

EXPEDITIONARY FIELD TRAINING,
RESEARCH PARTICIPATION
AND SEMESTER CREDITS IN

ARCTIC AND MOUNTAIN SCIENCES

41st to 43rd Summer Sessions in Earth Systems
Field Science Emphasizing Glaciological, Arctic,
and Alpine Environments

**July 1 - August 24, with an additional two week
option to September 7th, in 2000, 2001 and 2002
on the Juneau Icefield, Alaska and the Atlin Lake Region,
B.C.-Yukon, Canada**

This program is sponsored by the Glaciological and Arctic Sciences
Institute, University of Idaho. Among cooperating agencies are the National
Aeronautics & Space Administration (NASA); the U.S. Army Research Office;
U.S. Departments of the Air Force and the Navy; the U.S. Forest Service; the
Juneau Icefield Research Program (JIRP); the University of Alaska system;
and The Foundation for Glacier and Environmental Research, Seattle, WA.



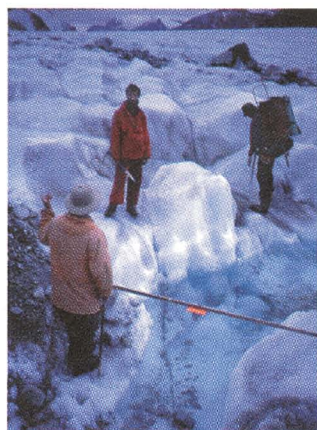
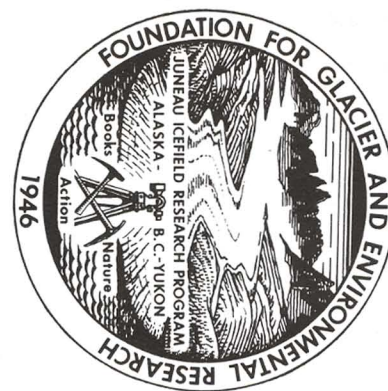
NASA - Landsat satellite photograph of Juneau Icefield, July, 1980. From North to
South (top to bottom) distance approximately 100 miles. Juneau, AK is indicated
by small arrow, lower left. Atlin, B.C.-Yukon lies just off the middle top of image.



University of Idaho

Glaciological & Arctic Sciences Institute
College of Mines & Earth Resources

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Moscow, Idaho 83844-1211



A student project to monitor
supraglacial stream hydrology
on Vaughan Lewis Glacier near
Camp 19. (M. M. Miller photo)

- DR. MARK NOBLE, Professor of Botany, University of Minnesota (geobotany, ecology).
- DR. MAURI PELTO, Associate Professor, Environmental Science, Nichols College, Dudley, MA. (mass balance, FGER Cascades project).
- DR. CHRISTIAN PETRICH, Water Resources Institute, University of Idaho (geohydrology).
- DR. ALFRED C. PINCHAK (Ph.D.; M.D.), Dept. of Mechanical Sciences, Case Western Reserve University, Cleveland, OH (fluid mechanics).
- JOAN RAMAGE, Dept. of Geological Sciences, Cornell University, NY (satellite remote sensing).
- DR. HEINZ SLUPETZKY, Institute of Geography, Salzburg University, Austria (glaciology).
- DR. KENNETH F. SPRENKE, Department of Geology, University of Idaho (geophysics).
- DR. RANDAL STAHL, Environmental Sciences Program, University of Alaska SE, Juneau, AK (env. hydrology, geochemistry, arctic soils).
- DR. DAVID STOCK, Professor, Mechanical Engineering, Washington State University, (continuum mechanics, ice-atmosphere interface).
- DR. CHARLES SWITHINBANK, Scott Polar Research Institute, University of Cambridge, England (polar glaciology, sea ice, Antarctica).
- DR. ANN M. TALLMAN, Geologist, Science Applications International, Richland, WA, and Found. for Glacier & Environmental Research, Seattle, WA (environmental geomorphology, nuclear waste disposal).
- JEFF L. TORGERSON, Research Associate, Glaciological and Arctic Sciences Institute, University of Idaho (synoptic meteorology, field methods, data analysis).
- DR. MICHAEL T. WALTER, Assistant Professor, Environmental Sciences Program, University of Alaska SE, Juneau, AK (hydrology, environmental engineering).
- DR. WALTER WELSCH, Dean & Professor, Institute of Geodesy, Bundeswehr University, Munich, Germany (geodesy, field surveying, photogrammetry, GPS surveys).
- DR. GEORGE A. WILLIAMS, Professor of Geology, Research Associate, Glaciological Institute, University of Idaho (regional geology, geologic mapping, senior mentor).
- DR. SCOTT WOOD, Professor of Geology, University of Idaho (geochemistry, hydro-geology).
- PROF. GEORGE WRAY, College of Art & Architecture, University of Idaho (science and humanities, landscape aesthetics, environmental art, geologic sketching).
- DOUGLAS C. WYATT, Foundation for Glacier and Environmental Research and attorney, New York City (science policy and environmental law).

