

# **SALSA Chief Scientist Reports**

**December 2018 – January 2019**



## **SALSA SCIENCE REPORT: 15 December 2018. Compiled by John Priscu**

**SALSA Science Personnel now at MCM (24 total):** John Priscu, Brent Christner, Tristy Vick-Majors, Alex Michaud, Mark Skidmore, Amy Leventer, John Dore, David Harwood, Kathy Kasic, Billy Collins, Wei Li, Brad Rosenheim, Bob Zook, John Winans, Tim Campbell, Martyn Tranter, Joel Barker, Christina Davis, Molly Patterson, Joel Barker, Chris Gardner, Al Gagnon, Ryan Venturelli, Cindy Dean

**SALSA Drillers at SLM:** Dar Gibson, Graham Roberts, Jonas Kalin, Justin Burnette

**SALSA Drillers in MCM:** Dennis Duling, Ed Krula, Anatoly Mironov

### **Science Update:**

- The SALSA science team arrived in McMurdo in 2 major pulses (21 arrived on 6 December and 3 arrived on 12 December after a 2 day delay in Christchurch). Most of the time spent since arriving in McMurdo Station has been spent on cargo handling and field planning. These items as well as other tasks addressed during our arrival follows:
- The new scintillation counters purchased by Crary Laboratory have been calibrated for 14C and 3H sample counting
- The entire SALSA science team has completed training
- Sampling bottles have been acid washed and are ready for samples
- A borehole blank kit has been organized and will be sent out with the first science team members arriving at SLM
- Deep SCINI has been decontaminated and delivered to Science cargo
- A majority of our cargo is now in the Science cargo system (estimated weight 8,000 lbs)
- Sediment sampling plan was discussed and is now in place
- Water sampling plan was discussed and is now in place
- Deep coring operations have been discussed with the marine techs and a plan is in place
- Radiation protocols (tracer vs natural abundance) have been established
- All SALSA members (science, drillers, marine techs) have been briefed on clean access requirements
- All chemicals have been received from Crary and solutions require in the field have been prepared and turned over as Haz cargo
- The borehole timeline has been finalized
- A priority put-in schedule has been developed for the SALSA team
- Flight schedule planning has been discussed daily. Our current plan is: 17 December - a Basler flight containing the remaining drillers, 3 science team members and cargo; 20 December – LC-130 flight containing 11 PAX plus cargo; 21 December an LC-130 flight 10 PAX plus cargo; the possible inclusion of a Basler flight to ensure that all PAX and Cargo have been delivered to SLM. This schedule is dynamic and has been altered daily.

### **Outreach update:**

- Drone CONOPS were discussed with MAC Center for protocols established. Successful test flights were made near McMurdo Station
- PI interviews are almost complete
- Traverse video is now available to the McMurdo Community on local TV (channel 20)
- Skype calls have been made to grade schools in the US
- An article highlighting our project was published this week in Nature Magazine
- The flight arrival of final team members was filmed at Phoenix Field
- Filming has been conducted at Hut Point, the Pressure Ridges and from Ob Hill

**SALSA SCIENCE REPORT: 20 December 2018. Compiled by John Priscu**

**SALSA Science Personnel at SLM (23 total):** Brent Christner, Tristy Vick-Majors, Alex Michaud, Mark Skidmore, Amy Leventer, John Dore, David Harwood, Kathy Kasic, Billy Collins, Wei Li, Brad Rosenheim, Bob Zook, John Winans, Tim Campbell, Martyn Tranter, Joel Barker, Christina Davis, Molly Patterson, Joel Barker, Chris Gardner, Al Gagnon, Ryan Venturelli , John Priscu

**SALSA Science Personnel in McMurdo (1):** Cindy Dean

**SALSA Drillers at SLM (7):** Dar Gibson, Graham Roberts, Jonas Kalin, Justin Burnette, Dennis Duling, Ed Krula, Anatoly Mironov

**Science Update:**

18 December:

- 3 drillers (Duling, Krula, Mironov), 3 scientists (Priscu, Christner, Venturelli) and 2 marine techs arrive at SLM around 14:30 local NZ time via Basler after a 4 h flight. The scientist and MTs set up mountain tents; larger Arctic Oven tents were already set up for the drillers and ASC camp staff. Priscu asked why Arctic Oven tents, purchased and used for the WISSARD project were not available for the scientists and was told that they must have been lost via attrition; we were told in McMurdo that these tents were not made available for scientists because of weight issues (seems like they could have been traversed to the field site as was done for the WISSARD project?).
- The laboratories were moved from the overwinter berms to their required location near the LARS deck and ramps were added to each lab. The locations were chosen based on prevailing winds. Brent, a traverse driver, supported us in this effort.
- The drillers and MTs began working on the heating units and the LARS deck, respectively.

