



West Antarctic Ice Sheet Divide Ice Core

Climate, Ice Sheet History, Cryobiology

2007/2008 Field Season Overview

The inaugural season of deep drilling at WAIS Divide went very well. Full production coring began on January 7 with two shifts operating. A third shift was started on January 10 initiating 24 hour/day operations. Coring continued through January 20 with a total of approximately 466 meters being drilled giving a final bore hole depth of 580 meters. Overall, the core quality produced by the DISC Drill was excellent, although one core (~1.4 meters) was rubble due to a problem with the core dogs. Average drilled core length was 2.7 meters. Average core production was about 40 meters per day with a total of 180 runs made in 16 days.

The amount of time available for production drilling was 8 days less than had been planned and the total depth drilled, therefore, was short of the 800+ meter goal for the season. This season was particularly stormy (compared to the previous two field seasons) and several major storms significantly slowed work and occasionally shut down operations. The installation of the drilling/core handling generators also took longer than scheduled, delaying the start of production drilling. A decision was also made to stop production drilling on January 20, rather than January 23 as originally planned, to ensure enough time to shut down operations and winterize



2007/2008 WAIS Divide Team. Photo: Brian Bencivengo (USGS/NICL, 2008)

all drilling/core handling equipment and redeploy all science personnel back to McMurdo Station by January 25. Despite the shortened time available for production drilling, the field season was very successful. Core quality was excellent, everyone worked really well together, and if the number of planned drilling days had been available, drilling 800+ meters would likely have been achieved.

In addition to the normal logging activities, this season's core handling line at WAIS Divide also involved cutting samples for physical properties and measuring the electrical properties of the ice. Twenty-one 10-cm samples taken at 20-meter intervals from 120 meters to 520 meters depth were cut for physical properties. Electrical properties were measured on all 466 meters of ice drilled this season. All ice drilled this season, except for the last three meters, has been shipped back to the National Ice Core Laboratory and will be worked on at this summer's core processing line (see below for more details).

Many, many thanks to all those involved in the WAIS Divide activities this year especially, Matthew Kippenhan (project management), Kevin Killilea and Elizabeth Morton (camp management), Brian Johnson (science support), Keith DePew and Sharon Lewis (cargo support), Julie Grundberg and Sharon Lewis (fixed wing support), and Eric Brown (construction management). Special thanks to the WAIS Divide camp staff and the arch facility construction staff for all of their help and support this season. This project would not be possible without the dedication and continual support of Julie Palais, Brian Stone and George Blaisdell at NSF-OPP, our sincere thanks to them.

2008/2009 Science Technicians

The Science Coordination Office has received more than 80 applications for the ~10 science technician positions that will log the core and assist with the drilling during the 2008/2009 field season. We're in the process of

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Raytheon Polar Services Company

The third season for the WAIS Divide Ice Core Project ended on 05 February 2008. After another very busy, successful season the camp staff winterized the entire camp's infrastructure and equipment on snow berms until next October when everything will start all over again. This season focused on supporting 11 science groups and the ice coring project construction and start-up operations. Numerous twin otter flights utilized the smooth 10,000 foot skiway and fuel bladders throughout the summer months while nearly 40 LC-130 Hercules missions brought in passengers, materials, and bulk fuel regularly. However, poor weather conditions across the Antarctic continent impacted camp operations and flight schedules on several occasions, some of which shut down all aircraft operations for up to 10 days consecutively. Typically, adverse weather and cancelled supply flights means limited outside work and delays in material arrivals, so the team was constantly adjusting priorities to stay on track.

Foremost on the construction list was completing Phase 3 interior arch work and installing and commissioning the large Caterpillar generator modules in time to begin coring operations scheduled for 22 December 2007.



