson, H.; Thorarinsson, S.; Thorsteinsson, I. (1973) Satellite geological and geophysical remote sensing of Iceland - preliminary results from analysis of MSS imagery. In: Proceedings of Symposium on Significant Results Obtained from ERTS-1, NASA SP-327, Goddard Space Flight Center, Greenbelt, Maryland, v.I, pp. 317-327.
- Williams, R.S., Jr.; Thorarinsson, Sigurdur; Saemundsson, Kristjan (1973) Vatnajökull area, Iceland: New volcanic and structural features on ERTS-1 imagery (abstract). In: Geological Society of America Abstracts with Programs, 1973 Annual Meetings, Dallas, Texas, pp. 864-865.
- Williams, R.S., Jr.; Bödvarsson, Agust; Fridriksson, Sturla; Palmason, Gudmundur; Rist, Sigurjon; Sigtryggsson, Hlynur; Saemundsson, Kristjan; Thorarinsson, Sigurdur; Thorsteinsson, Ingvi (1973) Iceland: Preliminary results of geologic, hydrologic, oceanographic, and agricultural studies with ERTS-1 imagery. In: Proceedings of Symposium on Management and Utilization of Remote Sensing Data, American Society of Photogrammetry, Sioux Falls, South Dakota, pp. 17-35.
- Williams, R.S., Jr.; Thorarinsson, Sigurdur (1973) ERTS-1 image of Vatnajökull area: General comments. Jökull, v.23, pp. 1-6.
- Williams, R.S., Jr.; Bödvarsson, Agust; Fridriksson, Sturla; Palmason, Gudmundur; Rist, Sigurjon; Sigtryggsson, Hlynur; Saemundsson, Kristjan; Thorarinsson, Sigurdur; Thorsteinsson, Ingvi (1974) Environmental studies of Iceland with ERTS-1 imagery. In: Proceedings of the Ninth Symposium on Remote Sensing of Environment, University of Michigan, Ann Arbor, Michigan, v.1, pp. 31-81.
- Williams, R.S., Jr.; Bödvarsson, Agust; Rist, Sigurjon; Saemundsson, Kristjan; Thorarinsson, Sigurdur (1975) Glaciological studies in Iceland with ERTS-1 imagery (abstract). Journal of Glaciology, v.15(73), pp. 465-466.

Williams, R.S., Jr. (1976) Dynamic environmental phenomena in southwestern Iceland. In: U.S. Geological Survey. Professional Paper 929, pp. 109-112.

Williams, R.S., Jr. (1976) Vatnajökull icecap, Iceland. In: U.S. Geological Survey. Professional Paper 929, pp. 188-193.

Williams, R.S., Jr. (1976) Monitoring of natural and land resources of Iceland. In: Abstracts Association of American Geographers, Middle Atlantic Division, Annual Meeting, Mary Washington College, Fredericksburg, Virginia, p. 23.

Williams, R.S., Jr.; Mecklenburg, T.N.; Abrams, M.J.; Gudmundsson, Bragi (1977) Conventional vs. computer-enhanced Landsat image maps of Vatnajökull, Iceland. In: Geological Society of America, Abstracts with Programs, 1977 Annual Meetings, Boulder, Colorado, v.9(7), pp. 1228-1229.

Primary Project Personnel

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Geologist
U.S. Geological Survey (730)
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University Science Institute
University of Iceland
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Prof. Sigurdur Thorarinsson
Geologist
Division of Geosciences
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Secondary Project Personnel

Agust Bödvarsson, Director (Emeritus)
Photogrammetist
Icelandic Geodetic Survey
Laugavegi 178
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National Energy Authority
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Dr. Kristjan Saemundsson
Geologist
National Energy Authority
Laugavegi 116
Reykjavik, Iceland

Principal Glaciers of Iceland

<u>Name</u>	<u>IHD Index Number</u>
Vatnajökull	None. Only for outlet glaciers (14-34)
Langjökull	None. Only for outlet glaciers (5-7)
Hofsjökull	None. Only for outlet glaciers (9-11)
Myrdalsjökull	None. (12-13)
Eyjafjallajökull	None. (12-13)
Drangajökull	None. (2)
Tungnafellsjökull	None.
Thorisjökull	None.
Thrandarjökull	None.
Tindfjallajökull	None.
Eiríksjökull	None.
Snaefellsjökull	(1)
Torfajökull	None.

Note: In Iceland, IHD Index Numbers are assigned only to individual outlet glaciers from six (6) ice caps and to three (3) cirque glaciers. Annual measurements are made of the variation in the position of the snouts of these outlet and cirque glaciers, not an areal measurement of an entire ice cap. Satellite imagery can permit an annual areal measurement of each ice cap to be made, thereby providing a measure of dynamic changes of an entire ice cap, including its outlet glaciers.

JAPAN

INSTITUTE OF LOW TEMPERATURE SCIENCE

Unfortunately our Institute has no field stations on mountain glaciers and ice caps, but we have three field stations in Hokkaido Island described in table 1.

