

PALMER STATION MONTHLY SCIENCE REPORT

JANUARY 2014



The B-018-P sampling team has an unexpected visitor hop into their zodiac while sampling at Station B.
(Image Credit: Joanne Feldman)

NEWS FROM THE LAB

By Dr. William Fraser, Station Science Leader

January 2014 began with sea ice conditions not observed in the area since 1986. Although the *ARSV Laurence M. Gould* (LMG) was able to dock at Palmer Station to exchange personnel and cargo in preparation for the annual LTER cruise, science groups remaining on station were for the most part unable to pursue their field plans because of the sea ice until nearly mid-month when gale-force winds finally dissipated it. Since then, it has remained dry and remarkably calm, thus giving researchers the opportunity to move ahead with their field work.

Palmer Station is currently hosting seven science groups, B-005-P (Kohut/Fraser/ Bernard), B-013-P (Fraser), B-018-P (Bench), B-019-P (Schofield), B-045-P (Ducklow), B-068-P (Saba/Seibel) and O-176-P (Corbett/Null). As we approach the end of the month, it appears all science groups are on track to meet their major objectives for the period. Despite challenges posed by the ice, B-018-P, B-019-P and, B-045-P were nevertheless able to sample the full dynamics of one of the most intense regional blooms in LTER history. B-005 and B-013 scouted and located the two needed sites on the Joubin and Wauwermans Islands that will be key to next

season's deployment of the CODAR array that will be used to study high resolution, small-scale interactions between the local oceanography and top predators. O-176 was able to capitalize on the calm weather towards the end of the month and sample through four full tidal cycles for their experiments, two more cycles than they anticipated. B-068 benefited greatly from the large amount of krill the LMG collected at the beginning of January for their project, and were able to complete multiple experiments testing the effects of enhanced carbon dioxide (CO₂) and temperature on Antarctic krill physiology, growth, and feeding. A most notable result is that Antarctic krill seem to *overcompensate* to high CO₂ conditions by increasing blood bicarbonate production and thus *increasing* blood pH compared to krill in ambient conditions. All investigators have commented that support from ASC personnel has been outstanding, and have acknowledged the progress made this month under these difficult ice conditions would not have been possible without their generous commitment to the science projects.

JANUARY 2014 WEATHER

By Glenn Grant, Research Associate

Mild weather prevailed throughout January. Minor low pressure systems moved through regularly, but only one, in mid-month, brought any significant precipitation and wind. The high temperature for the month was 7.5 C (46 F) on the 13th, the same day as the month's highest winds. The low temperature was -2.1 C (28 F), and the average was 1.3 C (34 F), a full degree below the 24-year average of 2.3 C (36 F). The maximum wind gust was 48 knots. The average wind speed was 6 knots, lower than the historical average of 7.5 knots.

It was a dry month, with melted precipitation totaling 25.9 mm, roughly half the January average of 56.2 mm. Precipitation mostly fell as snow, although it generally didn't stick; measured snowfall totaled 19 cm. The maximum accumulated snow stake depth was 8 cm, which all melted off that same day (15th).

Sea ice, lurking far offshore at the beginning of the month, was observed for 6 days when west winds pushed it ashore. Brash ice (of land origin, as opposed to frozen sea water), bergy bits and small ice bergs were observed during the rest of the month. Sea water temperatures hovered around 1 C, reaching a maximum of 1.7 C near the end of the month.

B-005-P: COLLABORATIVE RESEARCH: IMPACTS OF LOCAL OCEANOGRAPHIC PROCESSES ON ADÉLIE PENGUIN FORAGING ECOLOGY

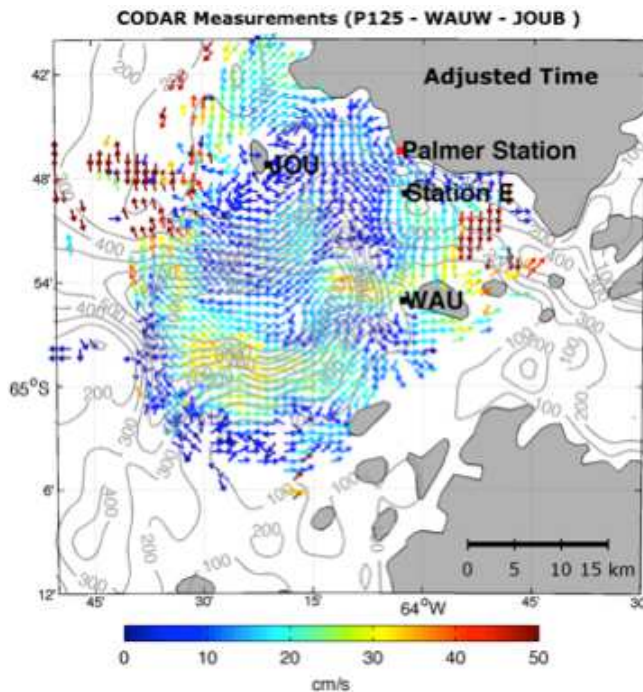
Dr. Josh Kohut, Principal Investigator, Rutgers University, Institute for Marine and Coastal Sciences; Dr. William R. Fraser, Co-PI, Polar Oceans Research Group; Dr. Kim Bernard, Co-PI, Oregon State University; Dr. Peter Winsor, Co-PI, University of Alaska, Fairbanks; Dr. Matthew Oliver, Co-PI, University of Delaware

