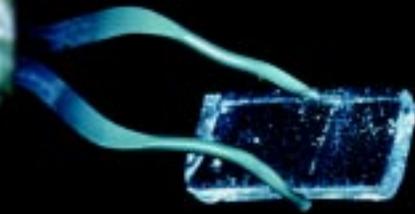


In-Depth



NEWSLETTER OF THE NATIONAL ICE CORE LABORATORY — SCIENCE MANAGEMENT OFFICE

Vol. 1 Issue 1 • March 2003

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Message from the Director

GREETINGS and welcome to the first *In Depth* newsletter published by the National Ice Core Laboratory - Science Management Office (NICL-SMO). The purpose of *In Depth* is to keep the ice core community informed about activities, policies, and projects that effect those involved in ice core research; those who use ice core data; and those who have interest in the science resulting from ice coring and it's data analysis. This inaugural issue is designed to give background information on the National Ice Core Laboratory, Ice Core Data Archive, the Ice Core Working Group, and other items. Future issues will be comprised of updates and descriptions about various projects underway. We are looking for short articles from the community for publishing *In Depth*. Please contact us if you would like to contribute an article.

National Ice Core Laboratory

THE NATIONAL ICE CORE LABORATORY (NICL), at the Denver Federal Center is a physical plant for storing, curating, and studying cores. The cores are collected from polar and other glaciers around the world. These cores represent a long-term, unbroken record of material deposited by the earth's atmosphere. The Lab provides scientists with the capability to conduct examinations of ice cores without having to travel to field sites, and it preserves the integrity of these ice samples in a repository for the study of global climate, changes and past environmental conditions. The facility houses the world's most comprehensive ice core collection available to the scientific community. NICL is a joint program funded by the U.S. Geological Survey (USGS) and the National Science Foundation (NSF). NICL is overseen by a governing board of research scientists, the Ice Core Working Group, which sets and approves policies, and approves allocation of samples to researchers.

NICL's archived collection of ice cores is kept in the Main Storage area of the lab which consists of 55,000 cubic feet of freezer space maintained at -36°C. Visiting scientists prepare and measure samples in the 12,000 cubic foot of the Exam Room which is held at -25°C. A Class-100 HEPA-filtered, cold clean room is provided for treatment of environmentally sensitive samples. A warm ante-room is available for suiting-up and taking short breaks. The Dock serves as a receiving area for incoming shipments of ice and also acts as a de-humidifying buffer for Main Storage. The Machine Room houses the computer controlled refrigeration system.

NICL currently stores over 13,700 meters of core collected from 100 different bore holes in Antarctica, Greenland, and North America. Main Storage presently contains over 12,700 tubes of ice samples. Among the most interesting samples are Summit Greenland (~110,000 years old) and Vostok (~450,000 years old) cores. The collection

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The Ice Core Data Gateway

THE ONE STOP GATEWAY to ice core data is held at the Antarctic Glaciological Data Center (AGDC), the World Data Center for Paleoclimatology, and the Arctic System Science Coordination Center (ARCSS).

The Ice Core Data Gateway archives and distributes physical and geochemical data from ice cores collected from across the globe.

Typical data sets include age-depth relationships, oxygen and hydrogen isotope ratios, chemical analysis, accumulation rates and pollen. Data are, in general, presented as ASCII files with a short text metadata

description.

The archive is designed to provide access to ice core data sets over the long term, thereby making them available for comparison with future data, a critical component of change detection studies. By facilitating broad data access, the center promotes interdisciplinary scientific research.

Investigators are encouraged to contribute data sets derived from ice cores to the Ice Core Data Gateway. Data center staff will work with you to compile data set documentation prior to making the data

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In-Depth is published semi-annually by the National Ice Core Laboratory – Science Management Office.

We welcome your comments, suggestions and submissions.

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Masthead photos courtesy of
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NICL Science Management Office

THE NATIONAL SCIENCE FOUNDATION (NSF) AND THE UNITED STATES GEOLOGICAL SURVEY (USGS) jointly manage and operate the National Ice Core Laboratory (NICL) in Denver, Colorado. This facility has proven to be vitally important for researchers from the ice core community. NICL provides a state of the art ice core processing area for investigators to conduct research funded by NSF and the USGS. NICL also maintains the integrity of ice core archives by providing a safe and controlled environment to preserve ice cores for future researchers. The Scientific Management Office coordinates the Scientific Management of NICL and is located at the Institute for the Study of Earth, Oceans and Space at the University of New Hampshire.