Scientists who would like to use these field stations are requested to write the Director of the Institute of Low Temperature Sciences, Hokkaido University, Sapporo, Japan 060.

Daisuke Kuroiwa
Director

Table 1. Field Stations.

Number	1	2	3
Name of Station	Tomakomai	Moshiri	Toikanbetsu
Major Research	Frost Heaving	Snow Hydrology	Snow Avalanche
Location Latitude Longitude	42°27'N 141°45'E	44°22'N 142°16'E	44°55.7'N 141°58.1'E
Elevation	15m	290m	235m
Total floor space	81m ²	100.2m ²	104m ²
Laboratories	45m ²	57.1m ²	34m ²
Dormitories	20m ²	12.2m ²	28.8m ²
No. of beds	4	3	8
Kitchen, dining room	8m ²		4.7m ²
Workshop			26m ²
Cold room	8m ² 0~-30°C		10.5m ² 0~-25°C
Electric sources	100V A.C. 200V A.C.	100V A.C.	100V A.C.
Other facilities		3 Snow mobiles	

JAPAN
TSURUGISAWA-GOYA

A. GEOGRAPHICAL LOCATION.

- 1) Country Japan
- 2) Name of station Tsurugisawa-goya (lodge for mountaineers)
- 3) Locality Toyama-ken, Honshu-island, Japan
- 4) Latitude: 36°36.1'N Longitude: 137°37.3'E Elevation(m) 2460m
- 5) Mountain range Japanese Alps
- 6) Drainage basin The Kurobe
- 7) Name of director Prof. Keiji Higuchi
- 8) Name of parent organization Section of Hydrospheric Physics
Address c/o Water Research Institute,
Nagoya University,
Nagoya, 464 Japan.
- Telephone number Japan 052-781-5111 Ext. 5725
- 9) Date of establishment of the station _____
- 10) Distance from the end of the road (in kilometers or hours of walking) _____
Other means of access: planes, float planes, helicopter, boat, etc.
Boarding point _____
- 11) Distance between the station and the perennial snow patches
0.5 to 2 km.
~~glaciers~~ studied _____

B. DESCRIPTION OF THE STATION (INCLUDE A MAP IF AVAILABLE).

- 1) Number of buildings One
 - a) Total floor space 400 m²
 - b) Details: e.g. Laboratories _____
Dormitories _____
Number of beds _____
Kitchens, dining rooms _____
Workshops 80 _____

Cold rooms _____
Generator source Electricity and battery

- 2) Major research activities of the station (please check and rank in order of importance)
- a) Glaciology 0
 - b) Snow studies 0
 - c) Hydrology _____
 - d) Climatology 0
 - e) Geophysics _____
 - f) Geomorphology 0
 - g) Botany, biology _____
 - h) Quaternary history _____

C. CALENDAR TIMING OF ACTIVITIES OF THE STATION.

- 1) Period of record _____
- 2) Yearly utilization period about one month
- 3) Type of utilization (teaching, research, level of students involved) _____
Research _____
- 4) Number of researchers: Summer 4 to 6 Winter 0
- 5) Number of technicians: Summer 0 Winter 0
- 6) List of station personnel (and speciality). ATTACH LIST.
- 7) Other laboratories working temporarily at the station on joint/separate projects None

D. MAIN TYPES OF RESEARCH AND DATA COLLECTED.

Put "0" for ongoing research, "p" for previous studies. Indicate period of records. (Add appropriate details.)

- 1) Glaciological research: perennial snow patches
 - a) Name/UNESCO inventory number of glacier(s) _____
Hamaguri-yuki, E12723
 - b) Fluctuations (terminal position, surface, mass balance) _____
"p" and "0"
 - c) Dynamics, movement _____
 - d) Studies of surface _____
 - e) Studies of deep ice (coring) "p"
 - f) Subglacial studies (access type) "p"
 - g) Ice Chemistry and physics "p"
 - h) Remote sensing _____
- 2) Snow study:
 - a) Snow cover "p"
 - b) Avalanches _____
- 3) Hydrology:
 - a) Discharges _____
 - b) Ice cover percentage _____
 - c) Sub glacial hydrology _____
 - d) Ice surface feature _____
 - e) Lacustrine hydrology _____

- 4) Climatology:
 - a) Proximity to glacier _____
 - b) Parameters _____
- 5) Geophysics:
 - a) Radio-echo sounding method _____
 - b) Magnetic surveys; electromagnetism _____
- 6) Earth science (including area surrounding station)
 - a) Geology _____
 - b) Tectonics _____
 - c) Glacial geomorphology _____
- 7) Botany - biology (including area surrounding station)
 - a) Pollen analysis _____
 - b) Micro bacterial fauna _____
 - c) Flora _____
 - d) Fossil woods (C^{14} dating) _____
 - e) Timberline _____
 - f) Lichenometry _____
- 8) Quaternary history:
 - _____
 - _____
 - _____

E. DATA AVAILABILITY.

- 1) Tabulations
 - Published reports Glaciological Studies on the Perennial Snow Patches in
 - ~~Unpublished reports~~ Tsurugisawa, Part I (1967) (in Japanese).
 - Journal of Japanese Society of Snow and Ice, Vol.32, No.6, pp.1-18, 1971.
- 2) Data files (tape, cards, satellite transmissions) _____
- 3) Address from which data are available _____
- 4) Other information _____

F. MAIN PUBLICATIONS (ATTACH LIST).

G. OTHER COMMENTS.

The Tsurugisawa perennial snow patch has been surveyed three times in a year;
twice in a summer and once in the end of an ablation season.