Personnel on station: Kim Bernard, Josh Kohut, and Hank Statscewich



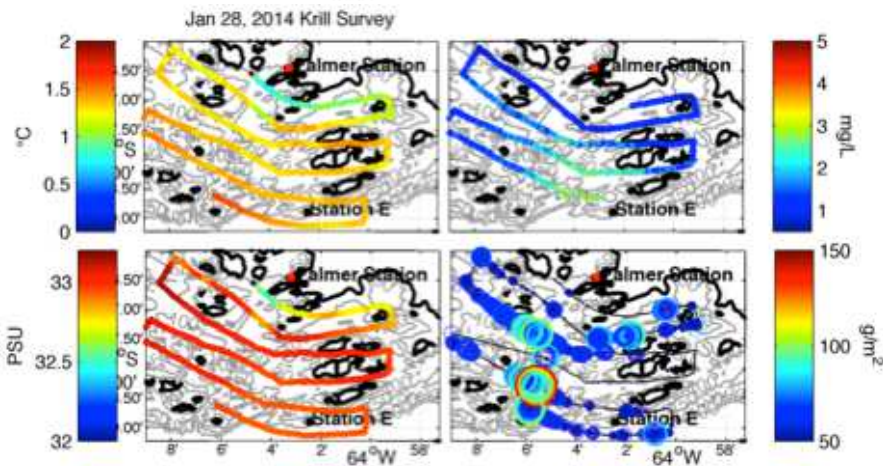
January 2014 was the beginning of the field effort for project CONVERGE. This month we focused on two main components, the HF radar (CODAR) network and the zodiac based krill surveys. The CODAR work during this pilot year took place on Palmer Station as well as two outer island locations in the Joubin and Wauwermans Island groups. At Palmer Station we successfully setup and ran two different systems (one at 25 MHz and the second at 13 MHz) at two locations (one near the VHF hut

off Terra Lab and another on Gamage Point). Each system ran at each location for over 10 days. Data coverage was between 30 and 60 km from Palmer station with a resolution of 0.5 to 1 km. These initial results indicate that the Palmer Station site will cover Palmer Deep over varying wind, wave, and ice conditions without interfering with station communications. In addition to our Palmer Station work we took two one-day trips to the Joubin and Wauwermans Islands. During each trip we identified suitable locations for the full installations next season. Both island sites have multiple landing areas and are excellent locations to house the remote power unit and CODAR equipment. While on location we were able to survey the sites, verify line-of-site communications with Palmer, and quickly setup a CODAR unit running off a generator for about 2 hours. These data when combined with the data collected at Palmer allowed us to produce our first total vector maps. The surface current map below shows the coverage we expect next season when all three sites will be up and running. Each vector indicates the speed and direction of the ocean current at that location. Please note that this is more a representation of coverage rather than the synoptic current map since the data from all three sites was not collected at the same time. We would like to thank all station staff for their support of our project. Specifically we would like to acknowledge the efforts of Cara Ferrier (for helping ensure we had all the equipment and additional supplies to carry out our work in a relatively short period of time), Chuck Kimball (for his advice and guidance in our site selection and setup and help on our outer island trips), Dave Moore (zodiac support), and the Fraser Birder group (for their safe escort to the outer island groups and helping with the equipment off and on load). We would also like to thank the LTER science team and LMG crew for accommodating our Joubin and Wauwermans survey from the LMG into their busy cruise schedule. Captain Joe safely navigated us close enough to both sites confirming that they could be supported from the LMG during next season's deployment.



