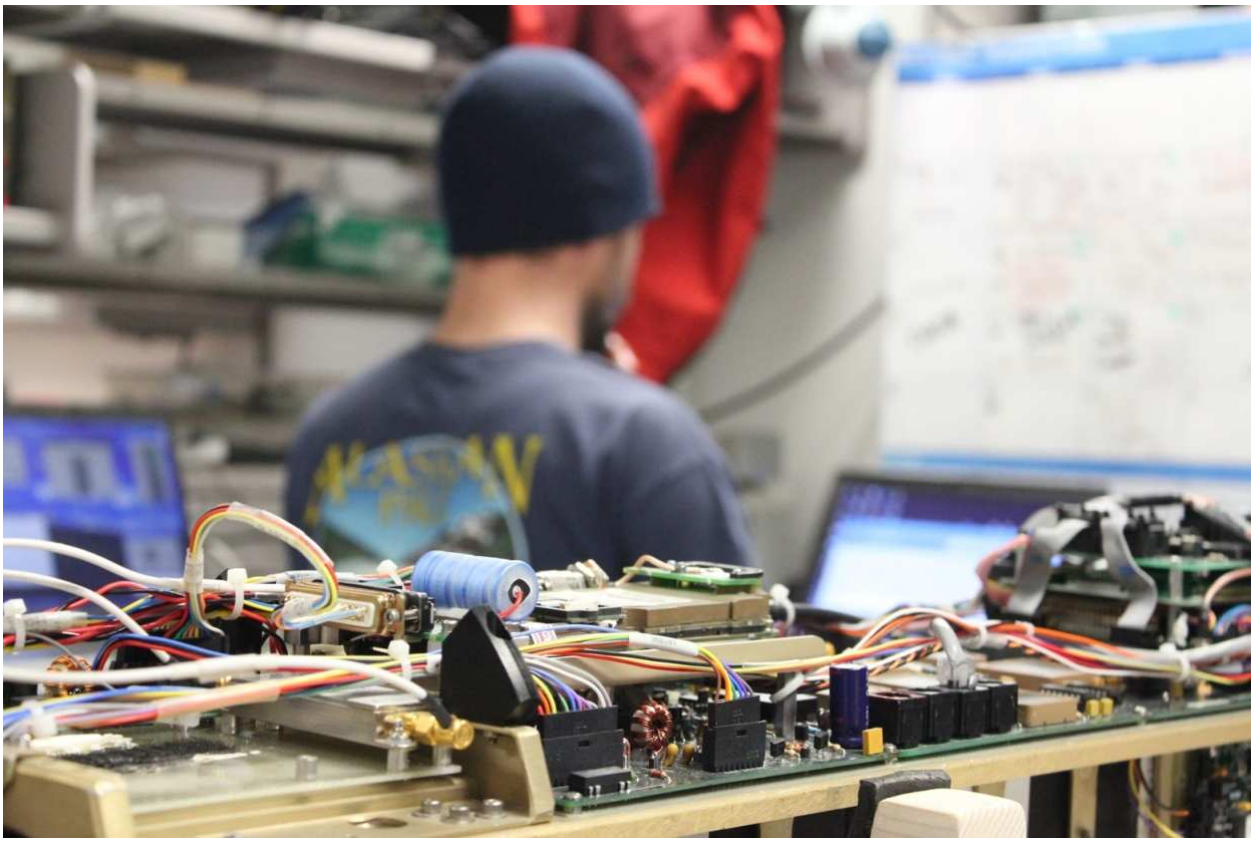
PALMER STATION MONTHLY SCIENCE REPORT
January 2011



Ian Robbins (B-391-P, Moline) prepares the AUV in the lab for its next mission.
Image Credit: Alena Kobelkova

NEWS FROM THE LAB
By Phil Spindler, Science Support Supervisor

The New Year started off with a bang- New Year celebration, the beginning of the LTER cruise, and more cruise ships. The *RV Laurence M. Gould* not only began the LTER cruise, but she also deployed three new science groups to Palmer Station: B-026-P (Matt Cottrell), B-256-P (Rick Lee), and B-391-P (Mark Moline).

We had gorgeous weather for most of the month, and this contributed to many successes in the field and projects around station. Station life was endlessly busy and productive with seven science groups and a population of 43.

As the month is wrapped up, we looked forward to welcoming the LTER cruise back to station. Sadly, it also concluded the summer field season for Matt Cottrell and Mark Moline. Matt will be back in May for his winter component, and we hope to see more of Mark in the future with the REMUS AUV and its very successful work.

From Palmer Station, we hope you are having a fun and successful start to your New Year.

