



# Ice Drilling Program Office

Dartmouth College - University of New Hampshire - University of Wisconsin

Quarterly update of IDPO and Ice Drilling Design and Operations (IDDO) activities [www.icedrill.org](http://www.icedrill.org)

SPRING 2011

### Overview of Activities

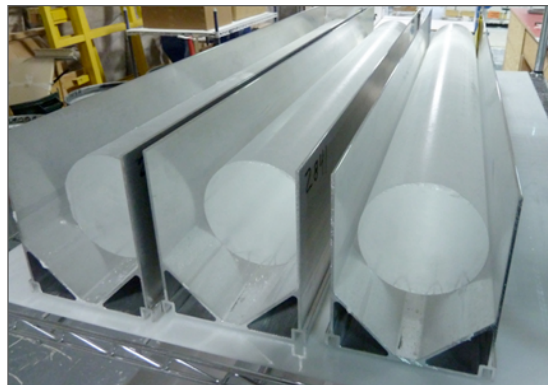
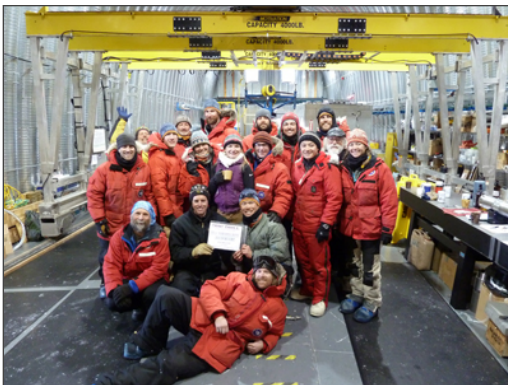
The second quarter FY2011 yielded success on many fronts for IDPO and IDDO. Of particular note is the reaching of the drilling goal of 3,331 meters using the DISC Drill at WAIS Divide, Antarctica, becoming the deepest U.S. ice core ever drilled. The newly-developed Blue Ice Drill achieved and surpassed its design requirements at Taylor Valley, Antarctica for drilling large volumes of ice in a short amount of time; over 600 meters of high quality, large (9.5-inch diameter) ice core was recovered at a rate faster than anticipated. IDPO worked with the community and with IDDO to discuss implications of the science requirements for the future intermediate depth drill design, cost estimates, and potential collaborations. The most critical issues currently facing IDDO are the repair and updating of the DISC Drill after the 2010-2011 WAIS Divide field season and the development of the DISC Drill Replicate Coring System, which is scheduled for testing at WAIS Divide during the 2011-2012 Antarctic field season.

### Highlights

#### *Deepest U.S. Ice Core Drilled in West Antarctica*

On January 28, 2011, the DISC Drill reached its much-anticipated bottom depth of 3,331 meters at WAIS Divide, Antarctica. Despite a field season fraught with challenges, the drill crew surpassed previous depth records set at Dome Fuji, Dome C and GISP-2. On January 17, 2011, the WAIS Divide core became the deepest U.S. ice core ever drilled, surpassing the GISP-2 depth of 3,056 meters! For more information about the field season, visit: <http://waisdivide.unh.edu/news/index.shtml>

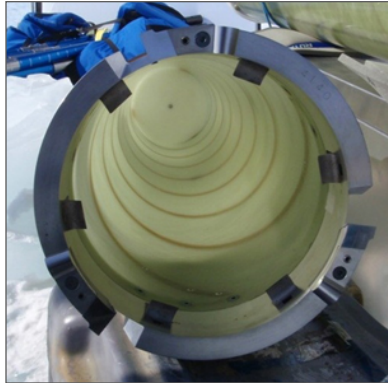
To view a short video about the DISC Drill, visit: <http://icedrill.org/equipment/videos.shtml#disc>



#### *New Drilling Technology Enables Study of Ancient Atmospheres*

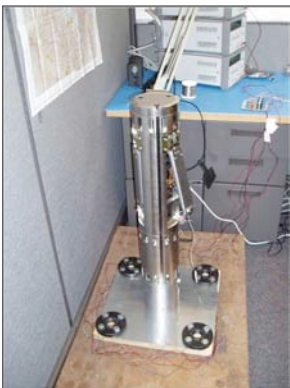
The new Blue Ice Drill, designed and built for the University of California - San Diego with ARRA funding from NSF-OPP, was deployed to the field for the first time in Taylor Valley, Antarctica with resounding success. The drill design proved very effective for collecting large volumes of ice in a short period of time. Over 600 meters of high quality, large (9.5-inch diameter) ice core was recovered and at a faster rate than anticipated. The large quantity of high quality core, which is needed to effectively measure rate gases, was melted and analyzed on site. The science experiment, led by PI Jeff Severinghaus, provides unique and important evidence of past atmospheric composition. The Blue Ice Drill will be used again in