During January we were also able to conduct three acoustic surveys for Antarctic krill within the nearshore Palmer Station safe boating limit (two during diurnal tides and one during a semi-diurnal tide). In addition to the DT-X echo sounder, we have added a Microcat CTD and C3 fluorometer to our onboard sensors, providing surface measurements of temperature, salinity and chlorophyll-*a* (logged at 10 second intervals). Data collected during our third survey is shown below (upper left panel = surface temperature; lower left panel = surface salinity; upper right panel = surface chl-*a*; and lower right panel = depth integrated krill biomass). Observations of foraging predators (including penguins, seals and whales) within 50m of the zodiac

are also recorded during the surveys. We would like to acknowledge the support of the following people: Carolyn Lipke and Mark Dalberth (for having the echo sounder calibrated prior to our arrival), Dave Moore (for getting our group Boating II certified before we'd even moved off the ship), and Steve Navarro and Dave Ensworth (for constructing the platform on



which the Microcat and C3 are attached).

Finally we successfully completed a video teleconference that connected 490 viewers from 10 different countries to our project through the Cornell Ornithology Lab. We would like to thank the incredible effort of Jeff Otten who supported the technical aspects of the call.

B-013-P: PALMER LONG TERM ECOLOGICAL RESEARCH (LTER): LOOKING BACK IN TIME THROUGH MARINE ECOSYSTEM SPACE, APEX PREDATOR COMPONENT

Dr. William R. Fraser, Principal Investigator, Polar Oceans Research Group, Sheridan, MT

Personnel on station: Bill Fraser, Shawn Farry, Ben Cook, Carrie McAtee, Madison McConnell, Brett Pickering

The arrival of Bill Fraser and Brett Pickering on the *ARSV Laurence M. Gould* on January 5th briefly increased B-013 personnel at Palmer Station to six people. However, on January 8th Brett Pickering and Carrie McAtee departed on the annual LTER cruise leaving four birders at Palmer Station for the remainder of January.

Ice and weather conditions improved in January with only 6 weather days allowing 25 days of much needed boating field work. Monitoring of Adélie, gentoo and chinstrap penguin breeding chronology continued as we continued indicator counts and completed an all-colony chick census on local islands as well as on Dream and Biscoe Islands. Adélie chick measurements occurred in conjunction with our LTER cruise team's measurements on Avian Island. Foraging ecology studies of Adélie and gentoo penguins continued this month with the deployment of presence/absence radio transmitters, satellite transmitters, and dive depth recorders. We also began diet sampling Adélie penguins on Torgersen Island.

Skua work continued this month documenting hatches and monitoring chick growth of brown skuas on local islands as well as on Dream and Biscoe Islands. Similar south polar skua nest monitoring as well as sample collections continue on Shortcut Island. Monitoring of the blue-eyed shag colony on Cormorant Island also continued. The start of our all-island giant petrel census was delayed in December due to ice however was near completion by the end of January. Our annual Humble Island giant petrel study also began this month with documentation of petrel hatch dates and the close monitoring of chick growth that will continue through the end of the season.

B-013 conducted its first trip of the season to the Joubin Islands on Jan 1st to census penguins and giant petrels. On Jan 17th we returned to the Joubins with B-005 to assist with CODAR site location and testing. On Jan 21st we again accompanied B-005 to the Wauerman Islands to assist with CODAR site location and testing.

Monitoring of marine mammals continued with large numbers of crab eater seals and humpback whales observed in late January. Lab work continued this month dominated by penguin diet sample processing.

B-018-P: MOLECULAR ASSESSMENT OF PHYTOPLANKTON COMMUNITY DYNAMICS AND METABOLISM IN THE WEST ANTARCTIC PENINSULA

Dr. Shellie Bench, Principal Investigator, Stanford University, CA

Personnel on station: Shellie Bench (PI and Post-Doctoral Research Fellow)

In the beginning of the month I spent a couple of days packing up supplies and setting them up the laboratories onboard the LM Gould for the two groups (B-019 and B-045) that will be processing samples for my project during the annual LTER cruise.

After the ice moved out in late December, it stayed out for most of the month (aside from a brief return in the second week of January), which enabled us to sample regularly. We were able to collect samples twice per week, along with the LTER groups (B-019-P, and B-045-P). The exception was the second week of the month when weather and ice prevented boating, so we sampled from the sea-water intake (SWI) system once that week. I also assisted with some of the glider activity (one deployment, and one recovery) of the B-019-P group. I collected water in the vicinity of Outcast Island, near the glider deployment because the sea water was so green, it was clear there was high phytoplankton biomass. The high phytoplankton abundance that began in late December, increased into the first part of January, and started decreasing in mid-January probably represented the major summer phytoplankton bloom.

Overall, I collected and processed 8 samples during the month, 7 water column samples (all from station B, except the one taken near Outcast Island), plus one SWI sample. I carried out my standard processing of each sample including filtering replicates for RNA and DNA, as well as preparation of samples for microscopy and flow cytometry.