19 December:

- The remaining scientists and approximately 8000 lb of cargo arrived at SLM via LC130 around 1700 NZ.
- The laboratories were cleaned and plugged into the local power supply by James, an ASC contractor who has been extremely helpful.
- The diesel engines on the Alkoda heaters for the drill had issues starting. When they did start, they would not run continuously. Small leaks in the fuel system were repaired overnight, which appeared to remedy the situation. The drillers are now ensuring that all solenoids are functioning. The drilling heaters are now supplying water to the RAC tent and drilling should begin tomorrow if all checks are OK.

20 December:

- Drillers continue to work on heating units and supply water to the laboratories

- The hot water heater in the Chem Lab was not drained after its last use and was cracked. Given that there were no replacements on site, the scientists requested that the plumbers bypass the hot water heater; leaving the lab with room temperature water.
- The sample hut was moved into place near the laboratories, supplied with electric for the refrigerators and cleaned.
- Requested email access from camp manager allowing the SALSA Chief Scientist to send SALSA science sitreps directly to NSF and was informed that this was not an option.

**Outreach update:**

- SALSA stickers and patches were passed to support staff
- Footage was obtained on camp set-up and daily operations
- As part of the morning briefing, Priscu thanked the support contractors for their assistance and briefed ASC staff on SALSA's scientific goals. He reiterated that our success is their success and visa-versa.

## **SALSA SCIENCE REPORT: 21 December 2018. Compiled by John Priscu**

**SALSA Science Personnel at SLM (23 total):** Brent Christner, Tristy Vick-Majors, Alex Michaud, Mark Skidmore, Amy Leventer, John Dore, David Harwood, Kathy Kasic, Billy Collins, Wei Li, Brad Rosenheim, Bob Zook, John Winans, Tim Campbell, Martyn Tranter, Joel Barker, Christina Davis, Molly Patterson, Joel Barker, Chris Gardner, Al Gagnon, Ryan Venturelli , John Priscu

**SALSA Science Personnel in McMurdo (1):** Cindy Dean

**SALSA Drillers at SLM (7):** Dar Gibson, Graham Roberts, Jonas Kalin, Justin Burnette, Dennis Dueling, Ed Krula, Anatoly Mironov

### **Science Update:**

General: Last night was very windy and we had to replace one of the mountain tents, re-secure all other mountain tents, and remove drifting snow. Weather was much better today, and we were able to accomplish many tasks. Support from ASC was excellent, and they dug us a very nice snow freezer behind out chemistry lab.

#### Drilling ops:

- Fuel issues on hot water heaters were resolved and the drillers have worked through the electrical issues that were present a few days ago. Three solenoid's and a starter have been purchased from a company in New Zealand and, once on site, will either act as backups or be installed on the system.
- 5 out of 6 heating units are now operating. High pressure tests on the system were good.
- The superstructure (WISSOMATIC) for the drilling hose and sampling blocks was installed on the LARS deck today and the keyhole will be drilled tonight to a depth of ~160m.
- Water was collected from the snow melting system and was tested by three dimensional fluorescence measurements to ensure that the propylene glycol used to melt the snow was not contaminating the melt water that will be used to initiate drilling. No contamination was found.
- All tanks are now full of snowmelt that will be used to initiate the drilling
- Overall, a very productive day for the drillers!

#### Science Ops:

- The final setup on the laboratories was completed and analytical equipment was calibrated.
- A 1 m deep snow pit was dug in an upwind area about 500 m from camp and samples for microbiology and geochemistry were collected from distinct horizons in the ice to provide background data for our ice cores and lake water samples. Surface snow samples were also collected from within the perimeter of the SALSA camp to determine the extent to which our camp may be impacting the environment.
- The sediment gravity coring system was removed from its crate and deployment was discussed with the marine techs.
- The MTs and scientists conducted a test run of the multi-coring system.