KENYA
ALLIANCE

A. GEOGRAPHICAL LOCATION.

- 1) Country Kenya
- 2) Name of station Alliance
- 3) Locality Mackinder's Camp, Mt. Kenya
- 4) Latitude: 0° Longitude: 37° E Elevation(m) 4000
- 5) Mountain range Mt. Kenya
- 6) Drainage basin Teleki Valley
- 7) Name of director Prof S. Hastenrath/ F.E. Charnley
- 8) Name of parent organization Hillcrest Secondary School
Address P.O. Box 73473
Nairobi, Kenya
- Telephone number Nairobi 332824/5
- 9) Date of establishment of the station 1/1/78
- 10) Distance from the end of the road (in kilometers or hours of walking) four hours
Other means of access: planes, float planes, helicopter, boat, etc.
nil
Boarding point _____
- 11) Distance between the station and the glaciers studied 1 km

B. DESCRIPTION OF THE STATION (INCLUDE A MAP IF AVAILABLE).

- 1) Number of buildings none
 - a) Total floor space _____
 - b) Details: e.g. Laboratories _____
Dormitories Tented accomodations only
Number of beds _____
Kitchens, dining rooms _____
Workshops 83

Cold rooms _____
Generator source _____

- 2) Major research activities of the station (please check and rank in order of importance)
- a) Glaciology _____ 1 _____
 - b) Snow studies _____ 2 _____
 - c) Hydrology _____ 3 _____
 - d) Climatology _____
 - e) Geophysics _____
 - f) Geomorphology _____
 - g) Botany, biology _____ 4 _____
 - h) Quaternary history _____

C. CALENDAR TIMING OF ACTIVITIES OF THE STATION.

- 1) Period of record _____ 12 months extending _____
- 2) Yearly utilization period _____ 8 weeks _____
- 3) Type of utilization (teaching, research, level of students involved) _____
Research, directed VI Form students and staff. _____
- 4) Number of researchers: Summer _____ 6 _____ Winter _____
- 5) Number of technicians: Summer _____ Winter _____
- 6) List of station personnel (and speciality). ATTACH LIST.
- 7) Other laboratories working temporarily at the station on joint/separate projects _____

D. MAIN TYPES OF RESEARCH AND DATA COLLECTED.

Put "0" for ongoing research, "P" for previous studies. Indicate period of records. (Add appropriate details.)

- 1) Glaciological research:
 - a) Name/UNESCO inventory number of glacier(s) _____ Lewis, Darwin, Tyndal _____
 - b) Fluctuations (terminal position, surface, mass balance) _____
P 1906 to date _____ 0 _____
 - c) Dynamics, movement _____ P 1934, 1958 _____ 0 _____
 - d) Studies of surface _____ P 1906 to date _____ 0 _____
 - e) Studies of deep ice (coring) _____ 0 _____
 - f) Subglacial studies (access type) _____ 0 _____
 - g) Ice Chemistry and physics _____
 - h) Remote sensing _____
- 2) Snow study:
 - a) Snow cover _____ P 1958 to date _____ 0 _____
 - b) Avalanches _____
- 3) Hydrology:
 - a) Discharges _____ P 1958 _____ 0 _____
 - b) Ice cover percentage _____
 - c) Sub glacial hydrology _____
 - d) Ice surface feature _____ P 1958 to date _____ 0 _____
 - e) Lacustrine hydrology _____ 84 _____

- 4) Climatology:
 - a) Proximity to glacier _____
 - b) Parameters _____
- 5) Geophysics:
 - a) Radio-echo sounding method _____
 - b) Magnetic surveys; electromagnetism _____
- 6) Earth science (including area surrounding station)
 - a) Geology _____ P 1958
 - b) Tectonics _____
 - c) Glacial geomorphology _____ P 1958
- 7) Botany - biology (including area surrounding station)
 - a) Pollen analysis _____
 - b) Micro bacterial fauna _____
 - c) Flora _____ P 1958 to date _____ 0
 - d) Fossil woods (C¹⁴ dating) _____
 - e) Timberline _____
 - f) Lichenometry _____
- 8) Quaternary history:

E. DATA AVAILABILITY.

- 1) Tabulations _____

Published reports see bibliography to "Some Aspects of the Glaciers of Mt. Kenya"

Unpublished reports _____ Journal of Glaciology, 1959.
- 2) Data files (tape, cards, satellite transmissions) _____

- 3) Address from which data are available _____

P.O. Box 73473, Nairobi, Kenya

- 4) Other information _____

F. MAIN PUBLICATIONS (ATTACH LIST).

G. OTHER COMMENTS.

The establishment of this station by Hillcrest Secondary School with the collaboration of Prof. S. Hastenrath and F.E. Charnley, is a tentative step which it is hoped will become increasingly productive and of worthwhile long term results.

