

WISSARD FIELD REPORT: 1 February 2013. Compiled by John Priscu

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WISSARD Drillers at SLW: Dar Gibson, Darin Blythe, Graham Roberts, Dennis Duling, Justin Burnett, Jeff Lemery, Chad Carpenter.

WISSARD Personnel in McMurdo: Betty Trummel, Susan Kelly, William Adkins, Rob Edwards

1 February: A Twin Otter exchanged ASC camp staff and transported Kelly and Adkins along with samples and retro cargo from SLW to McMurdo

SLW camp population: 49 (25 scientists, 7 drillers, 9 ASC SPOT2 traverse, 2 ASC marine techs, 2 ASC camp staff, 4 ASC WISSARD traverse) site

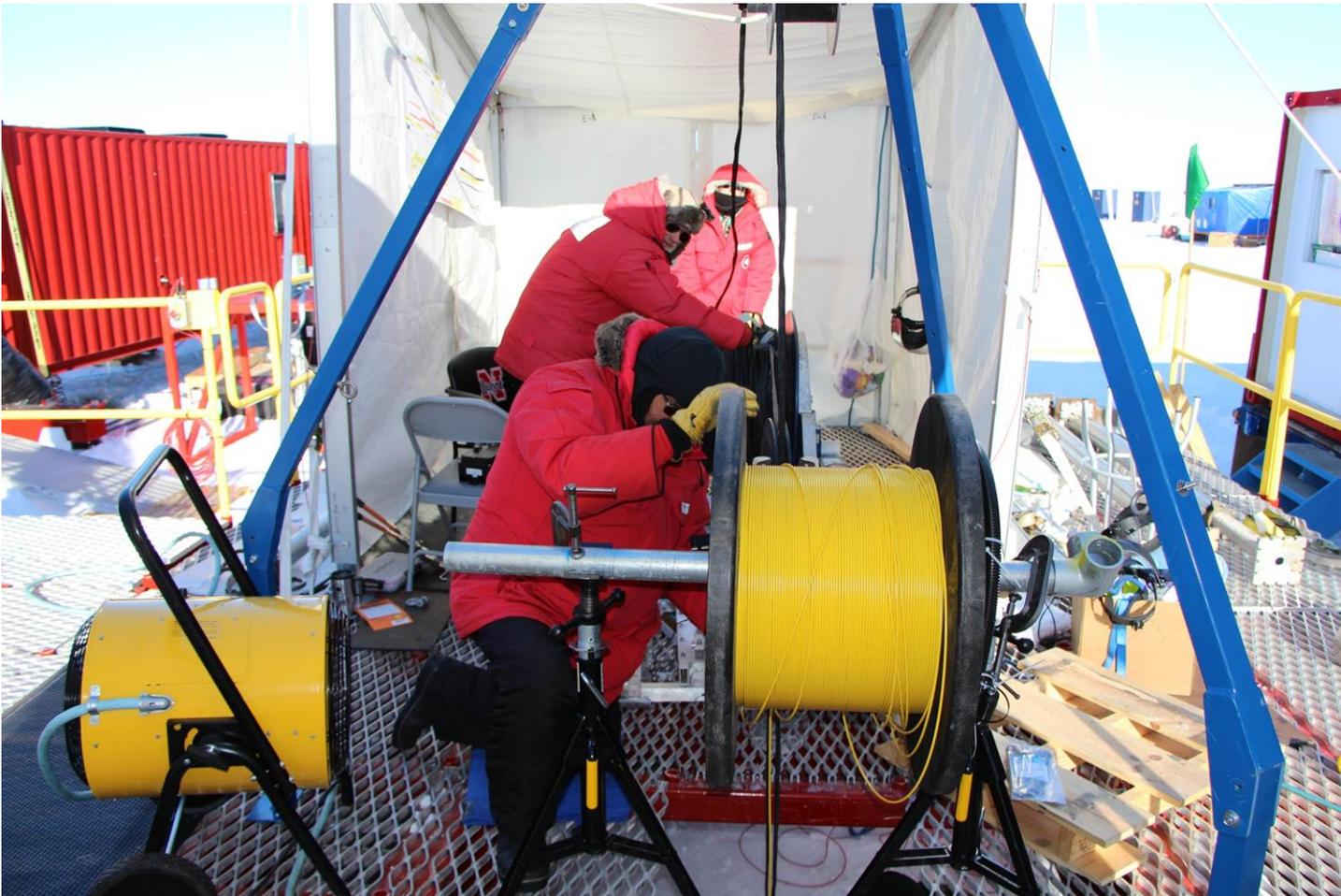
Science Update:

