

PALMER STATION MONTHLY SCIENCE REPORT

NOVEMBER 2013



The B-228-P (Amaral Zettler) field team harvests phytoplankton laden sea ice from the waters off Gamage Point. The group will use the melted sea ice to seed seawater incubation experiments in an effort to study the effects of phytoplankton released from melting sea ice on microbial communities. (Image Credit: Tina Haskins)

NEWS FROM THE LAB

By Carolyn Lipke, Assistant Supervisor of Laboratory Operations

November at Palmer Station brought us much to be thankful for. At the beginning of the month the ARSV *Laurence M. Gould* (LMG) returned to station, bringing the Fraser (B-013-P) and Bench (B-018-P) science groups.

After a long wait, the sea ice around station blew out, and scientists were finally able to get out on the water to collect samples and work on the local islands. With the exit of the sea ice we also noticed an increase in birds and seals. Skuas and Wilson's storm petrels were observed for the first time this summer. A small group of orcas was also sighted rounding Bonaparte Point. The ice returned though soon after however, and remained through the end of the month.

The LMG returned at the very end of the month bringing the Saba (B-068-P) group. The lab is now bustling with summer activity. The Palmer Station community all pitched in to create a delicious feast for Thanksgiving. It was a wonderful meal and a perfect time for reflection on how lucky we are to work in this amazing place.

NOVEMBER 2013 WEATHER

By Glenn Grant, Research Associate

Storms and high winds ushered-in November. Conditions through the rest of the month varied wildly as a few more large systems moved through, bringing rapidly changing temperatures and winds. The average wind speed for the month was 10 knots, and the peak wind gust of 66 knots came on the 2nd. The first week of windy weather was enough to finally blow away the sea ice surrounding the station; however, the open water was short-lived. By mid-month the sea ice lurking south of station had returned, pushed back into Anvers Island by winds from the southeast.

The average temperature was -2.2 C (28 F). We hit a record low air temperature for the month of November with a low of -16.7 C (2 F) on the 10th. Two days later, we broke the record high with a temperature of 8.7 C (48 F). Total melted precipitation was 48.2 mm, most of which fell as snow. 32 cm of fresh snow was recorded. Accumulated snow depth at the stake hit a maximum of 40 cm on November 4th, but had melted off entirely (0 cm) by the 24th. Near the end of November the sea surface temperatures warmed above -1 C. Despite the warmer waters, pack ice – with very few leads – stubbornly remained, covering the ocean to the horizon.

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: Ben Cook, Shawn Farry, and Carrie McAtee

B-013-P personnel arrived at Palmer Station on November 1st with plans to begin field work immediately. Unfortunately, extensive sea ice prevented all boating until November 22nd. Ice and high winds continued to restrict boating through the end of the month allowing only 4 partial days in the field. In contrast, B-013-P conducted boating field work on 23 of 30 days in November 2012.

During the brief opportunities available we were able to conduct censuses of Adélie colonies on Torgersen, Humble, Cormorant and Christine Islands. Breeding chronology and egg production were monitored when possible on a subset of Adélie nests on Torgersen and Humble Islands. Adélie adult body size, mass, and egg measurements usually taken at the 1-Egg stage were delayed approximately 1 week due to the ice. A brief opportunity to boat luckily coincided with the peak of Adélie egg laying and a census was completed for Adélies on all local islands. No trips to either Biscoe or Dream have been possible thus far, however we are eager to assess Adélie, gentoo, and chinstrap colonies on these islands as soon as the ice and weather allow.

During November we also began our brown skua band resighting and nest monitoring in the Palmer area. South polar skuas have also begun arriving in the Palmer area however due to the ice we have been unable to begin our band resighting and nest monitoring study on Shortcut Island. Marine mammal observations were recorded throughout November with the highlight being a sighting of five orcas near station on November 24th.

Satellite transmitter deployments on giant petrels began on November 20th and will continue through February. We also began the monitoring of the small blue-eyed shag colonies on Cormorant Island.