Joanne Feldman (ASC support staff) has generously continued to support my sampling by acting as a second qualified zodiac driver as well as helping during water collection and loading and unloading supplies. A highlight of our sampling time for the month was when we were lucky enough to be joined by a penguin that jumped into our boat. The penguin was a bit confused by the situation but quickly figured out how to make an exit over the side of the boat back into the water.

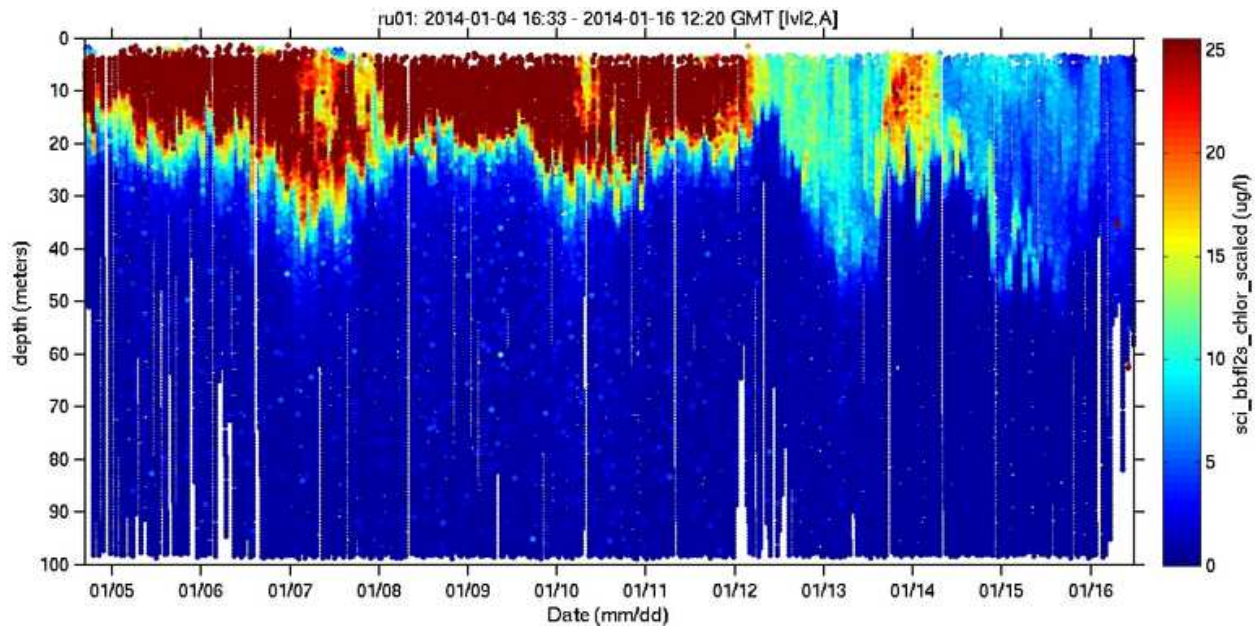
B-019-P: PALMER LONG TERM ECOLOGICAL RESEARCH (LTER): LOOKING BACK IN TIME THROUGH MARINE ECOSYSTEM SPACE, PHYTOPLANKTON COMPONENT

Dr. Oscar Schofield, Principal Investigator, Rutgers University, Institute for Marine and Coastal Sciences

Personnel on station: Christina Haskins and Austin Melillo

During the month of January we were able to start regularly sampling Stations B & E as part of the LTER time series. With the disappearance of the sea ice we saw quick changes in the water column as the spring phytoplankton bloom started. Sea ice imagery of the Anvers Island area was clear so we began prepping for glider deployments. On January 4th we deployed our first glider of the season. For the first time in the Antarctic we are flying a double payload glider equipped with standard optical pucks as well as a FIRE sensor. We were able to sample not only phytoplankton abundance but also phytoplankton physiology. We had two successful runs in the

month of January with the first run capturing the end of the spring bloom (see image below). On both of these missions we focused our sampling in the Palmer Deep flying in and out of the historic penguin foraging zones. We have one more run slated for the season, which will happen after LMG14-01 heads north.



B-045-P: PALMER, ANTARCTICA LONG-TERM ECOLOGICAL RESEARCH (LTER) STUDY, MICROBIAL / BIOGEOCHEMICAL COMPONENT

Dr. Hugh Ducklow, Principal Investigator, Lamont-Doherty Earth Observatory, Columbia University, New York, NY

Personnel on station: Fiona Jevon and Sebastian Vivancos

On January 5th the *ARSV Laurence M. Gould* (LMG) arrived at Palmer Station. Jamie Collins departed to participate in the LTER cruise, and Fiona Jevon joined Sebastian Vivancos to continue our sampling efforts. The first two weeks of January were dominated by sea ice and high winds, which prevented us from sampling stations B or E until January 16th. In the meantime, Fiona learned the methods and protocols as we continued our sampling the Station's seawater intake.

