

**U.S. Ice Drilling Program**

Ice Drilling Program Office | Ice Drilling Design and Operations



*Quarterly update of Ice Drilling Program Office (IDPO) and Ice Drilling Design and Operations (IDDO) activities*

## Scientific Drilling

### ***Denali (PI Osterberg)***

IDDO provided driller Mike Waszkiewicz and a Badger-Eclipse Drill for PI Erich Osterberg's coring project in Denali National Park. Two holes were completed down to a depth of 208 meters each, resulting in excellent core quality. A new solar and wind system capable of powering the Badger-Eclipse Drill proved successful on its maiden field project. Such clean drilling efforts were praised by National Park Service staff and will continue to be utilized in the future.

### ***Greenland Aerosol and Greenhouse Gases Core (PI McConnell)***

Despite being forestalled by weather in previous attempts to drill ice cores on Tunu Glacier in Greenland several years ago, IDDO driller Bella Bergeron and the science field team were able to recover successfully over 350 meters of ice core during the month of May. Using an IDDO 4-Inch Drill, one hole was completed down to 213 meters while a second hole was completed down to 141 meters.

### ***Greenland Cosmogenic C-14 Cores (PI Petrenko)***

A team of three IDDO drillers, Lou Albershardt, Mike Jayred, and Tanner Kuhl, accompanied by a field science team was able to successfully utilize a Badger-Eclipse Drill to drill two holes for firn air pumping studies outside of Summit Station, Greenland. One hole was completed to 90 meters and another completed to 102 meters. In addition, the IDDO-designed Blue Ice Drill was put to the test to determine its ability to collect firn cores. The Blue Ice Drill is expected to undergo several modifications over the next year to enable additional firn coring in Greenland as well as to extend its depth capabilities in both firn and ice.

### ***Greenland Perennial Firn Aquifer (PI Forster)***

As a follow up to a previous project conducted by PI Rick Forster in SE Greenland, IDDO provided driller Jay Kyne and the IDDO Thermal Drill to drill through the firn aquifer layer. Two holes were completed down to 60 meter and 25 meters, respectively, each allowing the deployment of a thermistor string through the aquifer.

### ***McCall Glacier Cores (PI Nolan)***

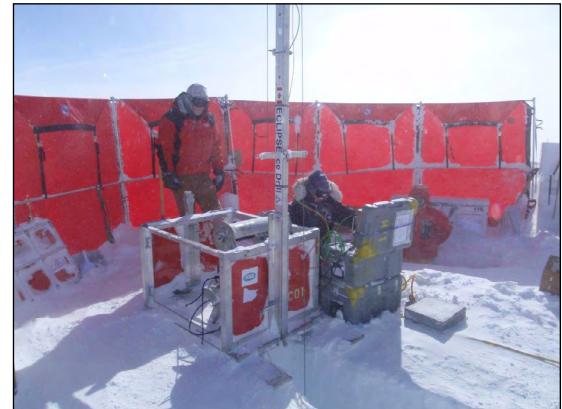
PI Matt Nolan completed his third season of a three-year ice coring project on McCall Glacier in Alaska. Throughout the project, Nolan utilized both a 3-Inch and 4-Inch PICO Hand Auger to retrieve shallow core samples.



*New solar and wind power system used for Badger-Eclipse drilling in Denali National Park. Photo: Mike Waszkiewicz*

### **Summit Shallow Core Array (PI Noone)**

PI David Noone's field team deployed late in the third quarter to continue their collection of shallow ice cores near Summit Station. To support this work, IDDO again provided a PICO hand auger and a new IDDO hand auger as well as a Sidewinder power drive system. This year marks the third year of IDDO's support of the four-year project.



*Badger-Eclipse drilling outside of Summit Station, Greenland. Photo: Tanner Kuhl*

## **Equipment Development**

### **Intermediate Depth Drill**

IDDO continued work on the procurement of the Intermediate Depth Drill (IDD) parts and components and started system fabrication, assembly, and components testing. The final assembly of the entire system is planned to be completed by September 30, 2013.