The Scientific Management Office for NICL (NICL-SMO) serves as a direct point of contact for principal investigators interested in access to ice cores. It also facilitates the Ice Core Working Group (ICWG) which represents ice core researchers and those in related disciplines whose research uses ice core data. Established in 1985, the ICWG primary role is to provide guidance to NSF. The ICWG investigates a wide range of topics related to ice core research including NICL oversight, sample access and distribution, inventory, policy issues and the development of a plan for future activities. Through yearly meetings and reports, the ICWG provide leadership and direction to the ice core community. Members of the ICWG are nominated by the scientific community and serve on a rotating basis. A Sample Allocation Committee drawn from members of ICWG provide timely recommendations to NSF and USGS on sample allocation and core access for qualified investigators.

At NICL, the USGS has the responsibility of maintaining the freezer operations and the day to day operation of the facility. This includes: maintaining current service contracts; assuring that activities and projects from an Annual Program Plan are carried out; assuring the ability to meet scheduling demands, planning, budgeting and contracting for the operation of NICL; providing and setting up laboratory and processing space for individual and group sampling teams; assisting investigators in scheduling, sampling, shipping and record keeping; system monitoring and emergency response; and providing outreach activities.

Ice core research and the societally relevant results produced from this research have created a large public interest. The NICL-SMO serves as a primary point of contact for such public inquiries and a conduit for information for researchers, the scientific community, and the public.

National Ice Core Laboratory *(continued from page 1)*

includes most of the samples remaining from deep-drilling projects funded by the NSF for more than 40 years. Cores recovered from 1958 to the present are stored at the NICL facility located in Denver, CO.

Tours are provided on request, dependant on availability. Due to heavy demand, providing alternate dates is advised. On the day of your tour, please be sure to bring a good winter coat along with hat and gloves. This will ensure comfort in the colder areas of the tour. To schedule a tour, or to receive a brochure about NICL, contact the curators at 303-202-4828.

Dr. Todd Hinkley, NICL Acting Technical Director

The Ice Core Data Gateway *(continued from page 1)*

available to users. Contributing scientists are given prominent recognition in the documentation. While the data center answers technical questions about format, citations for usage, etc., it can refer scientific questions to contributors if requested. Contributing your data to the Ice Core Data Gateway and associated data centers directly supports NSF Office of Polar Programs Guidelines and Award Conditions for Scientific Data (<http://www.nsf.gov/pubsys/ods/getpub.cfm?opp991>).

This effort is being coordinated with the West Antarctic Ice Sheet (WAIS) Initiative and U.S. component of the International Trans Antarctic Science Expedition (ITASE).

The Ice Core Data Gateway is at:
<http://www.ngdc.noaa.gov/paleo/icgate.html>.

Rob Bauer, National Snow and Ice Data Center

Upcoming Meetings

7-11 April 2003

2003 EGS - AGU - EUG Joint Assembly, Nice, France
<http://www.copernicus.org/egsagueug/index.html>

10-11 April 2003

12th Midwest Glaciology Meeting
<http://www.ume.maine.edu/iceage/Seminar/mgmindex.html>

21-22 August 2003

InterICE: International Consortium of Ice Core Establishments, Milan, Italy
nicl@usgs.gov

25-29 August 2003

Seventh International Symposium on Antarctic Glaciology (ISAG-7), Milan, Italy
<http://meteo.pnra.it/isag7/>

8-12 September 2003

International Symposium on Antarctic Earth Sciences (ISAES IX), Potsdam, Germany
isaes@awi-potsdam.de

17-20 September 2003

West Antarctic Ice Sheet Workshop (WAIS), Sterling, VA
<http://igloo.gsfc.nasa.gov/wais>

8-12 December 2003

AGU - Fall Meeting, San Francisco, CA
<http://www.agu.org/meetings/fm03>

Obtaining Ice Core Samples from NICL

THE NATIONAL ICE CORE Laboratory (NICL) provides the archival repository for ice cores collected by the U.S. scientific community. The Facility's objectives are (1) insure maximum availability of samples to qualified investigators, (2) encourage analysis over a wide range of research disciplines without unnecessary duplication, and (3) encourage prompt publication of results. Below are some of the highlights of the *Ice Core Distribution Policy* set by the Ice Core Working Group (ICWG). The complete policy can be read at: <http://nicl-smo.unh.edu/policy.html>

Since the ICWG reviews and revises the policy often, please read the policy before requesting samples from NICL.