During weather days in November we conducted lab work and were able to complete the processing of all blue-eyed shag boli, kelp gull limpet samples, as well as south polar skua scat and diet samples from the 2012-2013 season.

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)

After a nice Drake Passage crossing, and helping move people and supplies to Cape Shirreff on Halloween, I arrived on station on November first. It took about a week to set up my laboratory, including cleaning, unpacking, organizing, and checking inventories for three sets of supplies (my call-forward box from last year, supplies I shipped south, and supplies provided this year as requested in my SIP). I reconciled the three inventories into a single master list, and was ready to test out my process for filtering water samples. On November 11th I carried out that test with seawater from the pumphouse. I made a few small adjustments to the process and was then all set to process samples from Station B as planned. However, persistent sea ice made boating impossible, so all of the groups that needed to collect samples from boats were on hold, including mine.

In lieu of sampling at Station B, I collected water twice (in the second and third week of the month) from shore, using a submersible pump lowered into the water. Jullie Jackson and Mark Dalberth (ASC support staff) provided important support with equipment and logistics on both days. Both near-shore samples were processed using the same procedure that will be used for standard Station B samples collected on LTER days. This includes collecting four replicates of filters for DNA and/or RNA extraction, as well as making slides and cell concentrates for microscopy. These samples also gave me an opportunity to work with Allyson Comstock (W-492-P) who also assisted with sampling one day and April Surgent (W-489-P) to generate microscopic images that may be applicable to their projects. In addition, Sebastian Vivancos, with the B-045-P (Ducklow) group, carried out flow-cytometry on sub-samples of water from both days. The flow cytometry data will be used for comparison to Station B samples, and running these samples enabled us to clarify that process which will also be done on LTER sampling days.

Finally, we had clear water for a few days in the third week of the month, but wind prevented boating during those days. On November 22nd, we had a few hours of good conditions, and a member of each of the three LTER-related groups (B-045-P, B-019-P and mine) were able to complete the boating II training, but the wind picked up and prevented us from boating to Station B for sampling.

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, Oliver Ho, and Austin Melillo

The month of November provided B-019-P with endless amounts of sea ice. We were fortunate enough to have two days where boating was possible. One of those days allowed for Christina (B-019-P) and Jamie (B-045-P) to complete Boating Two allowing us the freedom to mobilize our science members in the event of open water. Unfortunately, winds picked up that afternoon preventing us from sampling. The second opportunity arose on Sunday November 24th at approximately 6pm. The winds had died down and we were permitted to travel to Station B. This was a perfect outing to test our CTD and bio-optical equipment. We spent three hours troubleshooting equipment and working out kinks. It was an extremely valuable expedition and has ensured we are set for sampling on the next boating opportunity. Jullie Jackson, our boating coordinator, has been extremely helpful in troubleshooting any boat issues as well as getting us out on the water whenever possible. The arrival of LMG 13-12 brought the Tempertron as well as the FIRE machine to us; the only thing missing now is open water.

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: Jamie Collins and Sebastian Vivancos

This season is now one of the latest sea ice retreats since PAL LTER began routine operations in 1992. In the past decade, sea ice has normally retreated sometime between late October and mid-November. As sea ice continues to block access to our field sampling stations, B-045-P carried out several comparison studies with the B-228-P project and performed experiments to measure indicators of lipid peroxidation and bacterial exoenzyme activity in water collected from the seawater intake for the aquarium room.

On Nov. 24th, favorable winds and a break in the ice finally allowed us to go out in the afternoon and test out the instruments to be used for routine sampling at Stations B and E. With the B-019-P team, we were able to deploy the CTD and optical profilers. Overall, our first trip out on the water as a group was a success. It helped prepare us for the day when we can get back out on the water—hopefully any day now. All the tools are in optimal shape for a successful LTER season.

We have been working with the B-228-P group to ensure a smooth transition to continue sampling when they depart Palmer Station in a few weeks. We performed a series of comparisons between our two benchtop flow cytometers and bacterial production assays.