IDPO-IDDO continued to work with the NSF Arctic Logistic contractor (CH2M Hill Polar Services) on the field logistics required for the 2014 IDD field test in Greenland. The Estisol-140 drilling fluid and borehole casing needed for the test were also purchased and are currently on vessel for delivery in Thule, Greenland for subsequent transportation to the field test site (the proposed Isi Station; ~3 miles due north of Summit Station) via the Greenland Traverse in April 2014.

### **Deep Logging Winch**

The Deep Logging Winch system is currently in production and is scheduled for delivery to IDDO by August 15th by Markey Machinery Co. IDDO designed and placed a purchase order for the winch sled and, working with the winch manufacturer, modified the winch control system.

### **Blue Ice Drill-Deep**

After finishing the design and fabrication of a new anti-torque and modifications of the cutter heads for the Blue Ice Drill-Deep (BID-Deep), IDDO successfully completed testing of firn coring capabilities in Greenland in May of 2013. IDDO plans to finish the entire BID-Deep design by September 30, 2013.



*Blue Ice Drill firn coring testing in Greenland. Photo: Tanner Kuhl*

### **DISC Drill/Replicate Coring System**

By June of 2013, IDDO completed the preparation of many DISC/Replicate Coring System components for storage. Small repairs, upgrades, and the necessary component maintenance have been completed. IDDO also developed a comprehensive list of all mechanical and electrical subsystem modifications and repairs needed for the drill's future re-deployment.

## **Planning for the Future**

IDPO and IDDO personnel continued work on local arrangements for the 7<sup>th</sup> International Workshop on Ice Drilling Technology. IDPO updated the Long Range Science Plan for the coming decade with input from the Science Advisory Board and the science community. IDDO, in turn, updated the Long Range Drilling Technology Plan, highlighting planned drill system development over the next decade. IDDO also worked with the Antarctic Support Contractor and the South Pole Ice Core PIs to plan for the future use of the Intermediate Depth Drill at the South Pole Station.

## Educational Outreach

Two new video resources for your use in education and outreach were recently added to IDPO-IDDO's YouTube site at:  
<http://www.youtube.com/user/USIceDrillingVideos>

The first, "How Ice Core Drills Work", responds to requests made of, and by researchers to have materials that explain how ice core drills function. The clip demonstrates the workings of a double barrel drill design featuring footage of IDDO's Blue Ice Drill test at the U.S. Army Cold Regions Research and Engineering Laboratory in Hanover, NH. Its narration highlights the interactions between scientific and engineering practices, as outlined in the new Next Generation Science Standards for educators.

The second, "Ice Core Processing: Discovering Earth's Climate History", features station-by-station interviews of graduate students and researchers from multiple universities involved with processing ice from the WAIS Divide ice core at the National Ice Core Laboratory in Lakewood, CO. Descriptions of investigations related to specific scientific indicators reveal the diversity of data emerging from ice core research and contribute to the larger picture of climate history and its relevance to our future.

For further information and support, please email: [linda.m.morris@dartmouth.edu](mailto:linda.m.morris@dartmouth.edu)

## Fiscal Challenges Facing the U.S. Antarctic Program - A Message to the U.S. Antarctic Program Research Community

On June 19, 2013, a letter from Scott Borg (Section Head, Antarctic Sciences, National Science Foundation) and Brian Stone (Section Head, Antarctic Infrastructure and Logistics, National Science Foundation) was released discussing the fiscal challenges facing the U.S. Antarctic Program (USAP). In the letter, the NSF re-affirms its commitment to existing projects, while stressing that all components of the USAP (support organizations and science projects alike) are examining ways in which to reduce costs. The letter can be downloaded at:

[http://www.nsf.gov/geo/plr/ant/dcl\\_usap\\_fiscal\\_challenges.pdf](http://www.nsf.gov/geo/plr/ant/dcl_usap_fiscal_challenges.pdf)

## WAIS Divide Ice Core 2013 Science Meeting

Registration is now open for the 2013 WAIS Divide Ice Core Science Meeting to be held on 24-25 September at the Scripps Seaside Forum in La Jolla, CA. The meeting will have activities for all of both days and the evening of the 24<sup>th</sup>. Everyone associated with the project is encouraged to attend. Additional focus meetings will be held on Monday, 23 September, to provide an opportunity to go into greater depth on topics of interest to only a portion of the WAIS Divide community.

