

FALL 2014

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

Scientific Drilling in the Polar Regions AGU Town Hall Meeting

Date: 15 December 2014

Time: 12:30 PM – 1:30 PM

Place: Moscone West – Room 2006



TH13C. Scientific Drilling in the Polar Regions

IDPO is once again organizing a town hall meeting at the Fall AGU Meeting entitled 'Scientific Drilling in the Polar Regions'. Ice sheets and the underlying bedrock and sediment hold crucial evidence of past climate and cratonic geology. National and international collaboration for drilling in the remote polar regions requires strategic coordination between science, technology, and logistics. This town hall will provide the research community with updates on IDPO-IDDO, NICL, IPICS, RAID, and ANDRILL initiatives. Opportunities for community involvement will be showcased, and input from the audience will be solicited.

AGU Meeting website for more information:

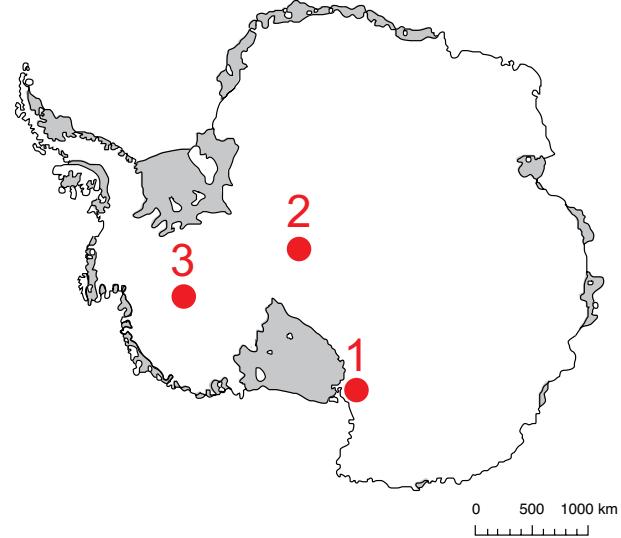
<http://fallmeeting.agu.org/2014/events/th13c-scientific-drilling-in-the-polar-regions/>

Field Support to Antarctic Projects

During the 2014-15 Antarctic field season IDDO is providing support to three projects:

(1) the Carbon-14 of Atmospheric Methane project (Petrenko, PI) will use the specialized Blue Ice Drill to collect large-diameter ice cores from the blue ice zone on Taylor Glacier that span the last deglaciation and the Early Holocene. The scientists require large-diameter ice cores to extract enough methane to analyze for the rare carbon-14 isotope of methane. The methane analyses will help pinpoint the source(s) of the greenhouse gas during past abrupt climate changes, and will also help scientists understand how modern-day sources of methane may respond to a warming world.

(2) the South Pole Ice Core project (Aydin, PI) will use IDDO's new Intermediate Depth Drill to begin collection of a 1500 meter ice core. The project will collect the ice core over the course of two field seasons from a site approximately 3 kilometers from South Pole Station. The ice core will provide an environmental record spanning approximately 40,000 years that will be used to investigate the magnitude and timing of changes in climate and climate forcing through time. The target of 40,000 years spans the transition from the peak of the last glacial period when ice sheets were at their maximum extent — referred to as the Last Glacial Maximum — to the present warm period (the Holocene) called an interglacial. One of our primary motivations for collecting an ice core from the South Pole is that it will provide one of the best trace gas records possible due to the very cold temperatures and low impurity levels at the South Pole. In addition to providing the Intermediate Depth Drill for the project, IDDO is also providing seven drillers to operate the drill throughout the season.



Map of Antarctica showing IDDO 2014-2015 field season locations. The numbers shown on the map correspond to the project numbers in the text at left.

(3) In support of the ongoing work at WAIS Divide, IDDO will assist with borehole logging operations, and will also disassemble the Deep Ice Sheet Coring (DISC) Drill system and prepare it for transport back to Madison, Wisconsin. The borehole logging operations consist of temperature (Clow, PI), seismic (Peters, PI), optical (Bay and Talghader, PIs) and acoustic televiewer logging (Pettit and Obbard, PIs). The temperature data will be used to refine estimates of the geothermal heat flow at the site, the melting rate at the base of the ice sheet, and to reconstruct past surface temperatures using borehole paleothermometry. The seismic data will be used to study the ice fabric, which will be linked to the physical properties of the WAIS Divide ice core. The optical data will be used to study the dust, crystal structure and ice fabric at the site. The acoustic televiewer will measure the shape and tilt of the borehole at high resolution to form a basis for measuring future changes in borehole shape and tilt. The changes in borehole shape and tilt over time will be used to study ice deformation.

Education & Public Outreach

A reminder for scientists who attended the **WAIS Divide** conference in La Jolla, this past September: To have your recent scientific results be 'front and center' in IDPO's outreach messages to teachers, television, and the public, please access the media information files, located on pp. 78-79 (pp. 80-81 if printing) of the WDC Handout on the conference thumb drive, and return the requested information to Linda Morris via fax at (603) 646-9795 or via email, at linda.m.morris@dartmouth.edu. This will help Linda to showcase knowledge of the community's many recent successes!