We also continued to collect weekly $\delta^{18}\text{O}$ water samples from the Palmer pump house for determination of the contribution of glacial meltwater to the coastal ocean. Samples will be analyzed by Dr. Mike Meredith of the British Antarctic Survey.

On Thanksgiving, we enjoyed great meal in fine company to give thanks for all those around us, not only our well deserving colleagues, but the hard working support staff who work tirelessly to ensure our operation runs smoothly.

We look forward to getting out on the water in earnest in the coming days.

B-228-P: COLLABORATIVE RESEARCH: MICROBIAL COMMUNITY ASSEMBLY IN COASTAL WATERS OF THE WESTERN ANTARCTIC PENINSULA

Dr. Linda Amaral-Zettler, Principal Investigator, Marine Biological Laboratory, Woods Hole, MA; Dr. Jeremy Rich, Co-PI, Brown University, Providence, RI

Personnel on station: Sharon Grim, Sean O'Neill, and Monica Stegman

The arrival of LMG13-11 brought Sharon Grim (M.S. U Del) to the team, and was scheduled to take Sean O'Neill on the return trip. However, Palmer Station was iced in and the LMG was unable to pick up passengers for the return trip. Subsequently, Sean remained with B-228-P and will depart with the entire team on LMG13-12. The support station staff was able to accommodate Sean and other personnel in the same situation, as well as the new residents from LMG13-12.

In November we have been able to conduct several tandem experiments. We are working with B-019-P (Tina Haskins, Austin Melillo, and Oliver Ho) to measure concentrations of phytoplankton pigments. Also, B-228-P and B-045-P (James Collins and Sebastian Vivancos) are collaborating to fine tune assays of phytoplankton abundances and microbial growth. When B-228-P departs, these groups will continue to collect these environmental and microbial parameters in order to provide additional context for our research.

At the end of the month the ice broke up briefly and several personnel were able to go boating, however windy conditions prevented B-228-P from completing training and going out to Station B. Though we were unable to get to Station B, we continued sampling the seawater intake (SWI) system weekly for environmental conditions and microbial populations.



When the ice broke up for a few days, we collected dirty sea ice with visible microbial growth such as diatom biofilms and pigmented organic matter. Pictured at left are Sean and Monica corralling a target piece of sea ice. Similar to earlier experiments, we melted the sea ice chunks and added the melt to 50L carboys of seawater, to examine resulting changes in marine microbial community structures. This experiment lasted 8 days to correspond with our earlier sea ice experiment.

We began our final experiment in the middle of our sea ice experiment. Chlorophyll measurements from last year's season indicated that a phytoplankton bloom occurred at the end of November 2012 into the beginning of December. Such a bloom would release dissolved organic matter (DOM) to the bacterial population. We were hoping a similar situation would occur this year and planned to have our final experiment capture that bloom at the end of the month. We amended 50L carboys with algal exudate to simulate a phytoplankton bloom and decay, and theoretically stimulate growth of certain members.

We plan to finish our final DOM experiment in the second week of December. We will continue to sample the SWI every week until we leave, to add to the time series data we have collected since the winter, and to work with B-019-P and B-045-P on our tandem sampling procedures. Sampling Station B is still on our agenda, but that is conditional on the sea ice extent. All in all, by the end of our stay we will have completed several key points of our project plan. Palmer Station support staff and grantees have been wonderful to work with, and have been extremely helpful in setting up our 50L carboys during the DOM and sea ice experiments. While we have mixed feelings about shutting down our lab in mid-December, we are pleased at how much we have accomplished despite the various challenges in the past half-year.

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

Dr. Gregory Roberts, Principal Investigator, University of California San Diego, Scripps Institution of Oceanography

Personnel on station: Gregory Roberts and Craig Corrigan

The Portable AERosol Observing System, PAEROS, has operated near continuously since its installation on the *ARSV Laurence M. Gould* on October 4th, 2013 and subsequent transfer to the Backyard of Palmer Station. As mentioned in the October report, the PAEROS system is a suite of miniaturized instruments assembled in a weather-proof case for the purpose of measuring aerosol particles and their relevance to climate change. The system measures aerosol concentrations, number size distributions, hygroscopicity, cloud condensation nuclei, absorbing carbon, radiative fluxes and meteorological parameters.