Deadlines:

- Saturday, August 24
  - Last day to register for meeting at \$150 price point
  - Last day to submit abstracts to Joe Souney (joseph.souney@unh.edu)
  - Last day to book a hotel room at the group rate at the La Jolla Shores Hotel

Saturday, August 31 - Last day to register for meeting (at \$200 price point)



Screen-shot of the new video, entitled "How Ice Core Drills Work", that explains how the double barrelled Blue Ice Drill works.

For the latest information about the meeting, visit:  
<http://waisdivide.unh.edu/meetings/index.shtml>

## Conference Announcement: International Workshop on Ice Caves, Idaho Falls, USA, August 2014

The International Workshop on Ice Caves (IWIC) is a series of workshops devoted entirely to ice cave research. IWIC is the only conference focused on state-of-the-art in ice cave research, where international experts discuss ongoing research efforts and promote global cooperation in ice cave science and management. These meetings have happened every year since 2004, and all in Europe. The next IWIC, IWIC-VI, will be held next year on 17-22 August 2014 in Idaho Falls, Idaho, USA!

For Europeans this will be the first opportunity to see cave ice in a completely different setting—lava tubes! For North Americans and many others, this is an excellent opportunity to meet with the world's leading cave ice experts. Major themes of IWIC-VI include:



- Cave glaciology and ice dynamics
- Cave meteorology and climatology
- Cryo-mineralogy and cryo-crystallography
- Paleoclimatology and global change
- Chemistry and geochemistry of ice caves
- Ice cave management and technology
- Glacier caves

In fact, IWIC-VI welcomes papers on any topic involving cave ice.

IWIC is a conference of the Glacier, Firn, and Ice Caves Commission of the International Union of Speleology, and the National Cave and Karst Research Institute of the USA are hosting IWIC-VI.

For more information, visit <http://www.iwic-vi.org/index.html>. Save the dates and look for more information to be posted on the conference's website within 3-4 months on registration and submitting papers for the conference.

## Drilling Support to Science Projects

### Current - Arctic 2013

- Isotope Hydrology at Summit, Greenland (Noone)

### Upcoming - Antarctic 2013-14

- Aerosol Fluxes to Taylor Dome and Taylor Glacier (Aciego)
- Beardmore Glacier Shot Holes, Antarctica (Conway)
- Carbon-14 from Taylor Glacier Blue Ice Cores (Petrenko)
- Roosevelt Island Borehole Logging (Hawley)
- WAIS Divide Fabric and Texture Logging (Pettit and Obbard)
- WAIS Divide Optical Logging (Bay)

### Upcoming - Arctic 2014

- Cosmogenic Carbon-14 in Polar Firn, Greenland (Petrenko)
- Disko Bay and Baffin Bay Firn and Ice Cores, Greenland (Das)
- Intermediate Depth Drill Field Test, Greenland (IDPO-IDDO)
- Isotope Hydrology at Summit, Greenland (Noone)

For the latest information on our current and upcoming field projects, visit:

<http://icedrill.org/expeditions/>

## Requesting Ice Drilling Support

If you are preparing a proposal that includes any kind of ice drilling or ice coring support from IDPO/IDDO, you must complete a Field Project Requirement Form ([www.icedrill.org/scientists/scientists.shtml](http://www.icedrill.org/scientists/scientists.shtml)) and submit it to IDPO/IDDO via [icedrill@dartmouth.edu](mailto:icedrill@dartmouth.edu) at least six weeks before your proposal deadline.

Once IDPO/IDDO receives your Field Project Requirement Form we will provide you with a Letter of Support and Scope of Work/Cost Estimate that MUST be included with your proposal. If you are submitting a proposal to NSF the Letter of Support and Scope of Work/Cost Estimate should be included as Supplemental Information in your proposal, and it is recommended that you also notify the relevant NSF Program Manager that your proposal requires support from IDPO/IDDO.

If you are preparing a non-NSF proposal, it is recommended that you familiarize yourself with the Policy for Ice Drilling for Organizations other than NSF available at [www.icedrill.org/scientists/scientists.shtml#otheragencies](http://www.icedrill.org/scientists/scientists.shtml#otheragencies).

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