Requests for samples from NICL are coordinated through the NICL-SMO and reviewed by the Sample Allocation Committee, appointed by the ICWG, with final approval from the NSF. Samples are available to any qualified investigator, but NSF funded investigators may be given priority access to core sections. All requests for samples from NICL must be sent to the Scientific Coordinator. The request should consist of a complete but concise statement describing the study for which samples are needed; methods and procedures to be used; the specific problem or objective of the study; and names and addresses of collaborating investigators. All requests will be reviewed by the Committee. Generally there are three types of requests: pilot studies, proposals requiring ice, and de-accessed ice.

Pilot Studies

The Working Group recognizes the valuable information archived in ice cores. To further the scientific knowledge available from the ice cores at the Facility, requests for limited samples are available to qualified investigators.

Proposals requiring ice from NICL or use of the NICL facility

All investigators must contact the Scientific Coordinator prior to submission of proposals if samples from NICL are being requested. This information is kept confidential but this process will help assure availability of samples after the review process. Once funded, the investigator will contact the Scientific Coordinator for final approval from the Committee and NSF.

De-Accessed Ice

The NICL Facility is currently near full capacity and the Working Group has selected a group of ice cores that have been placed on a de-accession list. These ice cores are generally older cores and have received minimal scientific interest in the last 10+ years. These cores are available to any qualified investigator for testing analytical procedures, method development, outreach activities and other scientific studies requiring large quantities of ice.

Some of the additional information/requirements

- The Facility may charge investigators to recover labor, freight or mailing expenses involved in filling requests. The Curator will furnish a charge estimate, if required, before processing the request.
- Data derived from measurement and analysis of all samples from the Facility must be archived at an appropriate Data Center, as described in the NSF-OPP data policy.
- If any work is done on samples that is, in addition to, or different than, that stated on the original request, the Scientific Coordinator must first be notified.
- Samples must not be transferred to other investigators without notification.
- Any unused samples or portions of cores must be returned to the Facility for re-archiving.
- Investigators who simply wish to briefly examine specific cores (without sampling or conducting analyses) may apply informally to the Scientific Coordinator. A decision will be made quickly to facilitate this activity.

Responsibilities of investigators who receive ice from NICL

1. Prompt publication of significant results, with acknowledgment of the National Science Foundation as the source of materials.
2. Submission of information to the Scientific Coordinator pertaining to samples obtained from the Facility. Also, be sure to include this information in your annual NSF report.
3. Notification to the Scientific Coordinator of any significant change in the research plan described in the original request.
4. Data derived from material from the Facility must be archived at an established data center in accordance to the NSF-OPP data policy.

Contact Information

Scientific Coordinator	NICL Curator
Mark Twickler	Geoff Hargreaves
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603-862-1991	303-202-4843

Ice Core Working Group

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Biological

Kendrick Taylor
Desert Research Institute
Electrical/Technical

Jeff Severinghaus
Scripps Institute of Oceanography
Gases

Sridhar Anandakrishnan
Penn State University
Geophysics

Joe McConnell
Desert Research Institute
Ice Chemistry

Kurt Cuffey
University of California, Berkeley
Modeling

Buford Price
University of California, Berkeley
Physical Properties

Bruce Vaughn
University of Colorado
Stable Isotopes

Mary Albert
Cold Regions Research and Engineering Laboratory
Surface Glaciology

About the Group . . .

In 1986, National Academy of Sciences recommended developing an Ice Core Working Group of representatives from institutions prominent in ice coring activities. The ICWG now provides guidance to NSF on the future directions for ice core research, on topics related to sample access, distribution, inventory, policy issues, operation and maintenance of the NICL facility. Administered by the NICL Science Management Office, ICWG is organized around scientific disciplines, rather than institutions. Members are elected to a three year term, with the committee chair serving two years. Learn more about the ICWG in the next issue of *In Depth*.