Once the ice retreated and the weather cleared, we were able to complete two successful sampling weeks at Stations B and E. We continue to collect additional water to filter for DNA analysis at 10m depth at station B each week, and collect water at both stations for $\delta^{18}\text{O}$ analysis by Dr. Mike Meredith of the British Antarctic Survey. We have also continued sampling the seawater intake each week, and filtering that water for DNA analysis.

Preliminary analysis of results indicates that enhanced bacterial production rates accompanied and followed a phytoplankton bloom triggered by the late ice retreat. These observations parallel the pattern observed by the LTER group aboard LMG, seen over the larger LTER sampling region extending south into Marguerite Bay during the past month.

In addition to our LTER work, we deployed soil temperature loggers in the backyard for Natasja van Gestel of Northern Arizona University. These loggers record hourly soil temperature data at various distances from the glacier's edge. We will retrieve the loggers at the end of March to obtain the data, and then redeploy them for the winter.

B-068-P: COLLABORATIVE RESEARCH: SYNERGISTIC EFFECTS OF ELEVATED CARBON DIOXIDE (CO₂) AND TEMPERATURE ON THE METABOLISM, GROWTH, AND REPRODUCTION OF ANTARCTIC KRILL (*Euphausia superba*)

Dr. Grace Saba, Principal Investigator, Rutgers University, Institute for Marine and Coastal Sciences; Dr. Brad Seibel, Co-PI, University of Rhode Island

Personnel on station: Abigail Bockus, Ryan Fantasia, Grace Saba, and Brad Seibel

The overall objective of our project is to determine the effects of enhanced carbon dioxide (CO₂) and temperature on the physiology, growth, and reproduction of Antarctic krill, *Euphausia superba*. We have proposed multiple experiments to investigate the responses of different life stages of krill to levels of CO₂ and temperatures predicted in the Southern Ocean in the year 2100. Saba, Seibel, and Fantasia arrived at Palmer Station on January 5, 2014 and met up with graduate student Abigail Bockus who had been at Palmer Station since mid-November. We quickly organized the troops and assembled small equipment (alkalinity titrator, pH electrodes, spectrophotometer) for sample analysis. The ARSV *Laurence M. Gould* (LMG) departed on Tuesday, January 7 for the annual LTER cruise. They began to tow for krill for our incubations on Thursday, January 9. They were unsuccessful in the Palmer Deep canyon region initially, likely because this season's biology was delayed by an anomalously high amount of sea ice. However, once they moved offshore, they were able to collect a healthy batch of sub-adult and juvenile krill and deliver it to Palmer Station later that evening. The krill were immediately placed into and maintained in the flow-through benchtop tanks in the aquarium room and small batches of krill were taken at a time for experiments.

Our first round of experiments began on Saturday, January 11. We conducted a 48-hour time-course experiment on sub-adult krill (about 40 mm in length) with 5 timepoints (0, 1 hour, 6 hour, 12 hour, 24 hour, 48 hour) to examine the change in krill blood pH as well as tissue pH, pCO₂, and lactate under ambient CO₂/pH, temperature (250ppm/8.2, 0°C); high CO₂/low pH, ambient temperature (850ppm/7.7, 0°C); and high CO₂/low pH, high temperature (850ppm/7.7, 3°C). We immediately analyzed the krill blood pH and carbonate chemistry parameters (salinity, pH, and total alkalinity). On January 18, we started an experiment to determine juvenile growth rates under the three treatments described above. This experiment will run for about 30 days, so we are still maintaining this experiment by checking for and processing molts every day, and doing water changes every two days to maintain pH and food concentrations in the experimental containers. During this time, we have conducted a 48-hour feeding/nutrient excretion experiment with juvenile krill under the three experimental treatments, and have repeated the 48-



Dr. Brad Seibel collecting blood from krill to measure blood pH.

hour time-course experiment two additional times with similar physiological responses. The LMG collected the second batch of krill for our second round of experiments on January 30. Saba and Seibel are departing Palmer on the LMG 14-01, while Bockus and Fantasia will continue incubation experiments until early March 2014.

O-176-P: SUBMARINE GROUNDWATER AND FRESHWATER INPUTS ALONG THE WESTERN ANTARCTIC PENINSULA

Dr. Reide Corbett, PI; Dr. Kimberly Null, Co-PI, Institute for Coastal Science and Policy, East Carolina University; Dr. Berry Lyons, Co-PI, Ohio State University

Personnel on station: Jared Crenshaw, Kimberly Null, Leigha Peterson, and Richard Peterson

We arrived on station January 5th excited to start our second field season at Palmer Station. The primary objective of this study is to quantify the freshwater discharge and the associated constituent loading to the nearshore coastal zone of Anvers Island. We have collected samples to measure a suite of tracers that identify glacial meltwater and groundwater discharge to the nearshore area. Tracers include radium ($^{223}, ^{224}, ^{226}, ^{228}\text{Ra}$), radon (^{222}Rn), and water isotopes (^{18}O and ^2H). In addition to tracers, we also collect samples to measure macronutrients and iron.