LOGISTICS AND SERVICE SUPPORT

Headquarters Operations:

- DR. LANCE D. MILLER, President, Foundation for Glacier and Environ. Research, Juneau, AK.
- ANNETTE ERICKSON, Administrative Coordinator, Foundation for Glacier and Environmental Research, Moscow, ID, and Juneau, AK.
- JOAN W. MILLER, FGER Liaison, Fiscal Adviser, Foundation for Glacier and Environmental Research, Moscow, ID, and Juneau, AK (consultant on logistics, personnel, fiscal mgt.).

Field Staff and Facilities:

- GUY ADEMA (Operations), MATT BEEDLE (Safety), MARK STINSON, M.D. (Wilderness Medicine), SCOTT McGEE (Camp Mgmt.), ANDREW YOUNG and DONALD McCULLY (Mechanics & Communication), RICK NEIER and NATALIE SILVERTON (Facilities). Other Staff: Nichole Alhadeef, Emily Baker, Andrew Bliss, Matt Bourke, Deron Carter, Brenna Davis, Chris Haagen, Nathan Hamm, Dr. Jack Helle, Hiram Henry, Trent Hubbard, Joanna Latham, Justus Meyer, Peter Pearson, Lt. Stefan Pinchak, USAF, G. Thoma, J. Thoma.

Medical and Terrain/Survival Instruction:

- Bill Cox, M.D., Susan Geletley, M.D., Christopher Ho, M.D., Kristin Van Konynenburg, M.D., Alan McPherson, M.D., T.R. Haley, M.D., Mark Stinson, M.D., A.C. Pinchak, M.D., Gary Mendivil, Karl Bausler, Carl Byers.

FGER Field Administration and Liaison:

- DR. M. M. MILLER, FGER Director; DR. L.D. MILLER, FGER President; J.W. MILLER, Fiscal Advisor; A.Clough, G. Mendivil, N. Graham, G. and J. Thoma, N. Vig, J. Wilson, D. Wilson.

Science Teacher Component:

- DR. JOHN DAVIS, Division of Science Education, University of Idaho, College of Education; ZACHARY SMITH, Foundation for Glacier and Environmental Research, University of Maine.

Project Advisers:

- R. HAMMOND, USGS, Geophysical Institute, University of Alaska, Fairbanks, (ice radar); DR. DAVID BREW, DR. ARTHUR FORD, USGS, Menlo Park, CA (regional geology); DR. DENNIS GEIST, Dept. of Geology, University of Idaho (igneous geology); DR. KEVIN HALL, University of Northern B.C., (periglacial geomorphology); JOHN HARVEY, FGER, Atlin, B.C. (economic geology, Canadian FGER liaison); DR. BRUCE MOLNIA, Chief, International Polar Programs, USGS, Reston, VA (glaciology, remote sensing); DR. ALAN ROHAY, Battelle NW Labs, Richland, WA (geophysics); DR. DOUGLAS SWANSTON, Consulting Engineer, Juneau, AK (engin. geology); DON THOMAS, USGS, Juneau, AK (hydrology).

