WINTER 2015/16

ICE BITS

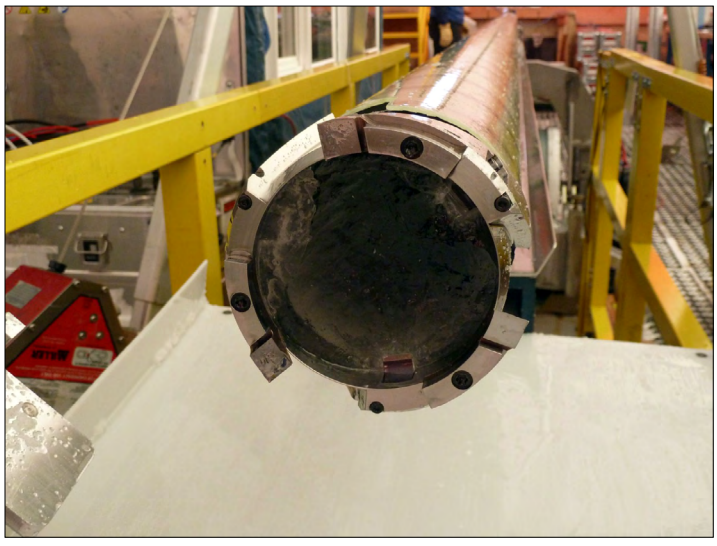
U.S. Ice Drilling Program
Ice Drilling Program Office | Ice Drilling Design and Operations

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

SPICECORE Drilling Successfully Surpasses Depth Goal!

On January 23, 2016, a team of seven IDDO engineers and drillers concluded drilling operations at South Pole Station in support of the two-year South Pole Ice Core project (SPICECORE; PI Murat Aydin). Supported by the SPICECORE PIs and fantastic science techs, the team reached a final borehole depth of 1751 meters, surpassing the original target of 1500 meters! With NSF permission, the drilling continued within the originally established schedule and the extra meters collected have ensured that the much sought-after Laschamp Event has been captured in the core samples. Nearly 550 meters of core, enough to fill one refrigerated SAFECORE shipping container, are now on the cargo vessel bound for the U.S. In addition, the core storage trench at the South Pole is full of cores that will fill yet another SAFECORE container in February 2017. The cores will then be transported to the U.S. National Ice Core Laboratory for processing. IDDO disassembled and packed much of the drilling equipment and extended the borehole casing to allow for future borehole logging operations. A limited IDDO crew of 1-2 people will return to the site during the 2016-2017 season to assist with borehole logging, to disassemble and pack any remaining equipment, and to remove the drill tent with assistance from ASC and the science techs on site.

Driller Dom Winksi and Engineer Grant Boeckmann operate the Intermediate Depth Drill. Credit: IDDO.



The very last run of ice (1751 meters depth) inside the barrel of the Intermediate Depth Drill. Credit: Jay Johnson

Dr. Eric Steig, SPICECORE co-PI, cleans a run of core from 1600 meters depth. Credit: Jay Johnson

Successful Support Across Antarctica

Several other projects supported by IDPO-IDDO were also successfully brought to a close during the quarter. Drilling efforts for the cosmogenic C-14 project on Taylor Glacier were completed for the third and final year. Out at Allan Hills, an IDDO driller utilized an Eclipse Drill to successfully core three holes to bedrock, collecting precious ancient ice. A second Eclipse Drill project was completed at South Pole Station. Finally, after years of programmatic delays, IDDO was able to conclude its operations related to use of the DISC Drill at WAIS Divide. All equipment is now disassembled, packed, labeled and ready for return to the U.S. as flights allow. IDDO also successfully extended the borehole casing to allow for future logging operations, including planned logging during the 2016-2017 field season.

South Pole Ice Core (PI Aydin)

An IDDO team of seven engineers and drillers, led by Lead Driller Jay Johnson, successfully completed this two-year drilling endeavor at South Pole Station, achieving a final borehole depth of 1751 meters, 251 meters beyond the original goal of the project. All necessary retro cargo was readied for vessel and COMAIR transport back to the U.S., whereas the drill tent and other items were winterized for use again in 2016-2017.