PAEROS has been transferring its real-time data by radio modem to a laptop in the Terra lab. We have set up this laptop to automatically transfer its new data back every hour to our home institution (Scripps Institution of Oceanography). We have trained the Research Assistant on performing the weekly maintenance. We are currently working with him on daily status checks to recognize problems with the instrumentation. The majority of instruments has performed flawlessly and has continued to deliver good data even in severe conditions, including storms up to 70+ knots of wind. There are communication issues with PAEROS's meteorological station, which we are trying to resolve. Fortunately, meteorological data is also being collected independently by Palmer Station's automatic weather station (AWS).

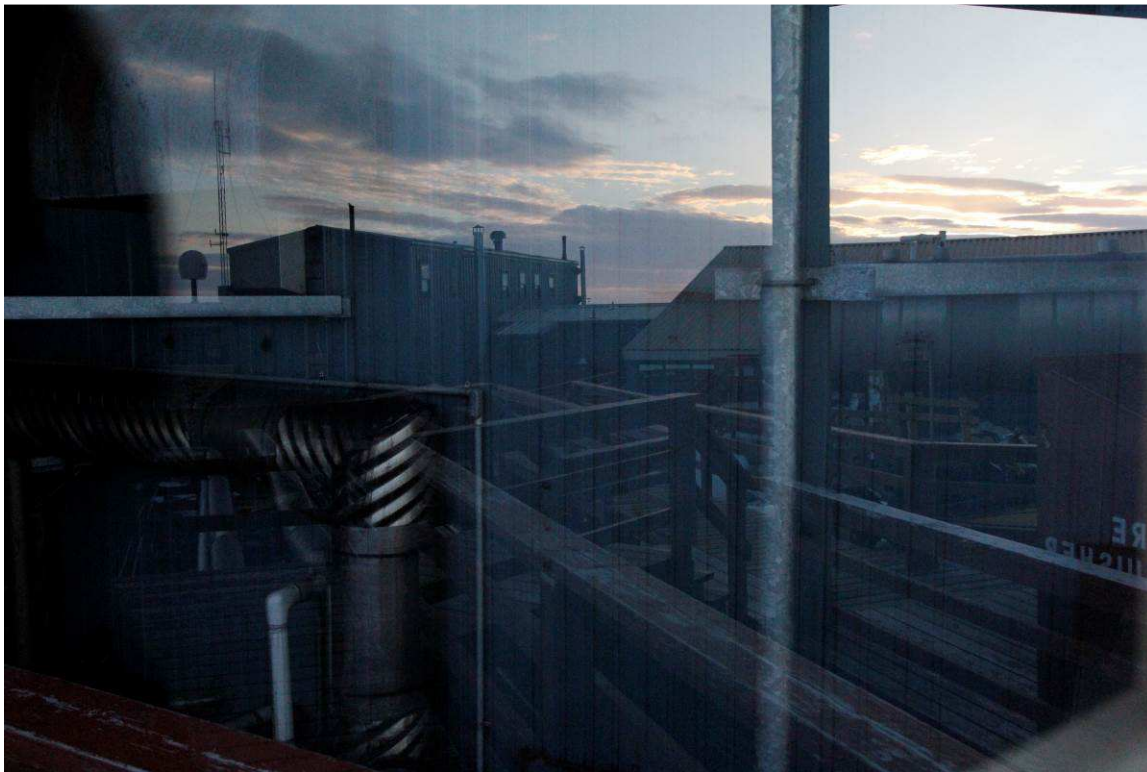
This project was featured in the Antarctic Sun in the Nov 21, 2013 issue (<http://antarcticsun.usap.gov/science/contenthandler.cfm?id=2942>).