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also

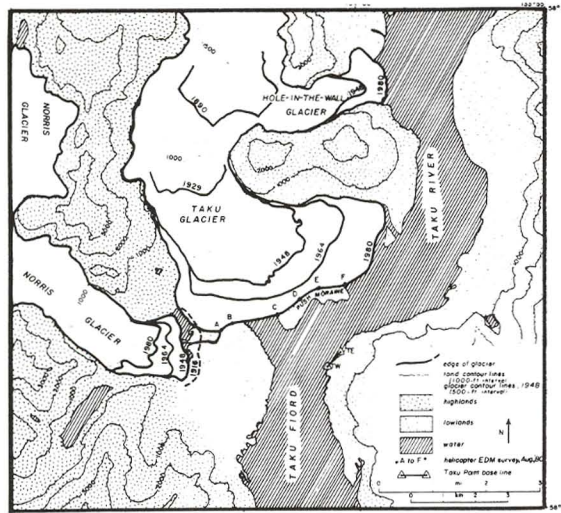
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E-MAIL: glacier@uidaho.edu or jirp@uidaho.edu FAX: 208-882-6207
Internet: http://www.mines.uidaho.edu/glacier

ACADEMIC AND RESOURCE SCIENTISTS

- DR. MAYNARD M. MILLER, Professor of Geology and Director, Glaciological and Arctic Sciences Institute, University of Idaho. Chairman, Foundation for Glacier and Environmental Research, and Director, Juneau Icefield Research Program (earth systems science).
- GUY W. ADEMA, M.S., Field Operations Manager, Research Associate, Glaciological & Arctic Sciences Institute, University of Idaho (geophysics, computer geology).
- DR. GREGG LAMOREY, Research Manager, Foundation for Glacier and Environmental Research. Assistant Research Professor, Desert Research Institute, Water Resources Division, University of Nevada, Reno (paleoclimatology, mass balance, core drilling, polar glaciology).
- PROF. WILLIAM A. DITTRICH, Field Projects Coordinator, JIRP. Head, Dept. of Physics, Portland Community College, Portland, OR (ice physics, glaciology, mass balance).
- DR. JAMES H. ANDERSON, Institute of Arctic Biology, University of Alaska, Fairbanks, AK (arctic geobotany, palynology, dendroglaciology).
- DR. MARK BRANDRISS, Geology Dept., Smith College, Northampton, MA (field mapping, metamorphic and igneous geology).
- DR. JAMES E. BUGH, Dept. of Geology, State University of New York, Cortland, NY (geomorphology, mass balance, senior mentor).
- DR. VALERIE CHAMBERLAIN, Professor of Geology, University of Idaho (geochemistry, isotope geology, accretionary terranes).
- ALBERT CLOUGH, Kvaerner Environmental Associates, Juneau, AK, and Foundation for Glacier & Environmental Research, Juneau, AK (economic geology, projects adviser).
- DR. FRANK COLBY, Professor of Meteorology, University of Massachusetts, Lowell, MA (micro-meteorology, mountain wind research, climate systems).
- DR. BRADLEY COLMAN, Research Meteorologist, NOAA Environmental Research Laboratory, Seattle, WA (atmospheric sciences, glacio-climatology, meteorology mentor).
- DR. CATHY CONNOR, Associate Professor of Geology and Coordinator, Environmental Science Program, University of Alaska SE, Juneau, AK (geology, environmental studies).
- DR. MICKEY E. GUNTER, Associate Professor, Dept. of Geology, University of Idaho (field geology, mineralogy, and environmental earth science).
- KENNETH HOWARD, Project Manager, NOAA National Storm Research Laboratory, Norman, OK (mountain meteorology, katabatic winds).
- DR. RICHARD KEEN, Adjunct Professor of Meteorology, University of Colorado. Meteorology Consultant, Golden, CO (micro-meteorology, radiation, synoptic climatology).
- DR. GARY A. LAURSEN, Dept. of Biology and Wildlife, University of Alaska, Fairbanks, AK (arctic botany, mycology, lichenology, tundra ecology).
- DR. W. ANDREW MARCUS, Professor of Physical Geography and Head, Dept. of Earth Sciences, Montana State University, Bozeman, MT (mountain geomorphology, projects adviser).
- DIPL. ING. MARTIN LANG, Dept. of Surveying, Bundeswehr University, Munich, Germany (GPS surveys, survey technology).
- DR. WILLIAM McCLELLAND, Asst. Prof. of Geology, University of Idaho (radiometric dating).
- SCOTT McGEE, Foundation for Glacier & Environmental Research and US Fish & Wildlife Service, Anchorage, AK (GPS, surface flow surveys, mass balance).
- DR. LANCE D. MILLER, Foundation for Glacier & Environmental Research. Exploration Geologist, Juneau, AK (economic geology, exploration and regional geology, senior mentor).
- ROSS M. MILLER, Foundation for Glacier & Environmental Research, Juneau, AK and Atlin, B.C. (projects development, multidisciplinary science, research creativity).