2011-2012 for the second field season of the project. To view a short video showcasing the Blue Ice Drill at Taylor Valley, Antarctica, visit: <http://icedrill.org/equipment/videos.shtml#blueice>



### ***Unique Ice Drilling Technology Developed for Increased Sampling of Key Events***

The first-ever Replicate Ice Coring technology is progressing toward its debut in the field next year (January 2012) at WAIS Divide as IDDO engineers design, assemble, and test a system that will allow the DISC Drill to be steered and recover cores from branches deviating from the main borehole. This new technology enables gathering of additional ice core samples containing key climate information on abrupt changes, drilled from targeted depths kilometers beneath the ice surface.



### **2011 Long Range Science Plan - Request for Community Input/Comment**

It is that time of year again when we solicit the ice coring and drilling community for input and comments on the Long Range Science Plan. The draft 2011 Plan has been updated to reflect the outcomes from the April 15-16, 2011 Ice Drilling Science Community Planning Workshop, as well as the outcomes from the 2011 Science Advisory Board meeting. The Plan is meant to be the forward planning path for our sciences. Please take the time to review the document and send comments, questions, additions, etc to [icedrill@dartmouth.edu](mailto:icedrill@dartmouth.edu) by **June 1**. On June 1 we will incorporate the information we receive and produce the final 2011 Long Range Science Plan. As usual, this Plan will be revisited and revised as appropriate each spring. We thank you in advance for your input.

<http://icedrill.org/scientists/scientists.shtml#scienceplan>

## Science Planning Workshop Review

On April 15-16, 2011 the IDPO sponsored an interdisciplinary Ice Drilling Science Community Planning Workshop held in Herndon, VA. The purpose of the workshop was to identify future Arctic and Antarctic ice drilling and coring sites, the ice drilling technology that will be needed at the sites, and the timeline over the coming decade for conducting the science. The workshop was well attended, with thirty-four people from the science, science support, and science funding communities in attendance, and proved to be very productive. The first day of the workshop started with short presentations from the scientists discussing their current ice drilling technology needs/desires. The afternoon involved forming four break-out groups centered around the following subject areas: (1) subglacial aquatic environments access drilling; (2) 10-year plan for shallow (1-400 meter deep) coring capabilities; (3) rapid access ice drilling (RAID) system; and (4) hot water drilling. Each break-out group discussed future drilling sites, drilling requirements, and tentative schedules, and began summarizing the information in a short white paper. Day two continued with the individual break-out group discussions and white paper development, and concluded with each break-out group reporting back to the entire workshop on their developments and whole group discussions.

Results from the workshop are reflected in updates to the science descriptions, timeline and planning matrices in the Long Range Science Plan and the corresponding Long Range Drilling Technology Plan to help ensure that the drilling technology will be ready when needed by the community's science.

For the workshop agenda and the list of workshop attendees, visit the workshop's web site: <http://icedrill.org/science-planning-workshop-2011/>

## Drilling Support to Arctic Field Projects

During the 2011 Arctic field season IDDO is providing drilling support to five projects: (1) the Greenland Snow Accumulation project (Forster, PI) will continue to use the 4-Inch Drill to collect shallow ice cores to investigate snow accumulation in the south-eastern sector of the Greenland Ice Sheet; (2) the Greenland Near Surface Cores project (Hawley, PI) will continue to use a hand auger to investigate the physical properties and the state of snow and firn along a traverse from Thule to Summit Greenland; (3) the McCall Glacier Cores project (Nolan, PI) will use a hand auger and sidewinder to collect firn cores from McCall Glacier in the eastern Brooks Range of Alaska to better understand the processes of internal accumulation of ice within firn; (4) the Summit Shallow Core Array project (Noone, PI) will use a hand auger and sidewinder to collect high-resolution firn cores to help investigate the stable isotopic hydrology at Summit Greenland; and (5) the Greenland Seismic Array project (Anderson, PI) will use the 4-Inch Drill to drill a borehole to house a seismometer for the Greenland Ice Sheet monitoring Network (GLISN).

## 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 cost estimate and a letter of support that MUST be included with your proposal. If you are submitting a proposal to NSF the cost estimate and letter of support should be included as Supplemental Information in your proposal, and it is recommended that you also notify your relevant NSF Program Manager that your proposal requires support from the 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](http://www.icedrill.org/scientists/scientists.shtml).

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