W-489-P: 21ST CENTURY ANTARCTICA – THE SCIENCE AND LANDSCAPE OF PALMER STATION

April Surgent, Glass Engraver, Seattle, WA

Personnel on station: April Surgent

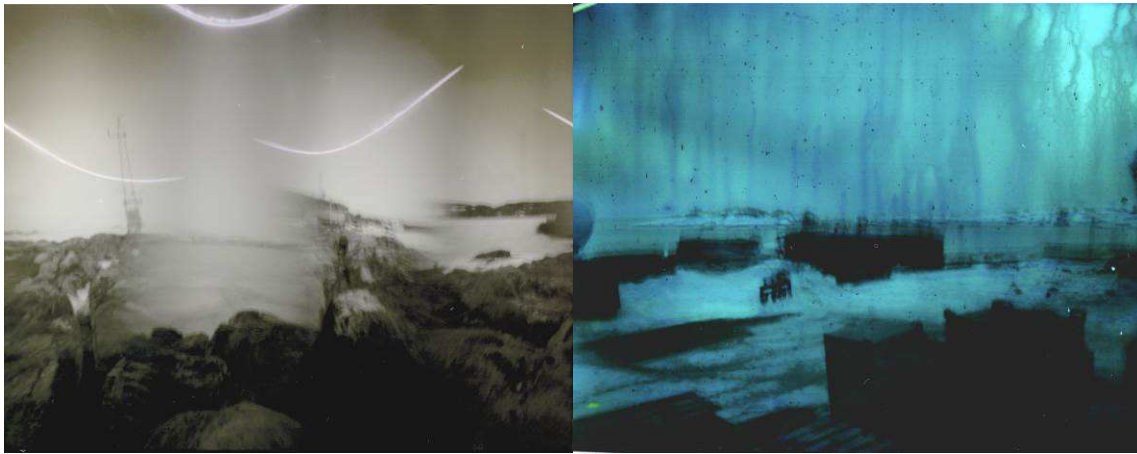
The primary goals of my project are to gather information about the scientific research, unique biology and rapid climate change occurring on the Antarctic Peninsula and Southern Ocean at the start of the 21st Century. I have been pleasantly surprised by the amount of information and resources available to me here, and have been reading through a mass of journal articles covering everything from the microbial communities of the local waters to the satellite tracking of the Southern Giant Petrels.



Digital image. Reflection of Palmer Station

A large part of my project consists of photographing and documenting life on station, the research happening here and the surrounding area. With my digital camera in tow I have been able to gather useful source material for art that I will make when I return to my studio. I have also been photographing the station and surrounds using long exposure pinhole photography. The resulting photographs from these cameras differ from digital imagery in that they are less a description and more an interpretation. The digital and pinhole camera images are supplying me with two wholly different views of Palmer Station and surrounds.

People on station seem to be interested in the pinhole photography and last week I held a 'how to' pinhole camera tutorial. It appeared to have had a good turnout.



Pinhole Camera images. Left –Gamage Point 4 apertures Right: Terra Lab deck. Paper got wet.

Lab technician Mark Dalberth helped me set up a camera on a dissecting scope in the Bio lab. Under the scope I have looked at and photographed the jawbones and vertebrae from fish digested by Cormorants, various shed feathers, ice and krill. These photographs will serve as source material for glass engravings.

The B-013 (Fraser) group has been especially generous in sharing their time and knowledge. I was able to accompany them on two Zodiac outings where they began their work of counting the Adélie colonies. An Antarctic Conservation Act permit that I acquired has enabled me to collect Adélie eggshell remnants left behind by the predating skua. I have since been experimenting with engraving on the eggshell remnants and have been pleased with the results. I am confident that when I return to my studio I will be able to successfully continue this work.



Initial engraving test on remnant of Adélie egg.

Southern Giant Petrel at Kristie Cove

I also accompanied the B-013 group to Kristie Cove where we walked to from station. There, I observed them working with the Southern Giant Petrels. While at Kristie Cove, I was able to record video and take still photographs of the birds and will use what I captured as source material for a sculpture of the skeletal structure of the Southern Giant Petrel.