For everyone: Please share the following information about an **upcoming National Science Teacher Association (NSTA) webinar** with your education networks, and others seeking the latest information. The event is free.

SPICE Core: Investigating Past Climate at the South Pole

What's the latest in Antarctic paleo-climate research? On **December 10, 2014**, this web seminar, targeting educators of students in grades 7-12, will introduce participants to the nation's newest ice core expedition... SPICE Core! Investigators seeking data from the past 40,000 years are drilling a 1500 meter ice core to study chemical isotopes, tiny particles called aerosols and atmospheric gases trapped in the earth's great southern ice sheet. The goal is to investigate environmental change since the last glacial/interglacial transition. Why was the South Pole targeted? What criteria affect the specific site selection for drilling? What new kinds of technology were required? Dr. T.J. Fudge will answer your questions, and share what it's like to work in the Pole's extreme environment.

A related, video-enhanced educational activity, focusing on "Polar Science and Engineering", will be presented by Linda Morris for you to share with your students. The interactions modeled in the video between scientists and engineers will serve as the basis of a reflective activity, *Drilling Back Through Time*, that introduces the students in your classroom to the NGSS's "Scientific and Engineering Practices". Educational resources from the US Ice Drilling Program will be showcased.

Date: Wednesday, December 10, 2014 **Time:** 6:30 p.m. ET / 5:30 p.m. CT / 4:30 p.m. MT / 3:30 p.m. PT

Registration: http://learningcenter.nsta.org/products/symposia_seminars/NSF/webseminar6.aspx

Presenters: Dr. T.J. Fudge, Postdoctoral Researcher, University of Washington, Earth & Space Sciences

Ms. Linda M. Morris, Director of Education & Public Outreach, US Ice Drilling Program Office, Dartmouth College

For further information, contact Linda at linda.m.morris@dartmouth.edu.



The 2014-15 South Pole ice core field team at the Ceremonial South Pole. (L to R): Elizabeth Morton, Grant Boeckmann, Nick Wipperfurth, Mindy Nicewonger, Kimberly Casey, Murat Aydin, Tanner Kuhl, Dave Ferris, Josh Goetz and Shawntel Singleton. Credit: Dave Ferris.

2014 Technical Advisory Board Meeting

IDDO held its annual Technical Advisory Board (TAB) Meeting in Madison, WI on September 9-10, with drilling experts from all over the world and from a wide variety of fields. The meeting was well attended by 9 of 12 TAB members, one proxy TAB member, IDDO staff, members from IDPO, former IDDO PI Charlie Bentley and new IDDO PI Mark Mulligan. IDDO presented on the current status of IDDO field projects, equipment development projects and equipment maintenance and upgrade efforts. As with each TAB meeting, IDDO gained very valuable feedback from board members on equipment development projects, ideas regarding new technologies in ice drilling and other fields, as well as input on field project logistics.

Notes from the meeting will be available at <http://icedrill.org/about/tab.shtml>

Media Kit

The 2014 Fall Media Kit is now available for download. While the Media Kit is written for the media, it is a good resource for anyone interested in learning more about IDPO-IDDO. The Media Kit can be downloaded at:

<http://www.icedrill.org/news/media.shtml>

Field Support to Science Projects

Current – Antarctic 2014-2015

- Carbon-14 from Taylor Glacier Blue Ice Cores (Petrenko)
- South Pole 1500-meter Ice Core (Aydin)
- WAIS Divide Borehole Temperature Logging (Clow)
- WAIS Divide Fabric and Texture Logging (Pettit and Obbard)
- WAIS Divide Optical Logging (Bay and Talghader)
- WAIS Divide Vertical Seismic Profiling (Riverman)

Upcoming – Arctic 2015

- Cosmogenic Carbon-14 in Polar Firn, Greenland (Petrenko)
- Disko Bay and Baffin Bay Firn and Ice Cores, Greenland (Das)
- Greenland Aquifer Investigation (Forster)
- Microbes and Ice Formation in Inland Waters, USA (McKay)

Upcoming – Antarctic 2015-2016

- Aerosol Fluxes to Taylor Dome/Glacier (Aciego)
- Carbon-14 from Taylor Glacier Blue Ice Cores (Petrenko)
- Ohio Range Ice-Rock Interface Samples (Mukhopadhyay)
- South Pole 1500-meter Ice Core (Aydin)

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 Support Requirements Form (www.icedrill.org/scientists/scientists.shtml) and submit it to IDPO-IDDO via icedrill@dartmouth.edu at least six weeks before your proposal deadline. Once IDPO-IDDO receives your Field Project Support Requirements Form we will provide you with a Letter of Support and Scope of Work/Cost Estimate document 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 document 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.

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