NEPAL
HIDDEN VALLEY

A. GEOGRAPHICAL LOCATION.

- 1) Country Nepal
- 2) Name of station Hidden Valley
- 3) Locality Mukut Himal, central Nepal
- 4) Latitude: 28°47.5'N Longitude: 83°33.0'E Elevation(m) 5055m
- 5) Mountain range The Himalayas
- 6) Drainage basin Kali Gandaki
- 7) Name of director Prof. Keiji Higuchi
- 8) Name of parent organization Glaciological Expedition to Nepal (Gen)
Address c/o Water Research Institute,
Nagoya University,
Nagoya, 464 Japan.
Telephone number 052-781-5111 Ext. 5725 (Japan)
- 9) Date of establishment of the station 1 July, 1974
- 10) Distance from the end of the road (in kilometers or hours of walking)
Other means of access: planes, float planes, helicopter, boat, etc.
Plane or helicopter
Boarding point
Kathmandu
- 11) Distance between the station and the glaciers studied 1 to 5 km

B. DESCRIPTION OF THE STATION (INCLUDE A MAP IF AVAILABLE).

- 1) Number of buildings One
 - a) Total floor space 40 m²
 - b) Details: e.g. Laboratories
Dormitories
Number of beds
Kitchens, dining rooms
Workshops 86

- 4) Climatology:
 - a) Proximity to glacier _____
 - b) Parameters _____
- 5) Geophysics:
 - a) Radio-echo sounding method _____
 - b) Magnetic surveys; electromagnetism _____
- 6) Earth science (including area surrounding station)
 - a) Geology _____
 - b) Tectonics _____
 - c) Glacial geomorphology _____ p
- 7) Botany - biology (including area surrounding station)
 - a) Pollen analysis _____
 - b) Micro bacterial fauna _____
 - c) Flora _____
 - d) Fossil woods (C¹⁴ dating) _____
 - e) Timberline _____
 - f) Lichenometry _____
- 8) Quaternary history:
 - _____
 - _____
 - _____

E. DATA AVAILABILITY.

- 1) Tabulations
 - Published reports Report of the Glaciological Expedition to Nepal, Part I & II, ~~1976/1977~~ Journal of the Japanese Society of Snow and Ice, Vol. 38 and 39, Special Issue, 1976 and 1977.
- 2) Data files (tape, cards, satellite transmissions) _____
- 3) Address from which data are available _____
- 4) Other information _____

F. MAIN PUBLICATIONS (ATTACH LIST).

G. OTHER COMMENTS.

The station had been abandoned on 8 Sept., 1974.

Cold rooms _____
Generator source Battery _____

- 2) Major research activities of the station (please check and rank in order of importance)
- a) Glaciology _____ 0 _____
 - b) Snow studies _____ 0 _____
 - c) Hydrology _____ 0 _____
 - d) Climatology _____ 0 _____
 - e) Geophysics _____ 0 _____
 - f) Geomorphology _____ 0 _____
 - g) Botany, biology _____
 - h) Quaternary history _____ 0 _____

C. CALENDAR TIMING OF ACTIVITIES OF THE STATION.

- 1) Period of record Two and a half months _____
- 2) Yearly utilization period _____
- 3) Type of utilization (teaching, research, level of students involved) _____
Research _____
- 4) Number of researchers: Summer 2 _____ Winter _____
- 5) Number of technicians: Summer 0 _____ Winter _____
- 6) List of station personnel (and speciality). ATTACH LIST.
- 7) Other laboratories working temporarily at the station on joint/separate projects None _____

D. MAIN TYPES OF RESEARCH AND DATA COLLECTED.

Put "O" for ongoing research, "P" for previous studies. Indicate period of records. (Add appropriate details.)

- 1) Glaciological research:
 - a) Name/UNESCO inventory number of glacier(s) Rikha Samba G1. and G.2 G1. _____
The glaciers have not been numbered yet. _____
 - b) Fluctuations (terminal position, surface, mass balance) _____
"P", from 1 July to 8 Sept. 1974. _____
 - c) Dynamics, movement "P", from 1 July to 8 Sept. 1974. _____
 - d) Studies of surface "P", ditto _____
 - e) Studies of deep ice (coring) _____
 - f) Subglacial studies (access type) _____
 - g) Ice Chemistry and physics _____
 - h) Remote sensing _____
- 2) Snow study:
 - a) Snow cover "P", from 1 July to 8 Sept. 1974 _____
 - b) Avalanches _____
- 3) Hydrology:
 - a) Discharges "P", from 1 July to 8 Sept. 1974. _____
 - b) Ice cover percentage "P", ditto _____
 - c) Sub glacial hydrology _____
 - d) Ice surface feature "P", ditto _____
 - e) Lacustrine hydrology _____ 88 _____