WAIS Divide Deep (PI Albert)

IDDO Driller Jim Koehler arrived at WAIS Divide on 1/14/16, following weather and aircraft delays, and worked expediently to prepare the remaining DISC Drill items for return shipment to the U.S. Koehler also worked with ASC personnel to extend the borehole casing to two feet above the Arch floor level.

The borehole casing extension at WAIS Divide, Antarctica. Credit: Jim Koehler

Taylor Glacier Blue Ice Cores (PI Petrenko)

IDDO Driller Mike Jayred operated the Blue Ice Drill (BID) in support of PI Vas Petrenko's C-14 of atmospheric methane fieldwork at Taylor Glacier. All science samples were successfully collected, with over 480 meters of core drilled over 35 drilling days. In total, over 40 holes were completed through approximately 530 drill runs. IDDO support of this three-year project is now concluded.

Climate Controls on Aerosol Fluxes in Taylor Valley (PI Aciego)

IDDO Driller Mike Jayred operated the Blue Ice Drill (BID) in support of PI Sarah Aciego's aerosol fluxes fieldwork at Taylor Glacier. All science samples were successfully collected in early November 2015, with 20 meters of core collected during this short duration project.

Driller Mike Jayred attaches Blue Ice Drill cargo to a waiting helicopter at Taylor Glacier, Antarctica. Credit: Heidi Roop

Allan Hills (PI Higgins)

IDDO Driller Mike Waszkiewicz operated an IDDO Eclipse Drill at Allan Hills in support of PI John Higgins' ancient ice fieldwork. All science samples were successfully collected. Each of the two planned holes were drilled to bedrock, with the first hole drilled to a depth of 100 meters and the second hole to a depth of 205 meters. The team was also able to re-enter a third hole that was originally drilled in 2011, coring an additional 20 meters of what is believed to be million year old ice.

South Pole Firn Air (PI Sowers)

Trevor Popp, an American driller and scientist working at the Centre for Ice and Climate in Copenhagen, Denmark, operated an IDDO Eclipse Drill at South Pole in support of PI Todd Sowers' firn air sampling campaign. In early November 2015, Popp set up the drill and began drilling without incident. Firn air sampling was progressing well until the firn air bladder provided by and operated by the science team became stuck in the borehole at 100 meters depth. Following unsuccessful efforts by the science team, IDDO, and ASC to retrieve the firn air sampling equipment, the hole was abandoned and efforts were redirected to drilling of the second hole, which was successfully drilled to 128 meters. Core quality was excellent throughout and the penetration rate was exceptional.

Hand Augers

During the 2015-2016 Antarctic field season, IDDO supported ten investigators through the deployment of a variety of hand auger and Sidewinder kits. The hand auger kits are currently en-route back to the U.S. via the cargo vessel.

Drilling tent and Eclipse Drill in operation at a snowy Allan Hills, Antarctica. Credit: Mike Waszkiewicz

Crary Ice Rise Shot Holes (PI Conway)

IDDO supplied PIs Twit Conway and Paul Winberry with a Small Hot Water Drill to create shot holes for their Crary Ice Rise seismic work. All shot holes were successfully drilled by the science team, and the equipment is currently onboard the cargo vessel headed to the U.S.

Exposed Rock Beneath the WAIS (PI Stone)

In anticipation of the upcoming 2016-2017 fieldwork, IDDO shipped borehole casing and drill rod for the ASIG Drill to Antarctica via the resupply vessel. These items are planned for use during the 2016-2017 field season to support PI John Stone's fieldwork near Pirrit Hills. The borehole casing and drill rods were shipped early to reduce ASC's shipping costs and to allow the cargo to be flown to West Antarctica in 2016-2017 on flights of opportunity.