- The WHOI winch that will be used to deploy the coring systems was unpacked and testing documented that it is working well and that the metering block is well calibrated.
- A 10 m deep x 0.5 m diameter sediment corer assembly hole was completed beneath the LARS deck.
- The winch system for the Deep SCINI ROV was assembled and initial tests were successful.
- The SCINI clump weight was assembled
- All SCINI remote controls and microphones tests were successful.
- The SCINI command and control center was set-up.
- The current meter was calibrated to the magnetic pole.

Outreach update:

- More SALSA stickers and patches were passed to support staff
- Footage was obtained on camp set-up and daily operations
- Initial deployment of the drill for keyhole drilling be filmed
- Plans are being made for the first drone flight

## **SALSA SCIENCE REPORT: 22 December 2018. Compiled by John Priscu**

**SALSA Science Personnel at SLM (23 total):** Brent Christner, Tristy Vick-Majors, Alex Michaud, Mark Skidmore, Amy Leventer, John Dore, David Harwood, Kathy Kasic, Billy Collins, Wei Li, Brad Rosenheim, Bob Zook, John Winans, Tim Campbell, Martyn Tranter, Joel Barker, Christina Davis, Molly Patterson, Joel Barker, Chris Gardner, Al Gagnon, Ryan Venturelli, John Priscu

**SALSA Science Personnel in McMurdo (1):** Cindy Dean

**SALSA Drillers at SLM (7):** Dar Gibson, Graham Roberts, Jonas Kalin, Justin Burnette, Dennis Duling, Ed Krula, Anatoly Mironov

### Drilling ops:

- Most of the issues related to extended storage and the traverse are now out of the hot water drilling system and all heating units are operational.
- Three heaters were used through the night and into today to drill a keyhole to 167 m at a drilling rate of 0.4 m/min. The drill water at the pump was ~1000 psi, the water temperature was 65 C, and the flow rate was 18 gal/min.
- The return pump was placed into the bottom of the keyhole and hot water is running into the hole to ensure that the return pump and hose do not freeze into the sidewall.
- Drilling of the main borehole, which will be located ~ 1 m from the keyhole, is scheduled to start tonight. The drill will be held in place for several hours once the drill head reaches 167 m and the flow rate increased to allow the main borehole to join the bottom of the keyhole. Once these holes join, drilling will begin operating on borehole meltwater rather than snowmelt supplied from the surface.
- All camp personnel pitched in to help shovel snow to melt for the keyhole drilling operations.
- Overall, another very productive day for the drillers!

### Science Ops:

- All laboratories are now set up and analytical equipment successfully tested.
- Snow pit analysis that will provide us with background geomicrobiological conditions in the ice revealed a distinct refrozen meltwater layer 37 cm below the surface. Fluorescence characterization of dissolved organic carbon (DOC) showed that DOC was distinctly different than the snow above and below this layer. A second snow pit was dug today to ~2 m to further characterize organic matter and geochemistry.
- Gravity corer and multi-corer tubes were cleaned and are now ready to deploy.
- Final tests were made on the McCartney Mash 4k winch and it is now ready to deploy the deep gravity core. Marine techs lifted the gravity core into place on the LARS deck and have a final plan on how the crane will be used to deploy the gravity core.
- The clump weight and its cameras, which will be used to examine the integrity of the borehole, determine water column depth and examine the texture of surficial sediments, were successfully tested.
- The SCINI ROV was unpacked and is now being configured for deployment.

Education and Outreach:

- Footage was obtained through the night to document drilling of the keyhole.
- A drone flight occurred last night to document drilling and camp set-up and operations.
- The E&O Mobius action camera was integrated with the clump weight.
- 360° video and sound was obtained from tent city.

## **SALSA SCIENCE REPORT: 23 December 2018. Compiled by John Priscu**

**SALSA Science Personnel at SLM (24 total):** Brent Christner, Tristy Vick-Majors, Alex Michaud, Mark Skidmore, Amy Leventer, John Dore, David Harwood, Kathy Kasic, Billy Collins, Wei Li, Brad Rosenheim, Bob Zook, John Winans, Tim Campbell, Martyn Tranter, Joel Barker, Christina Davis, Molly Patterson, Joel Barker, Chris Gardner, Al Gagnon, Ryan Venturelli, Cindy Dean, John Priscu

**SALSA Science Personnel in McMurdo (0):**

**SALSA Drillers at SLM (7):** Dar Gibson, Graham Roberts, Jonas Kalin, Justin Burnette, Dennis Duling, Ed Krula, Anatoly Mironov

General: A Basler arrived around 1400 h local NZ time with the rest of our cargo, Cindy Dean and the camp PA. Rebecca Ricards, the SALSA science coordinator, was also onboard and returned to McMurdo on the same aircraft.