JANUARY WEATHER
By Brian Nelson, Research Associate

As per usual, January brought the warmest temperatures of the season so far. Calm winds and sunny days dominated the first half of the month, allowing high productivity for science and support.

Temperatures were reasonably steady this month between 0 and 5 ºC, averaging 2.1 ºC. Maximum temperature was 8.1 ºC and minimum was -1.5 ºC. Wind speeds were very low, averaging only 6 knots. Though peak gusts topped 25 knots on a few days, the two minute average never escaped the safe boating limit. Precipitation came as drizzle or flurries, totaling 20.1mm, melted.

Brash continues to blow in and out of the area surrounding Palmer station and is increasingly fed by the calving glacier face, which seems to be retreating by the day. Sea surface temperatures rose from 0.5ºC in early January to a mid-month high of 3.5ºC, and then rolled back off to 1.5 ºC.

Snow on the glacier melted away rapidly, revealing multiple cracks and crevasses. Known cracks encroaching on the flag line have widened enough to be a serious hazard, and new cracks within the flagged area motivated a reassessment and reduction of the safe recreation area.

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: Jennifer Blum, Kelsey Ducklow, Shawn Farry, Kristen Gorman, Donna Patterson-Fraser, Marc Travers

The arrival of the Laurence M. Gould on January 5th increased our personnel to six people. Kristen Gorman and Shawn Farry departed on the annual LTER cruise on January 6th. Weather conditions were favorable for the first few weeks of January, but the last part of the month brought some stretches of high winds that postponed field operations and prevented access to our farther-ranging field sites.

Monitoring of Adélie penguin breeding chronology continued this month, as we obtained crèche dates, continued indicator counts, and completed an all-colony chick census on local islands as well as on Dream and Biscoe Islands. Chick measurements occurred in conjunction with our LTER cruise team's Avian Island and Charcot Island measurements. Gentoo indicator counts continued, and a gentoo chick census was completed on Biscoe Island. A chinstrap chick census was completed on Dream Island. Foraging ecology studies of the three penguin species occurred this month, which included diet sampling as well as deployment of presence/absence radio transmitters, satellite transmitters, and dive depth recorders. The penguin foraging ecology work was successfully aligned with the glider and REMUS deployments as part of our collaborations with Mark Moline and Matt Oliver.

Skua work continued this month, as we started observing hatches and monitoring chick growth of brown skuas on local islands as well as on Dream and Biscoe Islands. Similar nest monitoring as well as diet collections continue on Shortcut Island for south polar skuas; chick hatching will continue into February. Another all-island census of kelp gulls was completed this month to determine breeding success. Monitoring of the blue-eyed shag colony on Cormorant Island continued. Satellite transmitters continue to be deployed on giant petrels, and our all-island giant petrel census that began in mid-December was completed. Hatch dates and chick growth measurements were obtained for giant petrels on Humble Island as part of our annual study.

Monitoring of marine mammals has continued and was highlighted by sightings of humpback whales mid-month. Fur seals have also been seen in increasing number on area islands.

Lab work continued this month with diet sample processing.

Thanks to RPSC for their continued support this month. Thanks to Lily Glass for her support during the first part of this season, and to Ken Keenan for enthusiastically keeping us rolling during this boating coordinator position transition. Thanks to Paul Queior for miraculously recovering critical data from a crashed hard drive on our field laptop; we are incredibly grateful!

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

Principle Investigator: Oscar Schofield, Rutgers University and Matt Oliver, University of Delaware
Personnel on station: Kaycee Coleman, Matt Oliver

In the month of January, B019 had a personnel shift. Travis and Garzio joined Oscar Schofield on the Long Term Ecological Research (LTER) cruise, while Matt Oliver assisted on station. The Monday/Thursday biweekly sampling effort continued as usual with a few minor changes. The FIRe sensor and the AC-9 were moved onto the research cruise, so we incorporated the use of a CTD when sampling. Additionally our sampling efforts were accompanied by B026 who also wanted to collect water at the stations E and B. Primary productivity experiments using carbon 14 were started up again once the ship arrived replenishing our carbon 14 stock solution. In addition we found time to run more chlorophyll samples in the fluorometer.