NEPAL
LHAJUNG

A. GEOGRAPHICAL LOCATION.

- 1) Country Nepal
- 2) Name of station Lhajung
- 3) Locality Khumbu region, east Nepal
- 4) Latitude: 27°53.8'N Longitude: 86°49.6'E Elevation(m) 4420m
- 5) Mountain range The Himalayas
- 6) Drainage basin Dudh Kosi
- 7) Name of director Prof. Keiji Higuchi
- 8) Name of parent organization
Glaciological Expedition to Nepal (GEN)
Address c/o Water Research Institute,
Nagoya University,
Nagoya, 464 Japan
Telephone number 052-781-5111 Ext. 5725 (Japan)
- 9) Date of establishment of the station 30 March, 1973
- 10) Distance from the end of the road (in kilometers or hours of walking)
about 150 km. (or 2 weeks of walking)
Other means of access: planes, float planes, helicopter, boat, etc.
plane or helicopter
Boarding point Kathmandu
- 11) Distance between the station and the glaciers studied 3 to 30 km

B. DESCRIPTION OF THE STATION (INCLUDE A MAP IF AVAILABLE).

- 1) Number of buildings One
 - a) Total floor space 75 m²
 - b) Details: e.g. Laboratories _____
Dormitories _____
Number of beds _____
Kitchens, dining rooms _____
Workshops 89

Cold rooms _____
Generator source Battery

- 2) Major research activities of the station (please check and rank in order of importance)
- a) Glaciology 0
 - b) Snow studies 0
 - c) Hydrology 0
 - d) Climatology 0
 - e) Geophysics 0
 - f) Geomorphology 0
 - g) Botany, biology _____
 - h) Quaternary history 0

C. CALENDAR TIMING OF ACTIVITIES OF THE STATION.

- 1) Period of record Three and a half years
- 2) Yearly utilization period Continuous observation during the above period.
- 3) Type of utilization (teaching, research, level of students involved) _____
Research
- 4) Number of researchers: Summer 6 Winter 6
- 5) Number of technicians: Summer 0 Winter 0
- 6) List of station personnel (and speciality). ATTACH LIST.
- 7) Other laboratories working temporarily at the station on joint/separate projects None

D. MAIN TYPES OF RESEARCH AND DATA COLLECTED.

Put "O" for ongoing research, "P" for previous studies. Indicate period of records. (Add appropriate details.)

- 1) Glaciological research:
 - a) Name/UNESCO inventory number of glacier(s) Khumbu Gl. and others.
NEA45EC 200 (Muller's No. NEA45E 23) named by our glacier inventory.
 - b) Fluctuations (terminal position, surface, mass balance) _____
"P" from 30 March, 1973 to 30 March, 1975
 - c) Dynamics, movement "P", ditto
 - d) Studies of surface "P", ditto
 - e) Studies of deep ice (coring) "P", ditto
 - f) Subglacial studies (access type) _____
 - g) Ice Chemistry and physics "p", ditto
 - h) Remote sensing _____
- 2) Snow study:
 - a) Snow cover "p", ditto
 - b) Avalanches _____
- 3) Hydrology:
 - a) Discharges "p", ditto
 - b) Ice cover percentage "p", ditto
 - c) Sub glacial hydrology _____
 - d) Ice surface feature "P", ditto
 - e) Lacustrine hydrology _____ 90

- 4) Climatology:
 - a) Proximity to glacier P, from 30 March 1973 to 31 October 1976.
 - b) Parameters _____
- 5) Geophysics:
 - a) Radio-echo sounding method _____
 - b) Magnetic surveys; electromagnetism _____
- 6) Earth science (including area surrounding station)
 - a) Geology P, from 30 March 1973 to 31 October 1976.
 - b) Tectonics ditto
 - c) Glacial geomorphology ditto
- 7) Botany - biology (including area surrounding station)
 - a) Pollen analysis _____
 - b) Micro bacterial fauna _____
 - c) Flora _____
 - d) Fossil woods (C^{14} dating) sampled for dating glacier advances.
 - e) Timberline _____
 - f) Lichenometry _____
- 8) Quaternary history:

E. DATA AVAILABILITY.

- 1) Tabulations

Published reports Reports of the GEN, part one and two.

~~Unpublished reports~~ Journal of the Japanese Society of Snow and Ice, Vol. 38

and 39, Special Issue, 1976 and 1977.
- 2) Data files (tape, cards, satellite transmissions) _____

- 3) Address from which data are available _____

- 4) Other information _____

F. MAIN PUBLICATIONS (ATTACH LIST).

G. OTHER COMMENTS.

The station had been abandoned on 31 October, 1976.