Based on last season's findings, we have focused our current study to three primary locations, Point 8, Arthur Harbor, and Hero Inlet (Figure 1). It is important to constrain the activities and concentrations of the end-members in our study area (glacier, groundwater, surface water nearshore) to complete the box model used to quantify discharge in the nearshore environment. Sea ice limited boating activities during our first week on station, but provided an opportune time to sample some of our terrestrial end-members, including glacier ice and melt streams in the Backyard of Palmer.

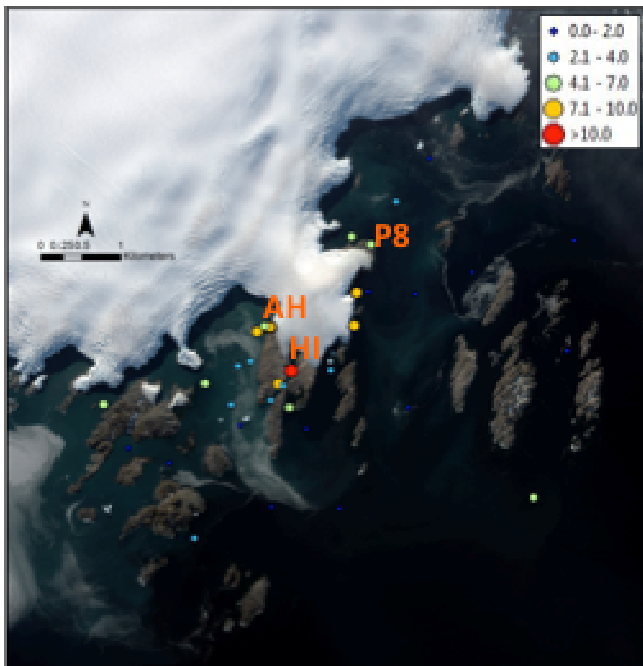


Figure 1. Satellite image from March 2013 of Anvers Island near Palmer Station. Circles represent ^{224}Ra activity in disintegrations per minute per cubic meter at all sites from last season. Primary sampling locations this season are labeled Arthur Harbor (AH), Point 8 (P8), and Hero Inlet (HI). (Georeferenced satellite image courtesy of the Polar Geospatial Center).

This first month at Palmer Station also included the completion of four 24-hr time-series sampling events at Point 8. These are intensive sampling campaigns in which we collect samples for all of the tracers and nutrients in the nearshore surface waters and in porewaters approximately every two hours. This involved setting up camp with all of our gear and staying out for the night (Figure 2). Each sampling campaign

occurred during a different tidal cycle, semi-diurnal, diurnal, and the transitions between the two. We also measured the resistivity of the subsurface throughout the 24 hours to discern between seawater and freshwater flow in the subsurface over the corresponding tidal cycle.



Figure 2. Point 8 camp site during the 24-hr time series sampling campaigns. The glacier terminus leading to a freshwater pond is pictured on the right side of the photo.

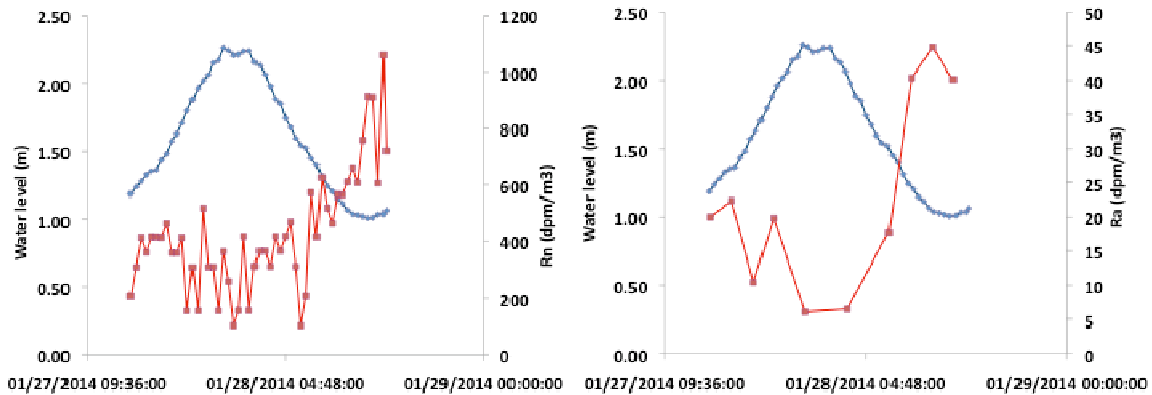


Figure 3. ^{222}Rn and ^{224}Ra activities (dpm/m^3) in the nearshore surface waters at Point 8 during diurnal tides demonstrate that the tides influence the groundwater exchange.