National Science Foundation Projects Related to Ice Cores or Ice Core Data

We have searched the NSF Fastlane webpage to compile a list of projects involving ice core research. Future issues of *In Depth* will contain new programs funded by NSF for ice core science work. If you have a project that was omitted from this listing, please let us know and we will add it to the next *In Depth*. To learn more about any of the projects listed below, go to the Fastlane search page <https://www.fastlane.nsf.gov/a6/A6AwardSearch.htm> and type in the Award Number.

Title of the Funded Project	Investigator	NSF Award Numer
A New Collaborative Ice Sheet Modelling Program	Kurt Cuffey	0082453
A Science Management Office for the U. S. Component of the International Trans Antarctic Expedition (US ITASE SMO) A Collaborative Program of Research from S. Pole to N. Victoria Land	Paul A. Mayewski	0229573
A Sulfate-based Volcanic Record from South Pole Ice Cores	Jihong Cole-Dai	0087151
Acquisition and Development of Two ICP Instruments: Continuous Ice Core Elemental Analyses and Other Environmental Applications	Joseph R. McConnell	0216552
Acquisition of a high resolution ICP-MS for environmental research and training in Maine	Karl J. Kreutz	0215724
Acquisition of an X-Ray Fluorescence Spectrometer for Geological and Environmental Analysis	W. Berry Lyons	0135318
Air-Snow Exchange of Nitric and Nitrous Acids at South Pole	Jack E. Dibb	9909428
An Archive and Data Distribution System for Glaciological and Cryospheric System Data from the U.S. Antarctic Program: The Antarctic Glaciological Data Center (AGDC)	Gregory R. Scharfen	9814550
An Investigation of Impurities in Greenland Ice Cores	Ian Baker	0221120
An Ion-Chromatography Based Continuous Flow Analyzer for Soluble Chemical Species in Ice Cores	Jihong Cole-Dai	0216152
Anisotropic Flow, Depth-Age Relationships and Stratigraphic Disturbances in Polar Ice Sheets	Raymond C. Fletcher Edwin D. Waddington	9815160 9815136
Applications of an Automated C-Axis Analyzer	Larry A. Wilen	9905738
Argon and nitrogen isotope measurements in the Vostok ice core as a constraint on phasing of CO ₂ and temperature changes	Jeffrey P. Severinghaus	0125468
Bacteria in Glaciers: A Mechanism for Bacterial Speciation in an Extremely Cold Environment	David L. Mitchell	0085589
Biogenic Sulfur in the Siple Dome Ice Core	Eric S. Saltzman	0196346
Borehole Fingerprinting: Vertical Strain, Firn Compaction, and Firn Depth-Age Scales	Edwin D. Waddington	0087521
Carbon Cycle Variations during the Last Glacial Period Based on Atmospheric Delta 14C	J. Warren Beck	0223311
Climate and Cosmic Ray Flux Coupled Models for Tropospheric Fallout of Cosmogenic 10Be, 36Cl and 26Al: Understanding their Archival Records in Polar and Temperate Ice Cores	Devendra Lal	9905467
CO ₂ and Delta 13CO ₂ in Antarctic Ice Cores	Martin Wahlen	9980691
Collaborative Research: A 700-Year Tephrochronology of the Law Dome Ice Core, East Antarctica	Gregory A. Zielinski Nelia W. Dunbar	0125560 0125549