Everyone has been particularly accommodating in helping me find and gather any information that I may need for my research. If and when we are able to get out on the water before my departure on December 16th, I may be able to observe and or help one or more of the groups out

in the field. In the meantime, I have taken video footage of B-045 and B-228 working in the lab and have spent time speaking with each of the research teams learning about their work.

Other things I have been doing include drawing, keeping a daily log, photographic portraits of people on station and blogging.

My time at Palmer Station is supplying me with a store of information that will no doubt enable me to make a body of work aimed at educating people about the Antarctic Peninsula and research happening here. I feel exceptionally fortunate and privileged to be a part of the Palmer Station community and would like to thank all of the support staff and grantees for so generously helping me to fulfill the goals of my project.

W-492-P: ANTARCTICA: MICRO, MACRO AND IN-BETWEEN

Allyson Comstock, Paper maker and visual artist, Opelika, AL

Personnel on station: Allyson Comstock

My proposed project, to create a suite of drawings that show multiple perceptions of the Antarctica environment through a triptych (three part) format, is well underway.

These drawings include one panel that depicts a macro view (a panoramic view of the landscape), a microscopic view (a view typically seen only by research scientists) and a third panel, that is placed between the macro and micro panels. This panel presents an “in-between” view of the landscape with features of the macro and the micro panels layered onto it to create a seamless connection between the three panels.

My goal of working collaboratively with researchers at Palmer Station has had a terrific start. In the short time I have been here, my “science” education has taken a steep upward turn. I have learned about the research projects taking place at Palmer through numerous conversations with all the scientists. I have also observed them at work in their labs (thanks to Monica Stegman (B-228-P), Sharon Grim (B-228-P), Jamie Collins (B-045-P) and Shellie Bench (B-018-P)). My education took a more hands-on-turn when Shellie Bench taught me how to prepare my own slide of a water sample and to operate a microscope so that I could view it under magnification and make photographs.

I am particularly grateful to Shellie Bench and Monica Stegman for providing me with stunning microscopic images that will be utilized as visual source material for future drawings. I thank them for their generosity. I thank John Postlethwait (B-029-P) who recently departed Palmer Station for also providing microscopic images after I contacted him by email. Without their contribution, my drawings would not be possible.

In addition to working on drawings and working in Photoshop with my collection of photographs to create triptych layouts for other drawings, I roam outside where I have taken many photographs that will serve as a resource for future drawings. I look forward to weather changes that will allow me to make trips on water so that I can make additional photographs and depict a more varied view of my subject.



Micro, Macro In-between #1 (completed drawing) and Micro, Macro and In-between #2 (drawing in-progress)



(two of seventeen photo layouts for future drawings)

PALMER STATION
RESEARCH ASSOCIATE MONTHLY REPORT
November 2013
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 during 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 collected data normally. Minor maintenance was performed on the antenna and cable on the glacier. The Research Associate helped with planning for the upcoming antenna move from the glacier to Palmer's "back yard".

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 system operated normally. Seasonal data collection ended on the 18th of November due to increased daylight hours.

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 throughout 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 during the month. The second monthly set of samples has been delayed due to poor wind conditions.

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 grantee team is on station. The Research Associate supported periodic maintenance of the system.

**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 completed as scheduled.

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.

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. A special set of high-resolution GPS data was sent to the grantees in support of research related to recent earthquakes in the region.

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 normally throughout the month. Data transmission problems, due to offsite problems, were noted on two occasions and resolved.

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

Deneb Karentz, Joe Grzyski, 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 operated normally during the month. Two I/O errors were noted; one was corrected in coordination with the grantee, the other resolved itself.

OCEANOGRAPHY

Pending the installation of a new tide gage system with salinity and sea water temperature sensors, the Research Associate takes daily readings of sea water temperature. 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 backup Present Weather Sensor, which detects precipitation and visibility, that was installed to replace the malfunctioning instrument was determined to be malfunctioning as well.