### Drilling ops:

- The water return pump located at the bottom of the keyhole did not power up. The night crew worked through their shift and found a loose wire, which they repaired. Following the repair, the return pump was returned to the keyhole and tested—all OK.
- The UV collar around the main borehole was tested—all OK.
- The drill was moved to the main borehole with the assistance of the Marine Techs and sprayed with 3% hydrogen peroxide to decontaminate the drill head. UV lamps on the collar were turned on to decontaminate the drilling hose and **drilling began at 1745 h local NZ time.**
- All camp personnel pitched in to help shovel snow to melt for the initial drilling operations.

### Science Ops:

- Snow pit temperature profiles were made, and selected samples were processed in the Chemistry Laboratory.
- Cargo that arrived on the Basler was staged in the appropriate laboratories.
- The borehole kit that will measure background geomicrobiology was prepared; samples will be collected at 300, 600 and 900 m in the borehole to ensure that it is “clean”.
- The Deep SCINI winch was prepared and is ready to mount to the top of the LARS deck.
- Clump weight software was configured.
- Aluminum I-beam that will hold the block for the gravity corer was installed.

### Education and Outreach:

- The deployment of the main drill was documented by surface and drone footage.
- Snow melting operations were filmed in detail.

## **SALSA SCIENCE REPORT: 25 December 2018. Compiled by John Priscu**

**SALSA Science Personnel at SLM (24 total):** Brent Christner, Tristy Vick-Majors, Alex Michaud, Mark Skidmore, Amy Leventer, John Dore, David Harwood, Kathy Kasic, Billy Collins, Wei Li, Brad Rosenheim, Bob Zook, John Winans, Tim Campbell, Martyn Tranter, Joel Barker, Christina Davis, Molly Patterson, Joel Barker, Chris Gardner, Al Gagnon, Ryan Venturelli, Cindy Dean, John Priscu

**SALSA Science Personnel in McMurdo (0):**

**SALSA Drillers at SLM (7):** Dar Gibson, Graham Roberts, Jonas Kalin, Justin Burnette, Dennis Duling, Ed Krula, Anatoly Mironov

### Drilling ops:

- Since Drilling began on 23 December at 1745 h local NZ time. Since starting the borehole, most of the focus has been on keeping the drill balanced and heading toward the lake at 0.25 m/min and 30 gal/min flow rate.
- Now that the main borehole has joined the keyhole, all drilling water is coming from the borehole so no more snow melting at the surface.
- Drill depth ~300m at 1930 h (NZ) on 24 December and ~500 m at 0800 h (NZ) on 25 December.
- 0.2 um filter on the clean access module is building pressure behind it. Plan to replace it today and continue drilling.
- Starting to pump down main borehole in preparation for breakthrough.
- Installed load cell readout on the LARS deck.

### Science Ops:

- Snow pit samples are continuing to be processed in the Chemistry Laboratory for nitrate, cell density, conductivity, ATP. Other samples frozen for analysis in Crary.
- Will collect and freeze the 0.2 um filter from the clean access module for geology and biological analysis.
- Collected a background (clean access) borehole sample at 300 m last night and plan another for 600 m later today. These samples are being analyzed for cell density, ATP, geochemistry, DNA.
- The Deep SCINI winch was mounted on the LARS deck last night.
- All hands meeting scheduled for 26 December to start putting names on the 24 h ops science schedule.

### Education and Outreach:

- Filmed camp life, drilling ops and science ops.