We have also completed shore normal transects at our three primary stations and will continue sampling transects intensely in the upcoming weeks to capture variability in melt conditions as the summer season progresses.

PALMER STATION
RESEARCH ASSOCIATE MONTHLY REPORT
January 2014
Glenn Grant

G-090-P: GLOBAL SEISMOGRAPH NETWORK (GSN) SITE AT PALMER STATION.
Kent Anderson, Principal Investigator, Incorporated Research Institutions for Seismology (IRIS)

Station PMSA is one of more than 150+ sites in the GSN, monitoring seismic waves produced by events worldwide. Real-time telemetry data is sent to the U.S. Geological Survey (USGS). The Research Associate operates and maintains on-site equipment for the project.

The system operated normally throughout the month.

A-109-P: ANTARCTIC EXTREMELY LOW FREQUENCY/VERY LOW FREQUENCY (ELF/VLF) OBSERVATIONS OF LIGHTNING AND LIGHTNING-INDUCED ELECTRON PRECIPITATION (LEP).

Robert Moore, Principal Investigator, University of Florida

ELF/VLF radio wave observations at Palmer Station are used to provide a deeper understanding of lightning and its effects on the Earth's inner radiation belt. The Research Associate operates and maintains on-site equipment for the project.

The ELF/VLF system failed due to a bad connection in the cable leading up the glacier. In the near future, the antenna is scheduled to be moved off the glacier and into Palmer's 'backyard'; because the glacier portion of the antenna was already in need of other significant maintenance, it has been removed from the glacier. The PI is sending a small, temporary antenna to maintain data collection until the permanently relocated antenna can be established. The system is currently offline until the temporary antenna is received.

A-132-P: FABRY-PEROT INTERFEROMETER (FPI)

Qian Wu, Principal Investigator, National Center for Atmospheric Research

The Fabry-Perot Interferometer observes mesospheric and thermospheric neutral winds and temperatures at Palmer Station by measuring the wind-induced Doppler shift in the air's nightglow emissions. The Research Associate operates and maintains on-site equipment for the project.

The FPI project has completed and is now shut down. The coolant has been drained from the chiller, and the cloud detector instrument has been brought in and stored in the lab.

**O-202-P: ANTARCTIC METEOROLOGICAL RESEARCH CENTER (AMRC)
SATELLITE DATA INGESTOR.**

Mathew Lazzara, Principal Investigator, University of Wisconsin

The AMRC computer processes satellite telemetry received by the Palmer Station TeraScan system, extracting Automated Weather Station information and low-resolution infrared imagery and sending the results to AMRC headquarters in Madison, WI. The Research Associate operates and maintains on-site equipment for the project.

The data ingestor operated normally through the month.

**O-204-P: A STUDY OF ATMOSPHERIC OXYGEN VARIABILITY IN RELATION TO
ANNUAL TO DECADAL VARIATIONS IN TERRESTRIAL AND MARINE
ECOSYSTEMS.**

Ralph Keeling, Principal Investigator, Scripps Institution of Oceanography

The goal of this project is to resolve seasonal and interannual variations in atmospheric O₂ (detected through changes in O₂/N₂ ratio), which can help to determine rates of marine biological productivity and ocean mixing as well as terrestrial and oceanic distribution of the global anthropogenic CO₂ sink. The program involves air sampling at a network of sites in both the Northern and Southern Hemispheres. The Research Associate collects samples fortnightly from both Terra Lab and the VLF Building.

Air samples were collected throughout the month.

**O-215-P: IN-SITU OBSERVATIONS OF MARITIME SOURCES/SINKS OF AEROSOL
AND CLOUD CONDENSATION NUCLEI AT PALMER STATION, ANTARCTICA:
PAEROS PILOT PHASE**

Gregory Roberts, Principal Investigator, Scripps Institution of Oceanography

A miniaturized aerosol package (PAEROS) has been deployed at Palmer Station Antarctica for the austral summer to measure aerosol physical properties, cloud condensation nuclei (CCN), radiative fluxes and meteorological parameters. The Research Associate assists the grantees with maintenance of the system.

The Research Associate supported periodic maintenance of the system. All operations were nominal.