- A CTD cast, water samples (2 each 9 L Niskin bottles) and 2 in-situ filtration system deployments were completed between 1500 h 29 January and 1000 h 30 January. Experiments were set up immediately to measure potential microbial growth rates. Respiratory enzymatic assays have provided the first evidence that the lake water microorganisms we observed with microscopy are viable. Further experiments are planned in McMurdo Station to verify results from these initial experiments. Remaining samples were preserved for geochemistry and nucleic acid sequencing. We noted that the borehole was beginning to narrow near the surface due to freeze back.
- Because the borehole was beginning to freeze back, the geothermal probe was modified to reduce its borehole profile and reconfigured to operate on our light winch system. The probe was successfully deployed at 1000 h and collected precision temperature, acceleration, and tilt data. The geothermal probe was re-deployed at 1500 h to provide us with replicate data. We are currently making measurements of thermal conductivity on sediment cores recovered over the last few days. Combined, these subglacial temperature and conductivity data will enable the first direct determination of heat flux beneath the Antarctic ice sheet.
- Our piston corer was also modified to reduce its diameter to ensure that it fit down the borehole. The corer was deployed at ~1400 h on 31 July and returned a ~1m long core that will be used for stratigraphy, sedimentology, biochemistry, and thermal conductivity measurement.
- Our underwater ROV (MSLED and Mothership) was readied and sent down the borehole at ~1700 h on 31 January and could not penetrate safely the thick ice cover that had formed at the air/water interface (the hydrostatic level in the borehole). The drillers sent down a stream of hot water in an attempt to melt the ice in this section of the borehole with no success. All cameras shut down following addition of hot water which we think resulted from thermal shock to the electronics. The ROV and its Mothership were removed from the borehole and, owing to the rapidly narrowing hole, a decision was made to scrap redeployment to ensure that the ROV would not be lost in the lake or borehole.
- Following ROV retrieval we decided that it would be very risky to deploy our pump-driven gas sampling device given the rapid borehole freeze back. This device required that a hose be lowered into the lake and remain there for ~10 h, a period that could easily freeze the hose to the borehole sidewall. This sampling system will be left in Antarctica with plans to collect these important samples next season.
- The drill crescent was moved away from the borehole and our sediment percussion corer was readied for deployment at 2230 h on 31 January. Due to its weight we were not concerned about the icing experienced by the ROV. The core was removed from the borehole at ~0800 h on 1 February. This tool descended in 30 minutes and successfully recovered core. As of late afternoon on 1 February the core liner had not been extruded from the barrel because it was frozen. We are slowly allowing it to thaw and have yet to determine the length of sediment recovered. However, diamict frozen to the outside of the core barrel inferred good penetration. This core will be used for stratigraphy, sedimentology, paleontology, geochemistry and geophysics.
- Deployment of borehole seismic and temperature strings began 0800 h on 1 February and was completed at 1700 h the same day.
- The WISSARD team (drillers and scientists) are now busy planning camp pull-out. Science samples are being categorized (e.g., can freeze, do not freeze, keep chilled) and hazardous chemicals are being readied for our flights back to MCM. We have worked with ASC camp staff and USAP cargo to have all samples accompanied by a member of the WISSARD science team from Pegasus to McMurdo to ensure sample integrity.

- We currently have a Basler pull-out flight planned for 2 February (12 PAX + samples + science cargo). Our final science PAX and Cargo pullout is scheduled for 4 February on a National Guard LC-130.
- Drillers are winterizing the drilling rig and plan to fly to McMurdo between 4 and 6 February. The final ASC pullout is scheduled for 7 February. The WISSARD and SPOT2 traverse teams are preparing the skiway for the LC130 landings/take-offs and building the snow berms where all of the equipment and fuel that will remain on-site will be stored. Both traverse teams will depart for McMurdo on 9 February. Deep field SAR coverage ends is scheduled to end on 23 February when the last aircraft depart from South Pole.
- **A decade of international and national planning, and three and a half years of project preparation came down to an intense period of drilling and science at Subglacial Lake Whillans. We were able to address almost all of our science goals for the season. The data and samples collected have provided us with a glimpse of the Antarctic subglacial world. We have no doubts that our results will transform the way we view Antarctica and pave the way for future national and international subglacial research efforts. The extraordinary success of our first WISSARD field season would not have been possible without the expertise and dedication of the WISSARD traverse team who hauled our fuel, drill, labs and camp facilities more than 700 miles to the SLW camp site, the SPOT 2 traverse for preparing the skiway and winter storage berms, an incredible group of drillers who worked around the clock to ensure that we had a conduit to the lake and hot water for showers, our two incredibly helpful marine techs who significantly aided science outcomes by directing and assisting all scientific deck and winch operations, and ASC camp staff for providing us with positive vibes, airlift coordination and excellent food during our hectic round-the-clock schedule. We have greatly benefitted from the experience of our foreign research collaborators who participated on the science team. The undergraduate and graduate students learned what it was like to do cutting-edge interdisciplinary science and worked feverishly to process the samples as they came out of the borehole. Finally, WISSARD outreach personnel used our drilling and research efforts to touch the lives (both young and old) of people throughout the world and inspire the next generation of polar scientists.**



Tent City, SLW field site



Deploying seismic string in SLW borehole