## **SALSA SCIENCE REPORT: 27 December 2018. Compiled by John Priscu**

**SALSA Science Personnel at SLM (24 total):** Brent Christner, Tristy Vick-Majors, Alex Michaud, Mark Skidmore, Amy Leventer, John Dore, David Harwood, Kathy Kasic, Billy Collins, Wei Li, Brad Rosenheim, Bob Zook, John Winans, Tim Campbell, Martyn Tranter, Joel Barker, Christina Davis, Molly Patterson, Joel Barker, Chris Gardner, Al Gagnon, Ryan Venturelli, Cindy Dean, John Priscu

**SALSA Science Personnel in McMurdo (0):**

**SALSA Drillers at SLM (7):** Dar Gibson, Graham Roberts, Jonas Kalin, Justin Burnette, Dennis Duling, Ed Krula, Anatoly Mironov

### Drilling ops:

- The drill head pressure increased at 9:40 PM on 26 December. Drillers said there was ~14 m water rise in the borehole indicating breakthrough.
- Upward reaming started immediately after breakthrough at 1 m/min below 600m and 0.8 m/min above 600m. Should take about 18 hours to complete reaming. Sampling should start the night of 27 December.
- Water hose came off on low pressure water feed tank at 5 AM on 27 December, causing about a 1 hour delay in reaming.

### Science Ops:

- All hands meeting on 26 December discussed the schedule for 24 h ops science schedule.
- Final preparations for clump weight and cameras made.

### Education and Outreach:

- Filmed “breakthrough” computer screens and deck ops.

## **SALSA SCIENCE REPORT: 28 December 2018. Compiled by John Priscu**

**SALSA Science Personnel at SLM (28 total):** Brent Christner, Tristy Vick-Majors, Alex Michaud, Mark Skidmore, Amy Leventer, John Dore, David Harwood, Kathy Kasic, Billy Collins, Wei Li, Brad Rosenheim, Bob Zook, John Winans, Tim Campbell, Martyn Tranter, Joel Barker, Christina Davis, Molly Patterson, Joel Barker, Chris Gardner, Al Gagnon, Ryan Venturelli, Cindy Dean, Matt Siegfried, Meghan Seifert, Kerry Key, Chloe Gustafson, John Priscu

### **SALSA Science Personnel in McMurdo (0):**

**SALSA Drillers at SLM (7):** Dar Gibson, Graham Roberts, Jonas Kalin, Justin Burnette, Dennis Duling, Ed Krula, Anatoly Mironov

General: SALSA surface geophysics team arrived on the evening of 27 December from their GPS and EM work.

### Drilling ops:

- Upward reaming completed early in the morning.

### Science Ops:

- Clump weight camera deployed at 0830 NZ time. Cameras showed a turbidity increase around 710 m and a very turbid water column (viz = 0). Apparent accretion ice (clear-large crystals) near bottom of ice sheet with a lot of sediment. Whiskers on clump weight showed a tight upper 15 m and a tight air water interface. Had trouble pulling the clump weight into the borehole. Based on tether marking on clump weight winch the bottom of the lake is 1100 from top of the ice; the ice  $z = 1086$  m, lake depth ~ 13-14 m. Note that the clump weight has up to 2% stretch.
- CTD cast 1 using wire winch. Encoder on block showed lake depth of 1084m, lake depth of 15m and water head level of ~101m. No obvious vertical stratification. We picked a borehole cast depth of 961 m and a lake water depth of 7.5 m for sampling.
- Niskin #1 with cage. Could not get down through ice water interface so collected borehole sample at 962m below snow surface.
- Niskin #2 with no cage. Collected sample 7.5m from bottom (center of the 15m deep water column). Still had a hard time getting the bottle into the borehole on upcast, despite no cage.

### Education and Outreach:

- Filmed deck ops.

## **SALSA SCIENCE REPORT: 30 December 2018. Compiled by John Priscu**

**SALSA Science Personnel at SLM (28 total):** Brent Christner, Tristy Vick-Majors, Alex Michaud, Mark Skidmore, Amy Leventer, John Dore, David Harwood, Kathy Kasic, Billy Collins, Wei Li, Brad Rosenheim, Bob Zook, John Winans, Tim Campbell, Martyn Tranter, Joel Barker, Christina Davis, Molly Patterson, Joel Barker, Chris Gardner, Al Gagnon, Ryan Venturelli, Cindy Dean, Matt Siegfried, Meghan Seifert Kerry Key, Chloe Gustafson, John Priscu

### **SALSA Science Personnel in McMurdo (0):**

**SALSA Drillers at SLM (7):** Dar Gibson, Graham Roberts, Jonas Kalin, Justin Burnette, Dennis Duling, Ed Krula, Anatoly Mironov

Drilling Ops: Hard ream of borehole on 29 December.