Moving the winch drum for the DISC Drill out to the arch facility. Photo: Dave Ferris (SDSU, 2007)

Simultaneously, ICDS

and NICL personnel were busy installing the DISC Drill and core handling line (CHL) equipment. Weather issues and delayed materials occurred in early December, so the power module project was delayed by two weeks making it difficult to complete on time. In response, the construction crew temporarily supplied electrical power to the arch facility for the remaining field season and resources shifted to finishing off loose arch projects. Once adequate power was supplied, the DISC Drill and CHL equipment was tested and eased into daily operations until the final core was produced on 20 January 2008. The arch facility is nearly completed with only a small punch list of items and issues to address prior to next season's startup. However, since the power module was not completely commissioned as scheduled, one of the first priorities for next season will be to finish them so coring operations can begin as early as possible.

As ice coring operations were ending, other science projects on-site were also winding down as the camp staff started to prepare for closing the camp. This is a large endeavor considering all tent structures are taken down, building modules closed up, and general cargo moved to the winter snow berms. Building winter berms begins several weeks before the camp closeout starts since it is a very time consuming activity and there is limited heavy equipment resources. Once winter staging is complete and the camp population is down to the last team necessary, all mechanical equipment is winterized and bermed for the winter also. The camp closeout usually takes a large camp and construction crew of up to 22 persons around 14 long days to complete.

All in all, approximately 709, 235 lbs of cargo, passengers, and fuel was flown in by LC-130 Hercules aircraft to support this season's construction, science, and operations. A peak population of 62 persons was at camp in early January. The camp staff and arch construction crew did another great and safe job in a very remote camp. With the addition of the CReSIS project next season, another busy, challenging field season is already in the works for 08-09.

-Matthew Kippenhan,
WAIS Divide Project Manager, RPSC

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selecting the crew and look forward to having a strong field team. Many thanks to everyone who applied and to those people who helped advertise the positions.

2008 NICL Core Processing Line

In June 2008 we will process the 466 m of core (114-580 meters depth) that was collected during the 2007/2008 WAIS Divide field season at the National Ice Core Laboratory in Denver, CO. If you are a funded P.I. for the WAIS Divide project and are expecting to receive samples from this year's processing of the core, you need to contact Mark Twickler (mark.twickler@unh.edu).

Annual Fall Science Meeting

This year's science meeting will be hosted by Scripps Institution of Oceanography and held in the San Diego, CA area. The current dates for the meeting are 2-3 October 2008. We're in the process of finalizing arrangements and will send out the final details soon.

Basal Sampling and Replicate Coring

Now that we are well on our way to recovering a deep ice core from WAIS Divide, preparations for the next phase of the project are underway. The WAIS CORES Science and Implementation Plan, the funded proposal to build the DISC Drill, and the funded proposal to conduct field activities at WAIS Divide all call for bore hole logging, basal sampling of basal water and geologic material, and replicate coring to recover additional ice from depth intervals of special interest. However, the basal sampling and replicate coring systems for the DISC Drill still need to be developed, the science objectives clearly defined, and funding for these activities secured.

At last October's annual science meeting, two groups were formed to aggressively investigate these activities. The basal sampling group consists of John Priscu, Mark Skidmore, Slawek Tulaczyk and Jim White. The replicate coring group consists of Ed Brook, Erin Pettit, Jihong Cole-Dai and Todd Sowers. Each group is in the process of developing a science and implementation plan, one for basal sampling and one for replicate coring. Ice Coring and Drilling Services is being consulted during this process to make sure the plans do not include unrealistic drilling operations. The goal is to submit the two science and implementation plans to NSF by July 2008. The current projected schedule for ice coring indicates that we may be in a position to begin basal sampling in January 2011. If these additional activities are funded, replicate coring would begin after the basal sampling.

Our current environmental permit requires that we stop drilling operations prior to reaching the basal environment. This means we have to pause the drilling about 40 meters above the bed of the ice sheet and delay obtaining the complete ice core record. Because ice flow compresses the time scale near the bed, the bottom 40 meters of the core may hold as much as 20% of the time in the climate record that can be recovered from WAIS Divide. For both science and logistical reasons, we hope to have the environmental permit to proceed with basal sampling (and the drilling technology developed) before the ice coring reaches 40 meters above the bed so that we don't have to shut down and then restart operations.

-WAIS Divide SCO



WAIS Divide Ice Core Project - Science Coordination Office (SCO)

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