Equipment Development

Agile Sub-Ice Geological Drill

During the First Quarter (Nov-Jan), initial sub-system testing was concluded for the Agile Sub-Ice Geological (ASIG) Drill components, and preparations were ramped up for the upcoming North American Test of the drill. A temporary ice well was constructed outside of Madison on the UW Physical Sciences Lab property. Project Manager Chris Gibson and other IDDO engineers worked to ready all equipment for the multi-week test planned for late February 2016. Extensive work on documentation was also initiated, including refinement of the test plan, drafting of an equipment lab testing report, updating of the system's Failure Modes and Effects Analysis (FMEA) document, and creation of a safety training presentation.

Deep Ice Sheet Coring Drill

As IDDO prepares to make modifications, upgrades, and repairs to the Deep Ice Sheet Coring (DISC) Drill equipment in preparation for its future use in Antarctica, IDDO Project Manager Alex Shturmakov and engineer Josh Goetz reviewed drilling logs and reports in an effort to understand and prioritize necessary modifications and upgrades. In the coming months, IDDO plans to work on preliminary sonde modifications in an effort to collect 4-meter long cores per run, to determine an optimal method of installing heavy equipment in the field without deploying the large blue gantry crane, and to upgrade the aging control system hardware to allow for optimization of the LabVIEW software.

Preparing the temporary ice well at PSL for the North American Test of the ASIG Drill. Credit: Chris Gibson

IDPO Education and Public Outreach: Linda Morris Retires and Louise Huffman is Hired

After many highly successful years as Director of Education and Public Outreach for IDPO, Linda Morris retired on Dec 31, 2016 in order to travel and to spend more quality time with her children and grandchildren. Linda created the IDPO Education and Public Outreach program from scratch, sustaining it on a shoestring budget since the early years of IDPO existence. Her vision, personal initiative, and persistence resulted in a program that uses best practices to contribute to teacher knowledge and proficiency and public understanding of discoveries enabled by ice coring and drilling, through nation-wide partnerships with the National Science Teacher Association, the American Meteorological Society, TERC, the Climate Literacy and Energy Awareness Network (CLEAN), and the Polar Educators International master class series, for example. Linda's leadership in establishment of the Lockheed-funded School of Ice program put climate understanding and classroom tools into the hands of college faculty and high school teachers, where they are using it with their students. Linda's grant for a second year of the School of Ice has been funded, and will occur in May. We sincerely thank Linda for her dedication, service, and professionalism.

Linda Morris retired on December 31, 2016, as the Director of Education and Public Outreach for IDPO.

Louise Huffman has been hired as the new IDPO Director of Education and Public Outreach. Louise is a former classroom teacher

and she served as the Chair of the Formal Education Subcommittee of the IPY-EOC. From 2007-2013, she was the ANDRILL (ANtarctic geological DRILLing) Coordinator of Education and Public Outreach. All IDPO projects and initiatives are continuing as planned, and new avenues are also being explored. Anyone with ideas, or who would like to become involved in IDPO EO projects, or who have specific EO needs relevant to the mission of IDPO-IDDO is welcome to contact Louise at louise.t.huffman@dartmouth.edu

Louise Huffman, IDPO's new Director of Education and Public Outreach.

April 4, 2016 Deadline for Requesting Ice Drilling Support for NSF Antarctic Research Proposals

Researchers intending to submit proposals requiring ice drilling or ice coring support to the National Science Foundation (NSF) 2016 Antarctic Research Opportunities (16-541) solicitation are reminded that they must contact the Ice Drilling Program Office (IDPO)/ Ice Drilling Design and Operations (IDDO).

Contact must be made via email (IceDrill@Dartmouth.edu) at least 6 weeks prior to the NSF proposal deadline, in this case by 4 APRIL 2016.