### Science Ops:

- CTD deployed with Kasic camera ~ 0300 h (NZ)
- Niskin cast #3-no cage. Hard to get back into borehole because it caught on ice. Eventually got it out.
- Niskin cast #4-no cage.
- WTS-LV cast #1
- WTS-LV #2 with Niskin (cast #5) attached above it.
- Multicorer #1 started at 2300 h (NZ)—Three full core tubes!

### Education and Outreach:

- Filmed deck ops.

**SALSA SCIENCE REPORT: 31 December 2018. Compiled by John Priscu**

**SALSA Science Personnel at SLM (28 total):** Brent Christner, Tristy Vick-Majors, Alex Michaud, Mark Skidmore, Amy Leventer, John Dore, David Harwood, Kathy Kasic, Billy Collins, Wei Li, Brad Rosenheim, Bob Zook, John Winans, Tim Campbell, Martyn Tranter, Joel Barker, Christina Davis, Molly Patterson, Joel Barker, Chris Gardner, Al Gagnon, Ryan Venturelli, Cindy Dean, Matt Siegfried, Meghan Seifert Kerry Key, Chloe Gustafson, John Priscu

**SALSA Science Personnel in McMurdo (0):**

**SALSA Drillers at SLM (7):** Dar Gibson, Graham Roberts, Jonas Kalin, Justin Burnette, Dennis Duling, Ed Krula, Anatoly Mironov

Drilling Ops: Hard ream of borehole on 29 December.

Science Ops:

- CTD deployed with Kasic camera ~ 0300 h (NZ)
- Niskin cast #3-no cage. Hard to get back into borehole because it caught on ice. Eventually got it out.
- Niskin cast #4-no cage.
- WTS-LV cast #1
- WTS-LV #2 with Niskin (cast #5) attached above it.
- Multicorer #1 started at 2300 h (NZ)—Three full core tubes!

Education and Outreach:

- Filmed deck ops.

## **SALSA SCIENCE REPORT: 1 January 2019. Compiled by John Priscu**

**SALSA Science Personnel at SLM (28 total):** Brent Christner, Tristy Vick-Majors, Alex Michaud, Mark Skidmore, Amy Leventer, John Dore, David Harwood, Kathy Kasic, Billy Collins, Wei Li, Brad Rosenheim, Bob Zook, John Winans, Tim Campbell, Martyn Tranter, Joel Barker, Christina Davis, Molly Patterson, Joel Barker, Chris Gardner, Al Gagnon, Ryan Venturelli, Cindy Dean, Matt Siegfried, Meghan Seifert, Kerry Key, Chloe Gustafson, John Priscu

### **SALSA Science Personnel in McMurdo (0):**

**SALSA Drillers at SLM (7):** Dar Gibson, Graham Roberts, Jonas Kalin, Justin Burnette, Dennis Duling, Ed Krula, Anatoly Mironov

#### Drilling Ops:

- Nothing in borehole
- Continued setting up ice corer
- Attempted to pull return pump up borehole yesterday but iced in.
- Drillers added hot water to the air-water interface to melt ice

#### Science Ops:

- Clump weight deployed with and without whiskers. Good footage of basal sediments and bottom. Air-water interface frozen over—had to break through it with clump weight. Noted that the wire on the return pump was in the borehole—must be the result of the attempt to pull the return pump out of the hole.
- Science ops stopped until melting.

#### Education and Outreach:

- Filmed deck ops.

## **SALSA SCIENCE REPORT 2 January 2019. Compiled by John Priscu**

**SALSA Science Personnel at SLM (28 total):** Brent Christner, Tristy Vick-Majors, Alex Michaud, Mark Skidmore, Amy Leventer, John Dore, David Harwood, Kathy Kasic, Billy Collins, Wei Li, Brad Rosenheim, Bob Zook, John Winans, Tim Campbell, Martyn Tranter, Joel Barker, Christina Davis, Molly Patterson, Joel Barker, Chris Gardner, Al Gagnon, Ryan Venturelli, Cindy Dean, Matt Siegfried, Meghan Seifert Kerry Key, Chloe Gustafson, John Priscu

**SALSA Science Personnel in McMurdo (0):**

**SALSA Drillers at SLM (7):** Dar Gibson, Graham Roberts, Jonas Kalin, Justin Burnette, Dennis Duling, Ed Krula, Anatoly Mironov