NEW ZEALAND

CARRICK

A. GEOGRAPHICAL LOCATION.

- 1) Country New Zealand
- 2) Name of station Carrick
- 3) Locality Carrick Range
- 4) Latitude: 45° S Longitude: 169° E Elevation(m) 1300m
- 5) Mountain range Carrick
- 6) Drainage basin Clutha
- 7) Name of director Dr. B.B. Fitzharris
- 8) Name of parent organization Dept. of Geography, P.O. Box 56
Dunedin
Address New Zealand
- Telephone number 40-109 Ext. 707
- 9) Date of establishment of the station 1975
- 10) Distance from the end of the road (in kilometers or hours of walking)
5 minute walk
Other means of access: planes, float planes, helicopter, boat, etc.
helicopter
Boarding point Cromwell
- 11) Distance between the station and the ~~glaciers~~^{snow} studied snow studied on site

B. DESCRIPTION OF THE STATION (INCLUDE A MAP IF AVAILABLE).

- 1) Number of buildings none
 - a) Total floor space _____
 - b) Details: e.g. Laboratories _____
Dormitories _____
Number of beds _____
Kitchens, dining rooms _____
Workshops 92

Cold rooms _____
Generator source _____

- 2) Major research activities of the station (please check and rank in order of importance)
- a) Glaciology _____
 - b) Snow studies _____ X
 - c) Hydrology _____ X
 - d) Climatology _____ X
 - e) Geophysics _____
 - f) Geomorphology _____
 - g) Botany, biology _____
 - h) Quaternary history _____

C. CALENDAR TIMING OF ACTIVITIES OF THE STATION.

- 1) Period of record _____ 1975-77 _____
- 2) Yearly utilization period _____ 6 months _____
- 3) Type of utilization (teaching, research, level of students involved) _____
teaching, research, 3rd-6th year students _____
- 4) Number of researchers: Summer _____ 1 _____ Winter _____ 1 _____
- 5) Number of technicians: Summer _____ Winter _____ 1 _____
- 6) List of station personnel (and speciality). ATTACH LIST.
- 7) Other laboratories working temporarily at the station on joint/separate projects _____

D. MAIN TYPES OF RESEARCH AND DATA COLLECTED.

Put "O" for ongoing research, "P" for previous studies. Indicate period of records. (Add appropriate details.)

- 1) Glaciological research:
 - a) Name/UNESCO inventory number of glacier(s) _____
 - b) Fluctuations (terminal position, surface, mass balance) _____
 - c) Dynamics, movement _____
 - d) Studies of surface _____
 - e) Studies of deep ice (coring) _____
 - f) Subglacial studies (access type) _____
 - g) Ice Chemistry and physics _____
 - h) Remote sensing _____
 - 2) Snow study:
 - a) Snow cover _____ X
 - b) Avalanches _____
 - 3) Hydrology:
 - a) Discharges _____ X
 - b) ~~Ice~~ cover percentage _____ X
 - c) Sub glacial hydrology _____
 - d) Ice surface feature _____
 - e) Lacustrine hydrology _____
- Snow

- 4) Climatology:
 a) Proximity to glacier _____
 b) Parameters X _____
- 5) Geophysics:
 a) Radio-echo sounding method _____
 b) Magnetic surveys; electromagnetism _____

- 6) Earth science (including area surrounding station)
 a) Geology _____
 b) Tectonics _____
 c) Glacial geomorphology _____
- 7) Botany - biology (including area surrounding station)
 a) Pollen analysis _____
 b) Micro bacterial fauna _____
 c) Flora _____
 d) Fossil woods (C¹⁴ dating) _____
 e) Timberline _____
 f) Lichenometry _____
- 8) Quaternary history:

E. DATA AVAILABILITY.

- 1) Tabulations _____
 Published reports _____
 Unpublished reports X Proceedings N.Z. Hydrological Society _____
- 2) Data files (tape, cards, satellite transmissions) _____

- 3) Address from which data are available _____
As above _____
- 4) Other information _____

F. MAIN PUBLICATIONS (ATTACH LIST).

G. OTHER COMMENTS.

Mainly snow research. No permanent building.
Operate small snow stations to investigate seasonal snow only.

NEW ZEALAND
DART GLACIER HUT

A. GEOGRAPHICAL LOCATION.

- 1) Country New Zealand
- 2) Name of station Dart Glacier
- 3) Locality Dart Glacier
- 4) Latitude: 44° 30' Longitude: 168° 37' Elevation(m) c 1425m
- 5) Mountain range Southern Alps
- 6) Drainage basin Clutha River
- 7) Name of director Dr. D.G. Bishop
- 8) Name of parent organization N.Z. Geological Survey/ Mount Aspiring
National Park Board
Address Box 5342
Dunedin, New Zealand
- Telephone number 77 722
- 9) Date of establishment of the station March, 1975
- 10) Distance from the end of the road (in kilometers or hours of walking)
Route 1: 8 to 10 hours walk (summer only); Route 2: 2 days walk
Other means of access: planes, float planes, helicopter, boat, etc.
helicopter
Boarding point Road end, Matukituki or Rees Valley
- 11) Distance between the station and the glaciers studied 100 m