The majority of work this month went into the use of autonomous underwater vehicles. We collaborated extensively with the birding field group and the AUV group running REMUS vehicles from Cal Poly, San Luis Obispo. All together we had four Slocum Electric Gliders (3 from Rutgers University, 1 from the University of Delaware) and two REMUS. We (B019, B013, B391)

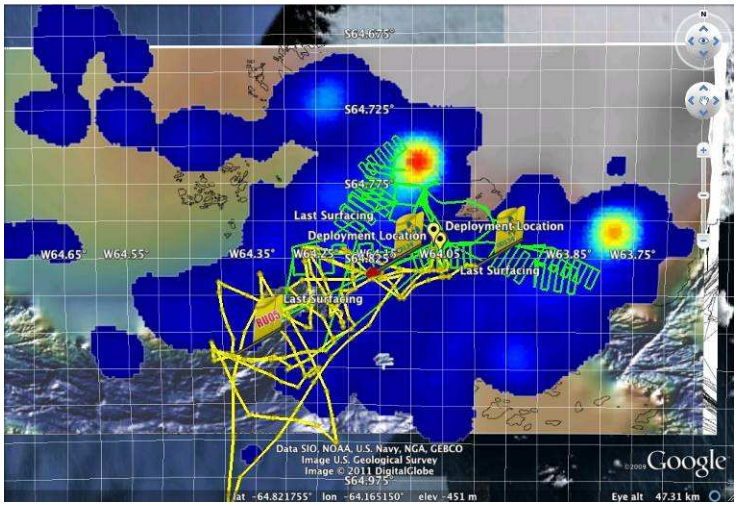


Figure 1: Mid-experiment Google Earth screenshot of penguin foraging areas (blue) with the Glider tracks (yellow) and REMUS tracks (green).

deployed PTT satellite splash tags on penguins. We focused primarily on the Adélie penguins, but Chinstrap and Gentoo penguins were occasionally included in tagging efforts. Chinstrap and Gentoo penguins appear to be replacing Adélie populations. Our group worked in a collaborative way to understand the oceanography and ecosystem dynamics that drive penguin foraging locations. We received daily locations from the ARGOS transmitters on the penguins from. Then, we filtered and analyzed the penguin location data to produce geo-referenced penguin foraging kernels. These kernels then became the foundation for mission planning for the glider and REMUS vehicles that day. This iterating collaborative process ensured that the vehicles were sampling in the locations of the penguins. The "Birders" recovered and redeployed tags as needed. In total, 27 penguins were tagged in the Palmer area. Gliders ran for 24 days and logged 300km of underwater track distance. The REMUS vehicles ran 21 missions for a total of 571km of underwater track distance.

B-026-P PHOTOHETEROTROPHIC MICROBES IN THE WEST ANTARCTIC PENINSULA MARINE ECOSYSTEM

Matthew T. Cottrell, Principal Investigator, School of Marine Science and Policy
University of Delaware, Lewes, Delaware

Personnel on station: Matt Cottrell and Mrina Nikrad

Photoheterotrophy is metabolism fueled by energy obtained from sunlight together with that obtained from organic substrates. The primary objective of this project is to explore the community structure and metabolism of microbes in the waters of the west Antarctic Peninsula, specifically those with the ability to supplement their heterotrophic metabolism using energy harvested from sunlight. One goal of our work is to contrast bacterial consumption of organic substrates in the light and the dark between summer and winter. We expect that seasonal variation in sunlight will be reflected in the fraction of the bacterial community harvesting sunlight to supplement the energy obtained from organic compound consumption. Our study is being done with seawater collected in coordination with the LTER group to take advantage of those time series core data and we hope to place our results within the broader context of the LTER time series. Our work this month has focused on three types of analyses, including bulk measurements aimed at determining in situ rates of metabolism, incubation experiments designed to assess shifts in community structure and activity in response to the addition of organic materials, and single cell analysis of targeted, photoheterotrophic bacteria. The aerobic anoxygenic phototrophic (AAP) bacteria are one group of photoheterotrophs that we are examining with our single-cell analysis of organic substrate consumption. AAP bacteria consume organic materials and harvest light using bacteriochlorophyll a (BChl a). This pigment fluoresces in the infrared, which allows us to enumerate AAP bacteria by infrared epifluorescence microscopy and image analysis. Cells actively assimilating organic substrates are identified using radio-labeled compounds added to seawater incubations. The bacteria are collected filtration and then are coated with photographic emulsion. Cells actively assimilating the radio-labeled compound are identified in the microscope by the silver grains they deposited by radioactive decay. We are using this approach to assess the abundance of BChl a-containing cells that actively assimilate a variety of organic substrates in the light and the dark. Samples generated from the seawater incubations are returned to our lab and analyzed using our semi-automated image analysis system.

B-045-P PALMER LONG TERM ECOLOGICAL RESEARCH (LTER): LOOKING BACK IN TIME THROUGH MARINE ECOSYSTEM SPACE, MICROBIAL ECOLOGY COMPONENT

Hugh Ducklow, Principal Investigator, Marine Biological Laboratory, Woods Hole Massachusetts

Personnel on station: Alice Alpert, Edgar Woznica

Sampling for the microbial ecology component of the Long Term Ecological Research project has gone smoothly in the month of January. Bacterial production values have varied but remained high through this month, indicating that there is a large amount of organic matter sources available for them to consume.