Night scene at avalanche research camp on Gilkey Glacier in the
Heritage Range, Juneau Icefield. (R. Benedict photo)



Advancing Taku and Hole-in-the-Wall Glaciers and receding Norris Glacier, 1890 to 2000.

PURPOSE

"We shall not cease from exploration and the end of all our exploring will be to arrive where we started and know the place for the first time." —T.S. Eliot

The Juneau Icefield Research Program (JIRP) was organized in 1946 to pursue long-term field research on interrelationships of all of the scientific disciplines necessary to understand the total environment of arctic and mountain regions. A key emphasis was research on the global glacier-climate problem. Stemming from this the Summer Institute of Glaciological and Arctic Sciences was organized in 1959 to provide combined academic and field training at the graduate and undergraduate level, and as well for selected secondary school science teachers. The basic aim is total systems experience for potential polar and mountain scientists and practical field training for careers in any or all of the field sciences.

Participants observe and study sub-aerial processes in a dynamic region of existing glaciers and rugged mountain terrain. The goal is to appreciate inter-science investigations not only in pristine wilderness regions but assessments of environmental problems even in rural and urban areas. The program especially enlarges the professional effectiveness of school science teachers. Increased emphasis will soon be given to this aspect.

Students also attend lectures at field sites, participate in demonstrations with instruments, and take and record scientific measurements as part of long-range research from high-elevation and continental periglacial areas to low-level temperate maritime regions. A special understanding is gained of glacio-climatological, glacio-geological and glacio-ecological relationships in natural systems. Because the activities strongly stress research involvement, the participants gain irreplaceable field work experience.

DATES

The Institute will be conducted from **July 1 to August 24**. For qualified students interested in participation in JIRP and allied regional research projects, or for those desiring further field work or thesis research, a period of additional field activity may be arranged.

THE PROGRAM

"Nature without learning is a blind thing — and learning without Nature is an imperfect thing." —Plutarch

The program theme is earth systems science via expeditionary experience and research participation, with relevant demonstrations and lectures. Interdisciplinary emphasis is on field geology, geophysics, atmospheric sciences, arctic ecology, glaciology, hydrology, applications geomorphology, surveying, environmental sciences and resource planning. These topics are coordinated by the Institute through its faculty and experienced staff members.

Up to 9 academic credits can be arranged through the Geology and Geography Departments, University of Idaho, or the environmental science



View across the Twin Glaciers' source region in the Northern Boundary Range and S.E. portion of the Juneau Icefield to Devil's Paw (8584').



Fully equipped, a scientist skis to Camp 14, on the Juneau Icefield.



Palynology sampling in glacial bogs of the Atlin Lake sector, Alaska-Yukon border. (Photos by FGER)

program at the UI and the University of Alaska. By special arrangement additional credits may be earned in the post-season autumn term.

Subsidiary topics considered as part of the Earth Systems Science program include: Environmental Geosciences; Terrestrial and Glacial Photogrammetry; GPS Surveys and Mapping; Structural Glaciology; Arctic Geobotany; Lichenometry; Tundra Ecology; Periglacial Geomorphology; Pleistocene Stratigraphy; Continuum Mechanics; Radiation Meteorology; Mountain Climatology; Glacio-hydrology; Exploration Geophysics; Mineral Prospecting; Remote Sensing and Geological Mapping.

Through field instruction, the offerings take advantage of a classical glacial, periglacial and alpine and arctic environment.

The courses are provided under aegis of the **University of Idaho**. Some also via the **University of Alaska**. All credits are transferable to other institutions.