B. DESCRIPTION OF THE STATION (INCLUDE A MAP IF AVAILABLE).

- 1) Number of buildings A-frame hut 2.6 x 3.3 m
 - a) Total floor space 8.6 m
 - b) Details: e.g. Laboratories _____
Dormitories _____
Number of beds 2
Kitchens, dining rooms _____
Workshops 95

Cold rooms _____
Generator source _____

- 2) Major research activities of the station (please check and rank in order of importance)
- a) Glaciology _____ 1 _____
 - b) Snow studies _____
 - c) Hydrology _____
 - d) Climatology _____
 - e) Geophysics _____
 - f) Geomorphology _____
 - g) Botany, biology _____ 3 _____
 - h) Quaternary history _____ 2 _____

C. CALENDAR TIMING OF ACTIVITIES OF THE STATION.

- 1) Period of record _____ 3/1975 onward _____
- 2) Yearly utilization period _____ November to April _____
- 3) Type of utilization (teaching, research, level of students involved) _____
Monitoring ablation, firn line position, movement, recession _____
- 4) Number of researchers: Summer _____ 1 _____ Winter _____
- 5) Number of technicians: Summer _____ 1 _____ Winter _____
- 6) List of station personnel (and speciality). ATTACH LIST.
- 7) Other laboratories working temporarily at the station on joint/separate projects _____

D. MAIN TYPES OF RESEARCH AND DATA COLLECTED.

Put "0" for ongoing research, "P" for previous studies. Indicate period of records. (Add appropriate details.)

- 1) Glaciological research:
 - a) Name/UNESCO inventory number of glacier(s) _____
 - b) Fluctuations (terminal position, surface, mass balance) _____
0 0 0
 - c) Dynamics, movement _____ 0 _____
 - d) Studies of surface _____ 0 (annual vertical air photography) _____
 - e) Studies of deep ice (coring) _____
 - f) Subglacial studies (access type) _____
 - g) Ice Chemistry and physics _____
 - h) Remote sensing _____
 - i) Photography (ground and aerial) _____ 0 _____
- 2) Snow study:
 - a) Snow cover _____
 - b) Avalanches _____
- 3) Hydrology:
 - a) Discharges _____
 - b) Ice cover percentage _____
 - c) Sub glacial hydrology _____
 - d) Ice surface feature _____ 96 _____
 - e) Lacustrine hydrology _____

- 4) Climatology:
 - a) Proximity to glacier _____
 - b) Parameters _____
- 5) Geophysics:
 - a) Radio-echo sounding method _____
 - b) Magnetic surveys; electromagnetism _____
- 6) Earth science (including area surrounding station)
 - a) Geology anticipated _____
 - b) Tectonics _____
 - c) Glacial geomorphology anticipated _____
- 7) Botany - biology (including area surrounding station)
 - a) Pollen analysis _____
 - b) Micro bacterial fauna _____
 - c) Flora anticipated _____
 - d) Fossil woods (C^{14} dating) _____
 - e) Timberline _____
 - f) Lichenometry _____
- 8) Quaternary history:

E. DATA AVAILABILITY.

- 1) Tabulations _____

Published reports _____

Unpublished reports 1975, 1976, 1977 _____
- 2) Data files (tape, cards, satellite transmissions) _____

- 3) Address from which data are available N.Z. Geological Survey

Box 5342

Dunedin
- 4) Other information A comprehensive report of results to date will be compiled

after the 1977-1978 summer programme

F. MAIN PUBLICATIONS (ATTACH LIST).

G. OTHER COMMENTS.

This is a rather small, simple project, aimed at producing a report of
general public interest. The project is expected to run 10 years (1975-1985).

NEW ZEALAND
IVORY GLACIER HUT

A. GEOGRAPHICAL LOCATION.

- 1) Country New Zealand
- 2) Name of station Ivory Glacier Hut
- 3) Locality West Coast, South Island
- 4) Latitude: 43° 08' S Longitude: 170° 55' E Elevation(m) 1400
- 5) Mountain range Southern Alps
- 6) Drainage basin Waitaha
- 7) Name of director T.J. Chinn/ P.W. Anderton
- 8) Name of parent organization Ministry of Works and Development
Water and Soil Division
- Address P.O. Box 1479
Christchurch, New Zealand
- Telephone number 791-200
- 9) Date of establishment of the station 1/5/69
- 10) Distance from the end of the road (in kilometers or hours of walking)
18 km (3 days walking)
Other means of access: planes, float planes, helicopter, boat, etc.
Helicopter
Boarding point Waitaha Valley
- 11) Distance between the station and the glaciers studied 0.5 km