IDPO/IDDO contact deadline: Monday, 4 April 2016
NSF full proposal deadline: Monday, 16 May 2016

For more information about requesting ice drilling support, visit: http://www.icedrill.org/scientists/scientists.shtml

For information and ideas about partnering with the IDPO for broader impacts, please visit:
http://www.icedrill.org/scientists/outreach_support.shtml

Information about the 2016 Antarctic Research Opportunities (16-541) funding opportunity is available at:
http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=5519

For questions, please email: IceDrill@Dartmouth.edu

Subglacial Access Drilling: IDPO Science Planning Workshop

May 22-23, 2016
Marriott Washington Dulles Suites
Herndon, Virginia, USA

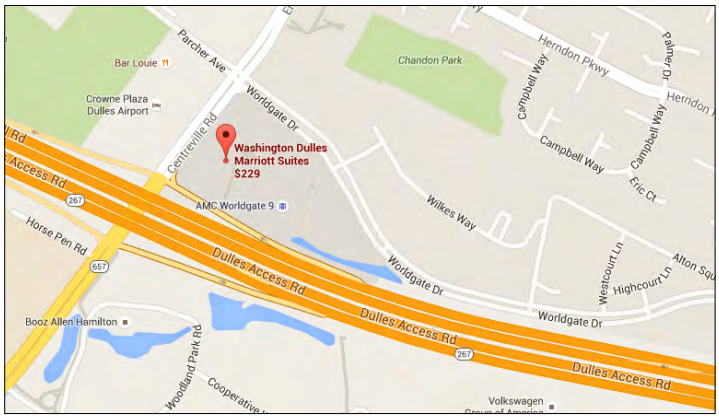
Scientific discoveries achieved from, within, and beneath the Greenland and Antarctic ice sheets, ice caps and valley glaciers are critical to society today, but large group endeavors are not achieved without significant advance planning. What is your vision for future subglacial science? The U.S. Ice Drilling Program Office (IDPO) is hosting an interdisciplinary science community-planning workshop to identify the science drivers, targets, and timelines of subglacial access drilling for the coming decade. Outcomes from the workshop will be used in the IDPO Long Range Science Plan for 2016-2026. **This workshop, originally scheduled for January but postponed due to winter storm Jonas, has been rescheduled to May 22-23, 2016.**

The goal of this workshop is to form consensus within the U.S. science community on scientific goals, potential drilling targets, and proposed dates and timelines for major science projects that will require subglacial access drilling over the coming decade, possibly

in joint endeavors with international partners. This information will be used in the 2016-2026 update of the IDPO Long Range Science Plan, which is the foundation for identifying and developing appropriate drilling technologies for use in larger projects defined by the U.S. science community. The workshop will be held on May 22-23, 2016, at the Washington Dulles Marriott Suites Hotel in Herndon, VA. All interested scientists who will be seeking science funding from a U.S. agency are encouraged to participate, including, but not limited to, those from the fields of glaciology, paleoclimatology, glacial geology, biology, and earth science. Scientists should come to the workshop prepared to summarize scientific research questions to be addressed by subglacial drilling in the coming decade, and to identify likely target areas, technologies needed, and timelines for completion of projects that they are likely to propose in the near-term or long-term future.

Sponsor and IDPO Lead:
Mary Albert, Dartmouth

IDPO Subglacial Access Working Group Conveners:
Ross Powell, Northern Illinois University
Jill Mikucki, Middlebury College
John Goodge, University of Minnesota-Duluth



Dates:
Sat, May 21: arrive in evening
Sun, May 22: meeting all day
Mon, May 23: meeting in morning; return home in afternoon

More information is posted, along with the online registration form, at http://icedrill.org/2016-subglacial-planning-workshop/ . Attendees should register at this site.

**** Registration for the workshop closes on Friday, May 6. ****

10-minute presentation slots are available in the agenda for participants interested in "making the case" for specific future subglacial drilling projects. Please indicate your interest in making a brief presentation in the registration form. We will send registered participants updates on the agenda and details of the meeting. Feel free to send comments to us at Icedrill@Dartmouth.edu, or contact one of us directly.

Workshop website and registration:
http://icedrill.org/2016-subglacial-planning-workshop/index.shtml

IDPO Hosts Successful Town Hall at AGU Fall Meeting

IDPO planned and convened the AGU Town Hall on Scientific Drilling in the Polar Regions (Dec 17, 2015) with co-convenor John Goodge. Presentations and Q&A were held on the topics of IDPO-IDDO (Albert), IPICS (Severinghaus), RAID (Goodge), and WISSARD (Mikucki).

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