Lectures, field studies and problem sessions are held on adjunct topics. The offerings are concurrent during a concentrated, **8-week** session on the Juneau Icefield, emphasizing Neoglacial conditions. Participants in the general courses are exposed to all offerings. The initial week is devoted to coastal geology field trips, and field methods, and safety and survival techniques. Two to five weeks may be used for work on a field problem, dependent on the participant's aim, interest and abilities. The last week is concentrated in the Atlin area where deglaciated terrain provides opportunities for study of Cordilleran Pleistocene chronology and Holocene periglacial environments. For those wishing to ally the program with a specific thesis project or equivalent independent study, including post-doctoral research, field problems can be developed. An optional additional two weeks to **September 7th** may be arranged for those desiring a **10-week** field season ending up with research in the Atlin sector.

PARTICIPANTSHIPS AND AWARDS

Although most students attend on the fee-paying base, some field scholarships are available for undergraduate and graduate students, depending on what student category pertains at the time of the summer session. A limited number of awards are available to outstanding junior and senior high school students. NASA provides some undergraduate student support on a competitive basis. Partial awards for upper class high school students are supported by the DOD and the U.S. Army Research Office in its Research in Engineering Apprenticeship Program (REAP). Some scholarships for undergraduates, graduate students, and secondary school science teachers are supported by the Foundation for Glacier and Environmental Research (FGER), the Glaciological and Arctic Sciences Institute, and the Rotary Club of Juneau, AK. Other sources of applicant support are available, for which students can apply. With appreciation, since 1962, this program has received 69 grants from NASA and the National Science Foundation for undergraduate and graduate student support. Proposals to continue some of these scholarships are pending from federal agencies.

Research assistantships in ongoing programs are offered to outstanding previous participants. Post-doctoral support is also available. Participation of minorities and females is actively sought and encouraged. The basic fee is **\$3,900** for the 8-week session, with an additional \$1,100 in real cost per participant provided by FGER. Costs are pro-rated for the 10-week session. Participants cover travel expenses between their home and Juneau, Alaska and return home from Atlin, B.C., via Juneau.

LOCATION

The main glacierized area lies on the Juneau Icefield in the Tongass National Forest and the Atlin Provincial Wilderness Park of the Alaska-Canada Boundary Range between Juneau, Alaska and Atlin, B.C. Attention is also given to the Lemon Glacier sector on the southwestern periphery and to the Cathedral Massif Glacier in the Atlin District adjacent to the icefield on the north. Here arrays of Wisconsinian deglaciation and periglacial features are observed.

FACILITIES AND LOGISTICS

Thirteen main stations and 17 lesser camp and research facilities are located in the field. Permanent metal-sheathed and well-insulated wooden buildings exist at the main field sites. Temporary shelters and tents are used at trail camps. A 7000-volume library containing pertinent research materials, maps, satellite imagery, aerial photos and other basic references is maintained at the main base camp, with smaller libraries at other field stations, as well as a comprehensive geosciences research library at the Atlin base. A wide range of field and laboratory equipment for geophysical, glaciological, surveying, photogrammetric, botanical, meteorological, and geological work is available for teaching and research. JIRP scientific data - bases on the internet.

Communication between camps and with the Juneau and Atlin bases is handled by radio. Helicopters and charter aircraft are used for supply transportation, with logistic ground transport carried out by oversnow vehicles. Participants travel on the icefield by boat or using cross-country skies.

Permanent installations are provided by **The Foundation for Glacier and Environmental Research, Seattle, WA 99802**; liaison with the **Pacific Science Center, 200-2nd Ave. North, Seattle, Washington, 98109**. The field address is: **P.O. Box 20298, Juneau, Alaska, 99802-0298**; also at the **Subarctic Research Station, P.O. Box 99, Atlin, B.C., Canada, V0W-1A0**.

ELIGIBILITY

Participants must be enrolled in, or admitted for, work as candidates for a degree. Exceptions are made when students are between programs in a long-term academic plan. High scholastic record or potential is expected. Weight is placed on personal character, interest, and professional motivation. High school students with university plans can also be included. Some experience in mountain and outdoor living is expected.

The University of Idaho, the University of Alaska and The Foundation for Glacier and Environmental Research do not discriminate on the grounds of race, creed, color, sex, or national origin.

APPLICATION

A completed application form will include an up-to-date transcript, evidence of school or university status, a statement of professional goals, a physician's medical certification, and three letters of recommendation regarding scholarship, character and compatibility.



Students roped up on the lower Lewellyn Glacier near Camp 26.



Seismic geophysics ice depth recording, upper Taku Glacier.