**O-264-P: COLLECTION OF ATMOSPHERIC AIR FOR THE NOAA/GMD
WORLDWIDE FLASK SAMPLING NETWORK**

James Butler, Principal Investigator, National Oceanic and Atmospheric Administration / Global Monitoring Division; Boulder, CO

The NOAA ESRL Carbon Cycle Greenhouse Gases (CCGG) group makes ongoing discrete measurements to document the spatial and temporal distributions of carbon-cycle gases and provide essential constraints to our understanding of the global carbon cycle. The Halocarbons

and other Atmospheric Trace Species (HATS) group quantifies the distributions and magnitudes of the sources and sinks for atmospheric nitrous oxide (N₂O) and halogen containing compounds. The Research Associate collects weekly air samples for the CCGG group and fortnightly samples for the HATS group.

Carbon Cycle and Halocarbon sampling were taken throughout the month, with some delays due to unfavorable wind conditions.

O-264-P: ULTRAVIOLET (UV) SPECTRAL IRRADIANCE MONITORING NETWORK
James Butler, Principal Investigator, National Oceanic and Atmospheric Administration / Global Monitoring Division; Boulder, CO

A Biospherical Instruments (BSI) SUV-100 UV spectroradiometer produces full sky irradiance spectra ranging from the atmospheric UV cutoff near 290nm up to 605nm, four times per hour. A BSI GUV-511 filter radiometer, an Eppley PSP Pyranometer, and an Eppley TUVR radiometer also continuously measure hemispheric solar flux within various spectral ranges. The Research Associate operates and maintains on-site equipment for the project.

Data was collected normally throughout the month.

O-283-P: ANTARCTIC AUTOMATIC WEATHER STATIONS (AWS).
Mathew Lazzara, Principal Investigator, University of Wisconsin

AWS transmissions from Bonaparte Point are monitored using the TeraScan system and the University of Wisconsin's Data Ingestor system. Data collected from this station is freely available from the University of Wisconsin's AMRC website. The Research Associate monitors data transmissions for the project and performs quarterly maintenance on the station at Bonaparte Point.

The system operated normally. A replacement electronic barometer was received and installed.

T-295-P: GPS CONTINUOUSLY OPERATING REFERENCE STATION.
Joe Pettit, Principal Investigator, UNAVCO

Continuous 15-second epoch interval GPS data files are collected at station PALM, compressed, and transmitted to the NASA-JPL in Pasadena, CA. The Research Associate operates and maintains on-site equipment for the project.

The GPS station collected data normally throughout the month.

T-312-P: TERASCAN SATELLITE IMAGING SYSTEM

The TeraScan system collects, processes, and archives DMSP and NOAA satellite telemetry, capturing approximately 25-30 passes per day. The Research Associate operates and maintains on-site equipment for the project. The TeraScan weather and ice imagery is used for both research and station operations.

Satellite passes were captured, recorded, and distributed normally throughout the month.

B-466-P: FLUORESCENCE INDUCTION AND RELAXATION (FIRe) FAST REPETITION RATE FLUOROMETRY (FRRF)

Deneb Karentz, Joe Grzymiski, Co-Principal Investigators, University of San Francisco

The focus of this project is to identify and evaluate changes that occur in genomic expression and physiology of phytoplankton during the transition from winter to spring, i.e., cellular responses to increasing light and temperature. A Fast Repetition Rate Fluorometer (FRRF) with a FIRe (Fluorescence Induction and Relaxation) sensor is installed in the Palmer Aquarium. The Research Associate downloads data and cleans the instrument on a weekly basis.

Weekly cleaning of the instrument and data downloads were performed as scheduled.

T-998-P: INTERNATIONAL MONITORING STATION (IMS) FOR THE COMPREHENSIVE NUCLEAR TEST BAN TREATY ORG. (CTBTO)

Managed by General Dynamics

The IMS Radionuclide Aerosol Sampler and Analyzer (RASA) is part of the CTBTO verification regime. The automated RASA continually filters ambient air and tests for particulates with radioisotope signatures indicative of a nuclear weapons test. The Research Associate operates and maintains the instrument.

The system collected data normally during the month.

OCEANOGRAPHY

Palmer Station's new tide gage system was installed and is now collecting continuous tidal height, sea water temperature, and conductivity. Daily observations of sea ice extent and growth stage are also recorded.

METEOROLOGY

The Research Associate acts as chief weather observer, and compiles and distributes meteorological data. Weather data collected using the automated electronic system is archived locally and forwarded twice each month to the University of Wisconsin for archiving and further distribution. Synoptic reports are automatically generated every three hours by the Palmer Meteorological Observing System (PalMOS) and emailed to the National Weather Service for entry into the Global Telecommunications System.

The system collected data normally throughout January. The system's pyranometer and quantum sensors are currently undergoing maintenance.