### Drilling Ops:

- Continued setting up ice corer. It was damaged in transit. D. Duling spent ~20 h attempting to repair it with no luck. It was decided to abandon the ice coring effort.
- The electrical cable on the return winch bulged into the borehole when the return pump was lifted

### Science Ops:

- Borehole had iced over at the air water interface and had to be melted around 1 AM.
- McLane multicorer deployed with 10L Niskin (#6) on top. All successful.
- Set up superstructure on LARS for another gravity core. First Gravity core started on 1 January took about 0.7m core. Second gravity core on 2 January obtained 1.7 m.
- Water column and sediment trap samples are being processed.
- Reset the superstructure for Deep SCINI winch. SCINI Dive initiated.

### Education and Outreach:

- Filmed deck ops.

**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 Mercer. We were able to address all of our science goals for the season. The data and samples collected have provided us with another 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 SALSA field season would not have been possible without the expertise and dedication of the SALSA traverse team who hauled our fuel, drill, labs and camp facilities more than 700 miles to the SALSA camp site, 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 three 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, SALSA 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.**

## **SALSA SCIENCE REPORT 3 January 2019. Compiled by John Priscu**

**SALSA Science Personnel at SLM (28 total):** Brent Christner, Tristy Vick-Majors, Alex Michaud, Mark Skidmore, Amy Leventer, John Dore, David Harwood, Kathy Kasic, Billy Collins, Wei Li, Brad Rosenheim, Bob Zook, John Winans, Tim Campbell, Martyn Tranter, Joel Barker, Christina Davis, Molly Patterson, Joel Barker, Chris Gardner, Al Gagnon, Ryan Venturelli, Cindy Dean, Matt Siegfried, Meghan Seifert, Kerry Key, Chloe Gustafson, John Priscu

### **SALSA Science Personnel in McMurdo (0):**

**SALSA Drillers at SLM (6):** Dar Gibson, Graham Roberts, Jonas Kalin, Justin Burnette, Dennis Duling, Anatoly Mironov

#### Drilling Ops:

- Following Deep SCINI dive the drillers put heat into the return pump hole to melt out the return pump. They then reamed the main borehole to set up for one more round of sampling
- Ed Krula redeployed to McMurdo

#### Science Ops:

- Deep SCINI finished its dive at ~ 2 AM (local NZ)
- Water column and sediment samples were processed
- Borehole logs compiled

#### Education and Outreach:

- Scientists interviewed Kathy Kasic
- Dave Harwood interviewed

## **SALSA SCIENCE REPORT 6 January 2019. Compiled by John Priscu**

**SALSA Science Personnel at SLM (24 total):** Brent Christner, Tristy Vick-Majors, Alex Michaud, Mark Skidmore, Amy Leventer, John Dore, Kathy Kasic, Billy Collins, Wei Li, Brad Rosenheim, Bob Zook, John Winans, Tim Campbell, Martyn Tranter, Joel Barker, Molly Patterson, Joel Barker, Chris Gardner, Al Gagnon, Ryan Venturelli, Cindy Dean, Matt Siegfried, Chloe Gustafson, John Priscu

**SALSA Science Personnel in McMurdo (2):** Christina Davis, David Harwood, Kerry Key, Meghan Siefert

**SALSA Drillers at SLM (6):** Dar Gibson, Graham Roberts, Jonas Kalin, Justin Burnette, Dennis Duling, Anatoly Mironov

### Drilling Ops:

- Following the light ream, the drill team began to melt out return pump. They got the pump out on 4-5 January.
- The air-water interface in the borehole was freezing up, making sampling impossible. Drillers added hot water to this area (~100m) to remove the ice.

### Science Ops:

- Following an all hands meeting on 2 January, it was decided to collect more data: Niskin, McLane filtration system, multicorer, gravity corer, current meter profile with aquadopp (with Kasic camera attached), deep SCINI dive, sensor string down hole.
- The Niskin and filtration system were deployed without issues. The multicorer may have been compromised by ice at the air-water interface but did bring up 4 cores. The gravity core came up with ice in the barrel and no sediment.
- We decided to eliminate the deep SCINI deployment and just deploy the sensor string. Drillers removed the UV collar, melted the borehole at the air-water interface and the sensor string was deployed on 5 January.

### Education and Outreach:

- Deck ops filmed