National Science Foundation Projects Related to Ice Cores or Ice Core Data

Title of the Funded Project	Investigator	NSF Award Number
Collaborative Research: A Benchmark Record of Temperature for the Last Four Glacial Cycles in Sediments of the Bermuda Rise	Scott J. Lehman	0081257
Collaborative Research: A Glaciochemical Record of Natural and Anthropogenic Environmental Change in the Northwestern North American Arctic	Cameron P. Wake Karl J. Kreutz	0136146 0136005
Collaborative Research: Accretion of Interplanetary Dust: A New Record From 3HE in Polar Ice Cores	Edward J. Brook Mark D. Kurz	9909384 9909663
Collaborative Research: Building Marine Sediment Analogs to the Polar Ice Cores in the South Atlantic Sector of the Southern Ocean	Christopher D. Charles David A. Hodell	9910416 9907036
Collaborative Research: Characteristics of Snow Megadunes and Their Potential Effect on Ice Core Interpretation	Mary R. Albert Mark Fahnestock Christopher A. Shuman Theodore A. Scambos	0125276 0225992 0125960 0125570
Collaborative Research: Deposition of HFC Degradation Product Trifluoroacetate in Antarctic Snow and Ice	Glenn C. Miller Joseph R. McConnell	0087731 0087776
Collaborative Research: Determining Methane Sources During the Last Deglaciation with Large-Volume Air Samples from Pakitsoq, West Greenland	Jeffrey P. Severinghaus Edward J. Brook	0221470 0221410
Collaborative Research: Dynamics and Climatic Response of the Taylor Glacier System	David L. Morse Kurt M. Cuffey	0126202 0125579
Collaborative Research: Fabric and Texture Characteristics of Micro-Physical Processes in Ice	Edwin D. Waddington Larry A. Wilen	0136047 0135989
Collaborative Research: History and Evolution of the Siple Coast Ice Stream System as Recorded by Former Shear-Margin Scars	Theodore A. Scambos Charles Raymond	9909469 9909518
Collaborative Research: Ice-Core Analysis & Physical Glaciology of the Galena Creek Rock Glacier, Wyoming	Douglas H. Clark Neil F. Humphrey	9996066 9710061
Collaborative Research: Impact of Snow Photochemistry on Atmospheric Radical Concentrations at Summit, Greenland	Manuel A. Hutterli Jack E. Dibb Cort Anastasio L. G. Huey Mary R. Albert Nicola J. Blake Barry L. Lefer	0221150 0221109 0221052 0221002 0220990 0220862 0220763
Collaborative Research: Initial Examination of the 500,000-year Climate Record at Mt. Moulton, West Antarctica	Nelia W. Dunbar	9814428
Collaborative Research: Remote Observations of Ice Sheet Surface Temperature: Toward Multi-Proxy Reconstruction of Antarctic Climate Variability	Dale Winebrenner Michael E. Mann	0126161 0125670
Collaborative Research: Stable Isotope Variability in Precipitation at Low Latitude Sites: An Observational and Modeling Study	Raymond S. Bradley Mark A. Chandler	9909201 9911590
Collaborative Research: Trapped gas composition and the chronology of the Vostok ice core	Michael L. Bender Jeffrey P. Severinghaus	0230260 0230448
Collaborative Research: Volcanic Records from the Siple and Taylor Dome Ice Cores, Antarctica	Gregory A. Zielinski Nelia W. Dunbar	0096317 9615167
Collaborative Research: Western Divide West Antarctic Ice Cores (WAISCORES) Site Selection	David L. Morse Howard B. Conway	0087507 0087345