B. DESCRIPTION OF THE STATION (INCLUDE A MAP IF AVAILABLE).

- 1) Number of buildings 1
 - a) Total floor space 36 m²
 - b) Details: e.g. Laboratories _____
Dormitories _____
Number of beds 6
Kitchens, dining rooms 1 common room
Workshops 1

Cold rooms _____
Generator source _____

- 2) Major research activities of the station (please check and rank in order of importance)
- a) Glaciology _____ 1 _____
 - b) Snow studies _____ 4 _____
 - c) Hydrology _____ 3 _____
 - d) Climatology _____ 2 _____
 - e) Geophysics _____
 - f) Geomorphology _____
 - g) Botany, biology _____
 - h) Quaternary history _____

C. CALENDAR TIMING OF ACTIVITIES OF THE STATION.

- 1) Period of record 1/5/69 to 30/4/77
- 2) Yearly utilization period short visits at two-monthly intervals
- 3) Type of utilization (teaching, research, level of students involved) _____
Research
- 4) Number of researchers: Summer 2 Winter 2
- 5) Number of technicians: Summer 2 Winter 2
- 6) List of station personnel (and speciality). ATTACH LIST.
- 7) Other laboratories working temporarily at the station on joint/separate projects Geography Dept. University of Canterbury, NZ

D. MAIN TYPES OF RESEARCH AND DATA COLLECTED.

Put "O" for ongoing research, "P" for previous studies. Indicate period of records. (Add appropriate details.)

- 1) Glaciological research:
 - a) Name/UNESCO inventory number of glacier(s) _____
 - b) Fluctuations (terminal position, surface, mass balance) _____
P (0 for terminal position only)
 - c) Dynamics, movement _____ p _____
 - d) Studies of surface _____
 - e) Studies of deep ice (coring) _____
 - f) Subglacial studies (access type) _____
 - g) Ice Chemistry and physics _____
 - h) Remote sensing _____
- 2) Snow study:
 - a) Snow cover _____ p _____
 - b) Avalanches _____
- 3) Hydrology:
 - a) Discharges _____ 0 _____
 - b) Ice cover percentage _____
 - c) Sub glacial hydrology _____
 - d) Ice surface feature _____
 - e) Lacustrine hydrology _____ 99 _____

- 4) Climatology:
 - a) Proximity to glacier 0.5 km to glacier center
 - b) Parameters precipitation, temperature, wind run, heat balance (short period)
- 5) Geophysics:
 - a) Radio-echo sounding method _____
 - b) Magnetic surveys; electromagnetism _____
- 6) Earth science (including area surrounding station)
 - a) Geology _____
 - b) Tectonics _____
 - c) Glacial geomorphology _____
- 7) Botany - biology (including area surrounding station)
 - a) Pollen analysis _____
 - b) Micro bacterial fauna _____
 - c) Flora _____
 - d) Fossil woods (C^{14} dating) _____
 - e) Timberline _____
 - f) Lichenometry _____
- 8) Quaternary history:

E. DATA AVAILABILITY.

- 1) Tabulations x

Published reports x

Unpublished reports x
- 2) Data files (tape, cards, satellite transmissions) _____

Stream flow records on computer file
- 3) Address from which data are available _____

Ministry of Works and Development

Water and Soil Division

P.O. Box 1479, Christchurch, New Zealand
- 4) Other information _____

F. MAIN PUBLICATIONS (ATTACH LIST).

G. OTHER COMMENTS.

Station now closed

References

- Anderton, P.W.; Chinn, T.J. (1973) Ivory Glacier. Report no. 2, April 1969-May 1971. Ministry of Works and Development. Hydrological Research Annual Report, no. 28.
- Anderton, P.W. (1976) Ivory Glacier. Report for 1972/1973. Ministry of Works and Development. Hydrological Research Annual Report, no. 35.
- Anderton, P.W. (1976). Ivory Glacier. Report for 1973/75. Ministry of Works and Development. Hydrological Research Annual Report, no. 36.
- Anderton, P.W.; Chinn, T.J. (In press) A representative basin study, Ivory Glacier, New Zealand.
- Chinn, T.J.; Bellamy, R.J. (1970) Ivory Glacier. Report no. 1, to December 1969. Ministry of Works and Development. Hydrological Annual Report, no. 1.
- Dickson, B. (1974) Glacio-meteorological research on the snowpack surface of the Ivory Glacier. M.A. thesis, University of Canterbury, New Zealand.
- Harding, F.B. (1972) Micro-meteorological investigations over a mid-latitude temperate glacier - the Ivory Glacier. M.A. thesis, University of Canterbury, New Zealand.

GLACIOLOGICAL DATA SERIES

Glaciological Data, which supercedes *Glaciological Notes*, is published by the World Data Center A for Glaciology (Snow and Ice) several times per year. It contains bibliographies, inventories, and survey reports relating to snow and ice data, specially prepared by the Center, as well as invited articles and brief, unsolicited statements on data sets, data collection and storage, methodology, and terminology in glaciology. Contributions are edited, but not refereed or copyrighted. WDC publications are distributed without charge to interested individuals and institutions.

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