National Science Foundation Projects Related to Ice Cores or Ice Core Data

Title of the Funded Project	Investigator	NSF Award Numer
Constructing the first D/H record of atmospheric methane covering the last two centuries.	Todd A. Sowers	0125900
Construction and Operation of Biospectrologger in a Borehole in Polar Ice	P. Buford Price	0119988
Continuation of Physical Properties of the Siple Dome Deep Ice Core	Richard B. Alley	0087160
Continuous High Resolution Ice-Core Chemistry using ICP-MS at Siple Dome	Joseph R. McConnell	0126286
Cosmogenic Radionuclides in the Siple Dome Ice Core	Kunihiko Nishiizumi	0126343
Developing a 480,000 Year Climate Record for West Antarctica	Todd A. Sowers James W. White	9909474 9909968
Development of a High-Resolution Continuous-Flow Analysis System for Measurements of Soluble Chemical Species in Ice Cores	Roger C. Bales	0116674
Development of a Multi-Parameter Ice Core Record from Eclipse Dome, St. Elias Mountains, Yukon Territory	Cameron P. Wake	9906844
Development of High Resolution Environmental Tracers to Enhance Interpretation of Ice Core Chemical Records	Joseph R. McConnell	9977252
Diffusion in Crystalline Ice Measured Using Laser Resonant Desorption Techniques	Steven M. George	9905812
Doctoral Dissertation Research: Pollen Dispersal and Deposition on Tropical Andean Ice Caps: Quelccaya, Peru, and Nevada Sajama, Bolivia	Kam-biu Liu	0117338
Dynamics of Ice Streams: A Physical Statistical Approach	C van der Veen vanderveen	0229292
Electrical and Optical Measurements on the Siple Dome Ice Core	Kendrick C. Taylor	9526420
Extraction and Analysis of Halocarbons and Other Trace Gases in Greenland Ice Cores	Eric S. Saltzman	0221480
Firn Accumulation Processes in Taylor Dome, Vostok and Siple Dome Ice Using Cosmogenic ¹⁴ C and ¹⁰ Be as Tracers	Devendra Lal	9909484
Generating an Isotopic Record of Atmospheric Methane and Nitrous Oxide Over the Last Century from South Pole Firn Air	Todd A. Sowers	0125981
Glacial-Interglacial Variations in δ ¹⁷ O of O ₂ in Ice Cores: Implications for Interactions Between Climate and the Biosphere	Michael L. Bender	0087999
Glacial and Paleoclimate Record of the Southern Andes, 46 Degrees South, for the Late Pleistocene	Bradley S. Singer	0212450
Greenland Ice Sheet Accumulation Variability	Roger C. Bales	0133204
Investigation of the Glacial History of the Siple Coast Using Radar-Detected Internal Layers and the Ice Core from Siple Dome	Howard B. Conway	0229490
High Precision Borehole Temperature Measurements at Siple Dome, Antarctica, for Paleoclimate Reconstruction and Ice Dynamics Studies	Edwin D. Waddington	9726078
High Resolution Records of Atmospheric Methane in Ice Cores and Implications for Late Quaternary Climate Change	Edward J. Brook	0126057
High-Resolution Reconstruction of the South Asian Monsoon from the Puruogangri Ice Cores (Tibet)	Lonnie G. Thompson	0117113
Holocene Climate Variability	Paul A. Mayewski	0096331

National Science Foundation Projects Related to Ice Cores or Ice Core Data

Title of the Funded Project	Investigator	NSF Award Numer
How Fast is Fast? Speed of Abrupt Climate Change from Subannual-Resolution Nitrogen Isotope Measurements in Ice Cores	Jeffrey P. Severinghaus	9905241
Ice Core Paleoclimate Study of East African Monsoon and ENSO Variability from the Ice Fields of Kilimanjaro	Lonnie G. Thompson	9910172
Ice Core Reconstruction of North Pacific Climate Variability and Environmental History from the Bona-Churchill Ice Field, Alaska	Lonnie G. Thompson	009311
Ice Core Records of Atmospheric Carbon Monoxide	Edward J. Brook	0126194
Ice Coring and Drilling Services	Charles R. Bentley	0003289
Ice Dynamics, the Flow Law, and Vertical Strain at Siple Dome	Mark A. Zumberge William D. Harrison	9615454 9615502
International Ice Core Data Cooperative	James W. White	9809463
International Research Fellow Awards: Influence of Atmospheric Dust on Global Climate Variations During Last Glacial Cycle	Natalie M. Mahowald	9703688
Investigation of the Glacial History of the Siple Coast Using Radar-Detected Internal Layers and the Ice Core from Siple Dome	Howard B. Conway	0229490
Laboratory Studies of Photochemistry in Antarctic Snow and Ice	Cort Anastasio	0230288
Laboratory Study of Texture Development During Grain Size Sensitive Creep of Ice, with Applications to the Flow of Glaciers and Ice Sheets	David L. Goldsby	0230190
Laurentide Thermal Instability Modeling	Richard B. Alley	9870886
Life in Ancient Ice: A Workshop	Scott O. Rogers	0196481
Mass Balance and Accumulation Rate Along US ITASE Routes	Gordon S. Hamilton	0196441
Measurement and Interpretation of d13C of Atmospheric Methane from the Law Dome Ice Cores	James W. White	0087357
Measurements of Stable Isotopes in Atmospheric Gases from the North GRIP Ice Cores	James W. White	0095078
Operation and Maintenance of the U.S. National Ice Core Laboratory	Todd K. Hinkley	0223387
Optical Logging for Dust and Microbes in Boreholes in Glacial Ice	P. Buford Price	0125794
Oxidation, Photooxidation and Photodecomposition of Dicarboxylic and Ketocarboxylic Ice Core Dopants	Michael R. Hoffmann	0228140
Paleoclimate from Mount Everest Ice Cores	Paul A. Mayewski	0139491
Physical and Structural Properties of the Siple Dome Core	Debra A. Meese	0126212
Preparation for a Deep Ice Coring Project in West Antarctica	Kendrick C. Taylor	0230396
Recovery and Science Coordination of an Ice Core at Siple Dome, Antarctica	Kendrick C. Taylor	9526421
Relating West Antarctic Ice Cores to Climate with Artificial Neural Networks	Richard B. Alley	0087380
Revision of the Greenland Ice Sheet Program 2 (GISP2) Depth-Age Scale	Debra A. Meese	0220949
Science Coordination Office for Summit, Greenland Environmental Observatory	Jack E. Dibb Roger C. Bales	9910337 9910303
Science Management of the National Ice Core Laboratory	Mark S. Twickler	0126492

National Science Foundation Projects Related to Ice Cores or Ice Core Data

Title of the Funded Project	Investigator	NSF Award Number
Seasonal Differences in Air-Snow Chemical Relationships at Summit, Greenland	Donald R. Blake	9813550
	Mary R. Albert	9813441
	Eric J. Steig	0196085
	Jonathan D. Kahl	9813549
	Roger C. Bales	9813442
	George A. Klouda	9813333
	Jack E. Dibb	9813312
	Cliff I. Davidson	9813462
Separating Net Accumulation into Precipitation and Sublimation in Firn	Edwin D. Waddington	0087439
Cooperative Ice Core Paleoclimate Study of Monsoon Variability as Archived in the Puruogangri Ice Cap on the Central Tibetan Plateau	Lonnie G. Thompson	0092096
Investigation of Electrospray Mass Spectrometry (ES/MS/MS) for Chemical Analysis of Polar Ice Cores	Eric S. Saltzman	0228212
Squeezing the Juice out of Paleoclimate Proxies	Wallace S. Broecker	9730546
Stable Isotope Studies at West Antarctic ITASE Sites	Phillip A. Arkin	9904295
	James W. White	9815200
	Eric J. Steig	0196105
Support for GeoCAMS: An Accelerator Mass Spectrometry Facility for Earth Science Research	Robert C. Finkel	0217981
Synchronizing Ice and Sediment Records with Leaf Wax Abundances:	Julian P. Sachs	0196019
Technician Support: The Penn State Stable-Isotope Biogeochemistry Laboratory	Katherine H. Freeman	0092002
Testing the 'Clathrate Gun Hypothesis' with Atmospheric Methane from the Greenland Ice Sheet Project Two (GISP II) Ice Core	Todd A. Sowers	0117291
Temperature Variability of the Last 1000 years in East Antarctica	Eric J. Steig	0229416
The Geomicrobiology of Vostok Ice: Implications for Life in Lake Vostok	John C. Prisco	0085400
The Physical Properties of the US ITASE Ice Cores	Debra A. Meese	9980434
Thermal Fractionation of Firn Air and the Ice Core Record of Abrupt Interstadial Climate Change	Edward J. Brook	9725918
Transfer Function for Photochemically Produced Chemical Species in Greenland Snow, Firn and Ice	Roger C. Bales	9813311
U.S.-France Cooperative Research: Nitrogen and Sulfur Cycles in Antarctica Inferred from Concentration and Isotopic Measurements	Mark H. Thiemens	0128971
Understanding the Boundary Conditions of the Lake Vostok Environment: A Site Survey for Future Work	Robin E. Bell	9978236
US ITASE Glaciochemistry	Paul A. Mayewski	0096299
West Antarctic Ice Sheet Surface Melting: Recognition Controls and Significance	Richard B. Alley	9814485
Workshop on Interdisciplinary Polar Research Based on Fast Ice-Sheet Drilling - FASTDRILL; Santa Cruz, CA, October, 2002	Slawek M. Tulaczyk	0220920

NOTE: SOME OF THESE PROJECTS MAY NOT BE CURRENTLY FUNDED BY NSF.

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