Our data has continued to display an intriguing decoupling between the two sampling sites. Bacterial production rates at the site in shallow water close to shore are at times twice as high as those at the site on the edge of open water in the Bismarck Strait. Without more data it is difficult to speculate on why this is happening.

This month has provided more opportunities for coordination with other scientific groups, as we have sampled in conjunction with a microbial group working from the University of Delaware.

B-239-P VIRAL CONTRIBUTIONS TO SUMMER BLOOM DYNAMICS IN THE WESTERN ANTARCTIC PENINSULA

Grieg Steward, Principal Investigator, University of Hawai`i at Manoa

Personnel on station: Alexander Culley, Christopher Schvarcz

The month of January featured a precipitous increase in primary production followed by a dramatic decline. This is just the feature we were hoping to see, and fortunately, the weather permitted us to collect samples with great frequency over the entire duration of this event. This month we collected samples for total viral abundance, the frequency of infected cells, viral nucleic acids, viral community fingerprints, viral production and viral metagenomic libraries from Station B, supplemented by occasional visits to Station E to assess spatial variablity. We anticipate that these samples will give us a greater understanding of viral dynamics during a putative bloom.

In addition to the above measurements, Chris has now established several species of phytoplankton in culture. At the end of January, Chris began challenging these cultures with concentrated communities of viruses collected from Station B. These experiments are now underway and our hopes are high that we will have a host virus system isolated soon. In addition to our own work, we collected samples, for Jennifer Brum (B-319-P) who is investigating the incidence of lysogeny in the microbial population at Station B. We were excited to hear that the second ocean acidification experiment lead by the Schofield group (B-019-P) was a success. We will use the samples collected for us to assess how different CO_2 levels affect virus abundance, diversity and host infection.

Our initial sampling season at Palmer Station continues to be productive and it is in large part due to the cooperative spirit that exists at Palmer Station. We thank in particular the scientists of B-019-P for collecting our samples during the ocean acidification experiment, Carolyn Lipke for her indispensable support in the lab and the logistics team headed by Bob DeValentino and David Pettengill.

B-256-P: ROLE OF DEHYDRATION AND PHOTOPERIODISM IN PREPARING AN ANTARCTIC INSECT FOR THE POLAR NIGHT

Richard E. Lee, Jr. and David L. Denlinger, Principal Investigators, Miami University, Oxford, Ohio and Ohio State University, Columbus, Ohio.

Personnel on station: Richard Lee, Alena Kobelkova, Yuta Kawarasaki, Pat Betteley

The efficient support system at Palmer Station allowed us to begin field collections almost immediately upon our arrival. During our first collecting trip, we found both adults and larvae of the wingless midge (*Belgica antarctica*), whose exceptional tolerance to a variety of environmental stresses comprises the focus of our research. Fly larvae were found in diverse microhabitats ranging from moss beds to mats of terrestrial algae (*Prasiola*) to guano-rich sites adjacent to penguin rookeries.

Winter survival for many polar organisms depends on a coordinated transition from feeding, growth and reproduction during short summers, to an energy-conserving dormancy coupled with enhanced resistance to environmental extremes during long, severe winters. Our project focuses on physiological and molecular mechanisms used by larval midges for winter survival. Although summer larvae are freezing tolerant, we recently demonstrated that they also have the capacity to cryoprotectively dehydrate. We have begun a series of field and laboratory investigations to determine whether larvae survive winter by freezing or dehydration. Although many temperate species rely on photoperiodic cues to trigger physiologic retooling in advance of winter, few studies have specifically addressed the role of photoperiodic timers in polar animals. To determine whether larvae use photoperiodic cues to trigger anticipatory preparations for winter, we conducted field experiments designed to track expression of the major clock genes and the proteins they encode.

Our outreach efforts seek to connect the science activities of our team and other research projects on station with teachers and their students. Our website (www.units.muohio.edu/cryolab/) at Miami University, provides K-12 classroom activities based on national and state standards. Pat Betteley, a sixth grade teacher, published a series of interactive blogs (http://frozenfly.edublogs.org/) targeted at 5-8th graders but also informative for teachers and the general public. Pat created an 11-minute movie of photos, video clips and text, describing a day in the life of a researcher at Palmer Station (http://www.youtube.com/watch?v=JxJyr3IzR5o). She communicated with 450 students and staff at her middle school using a combination of prerecorded video and real-time discussions. Four other distance- learning sessions by phone or video connection reached 225 elementary and middle school students in Pennsylvania and Ohio. Children were able to ask questions during these live interactive sessions.

We are grateful to station personnel for their support and helpfulness during our second field season. Tracey Baldwin, Phil Spindler and Carolyn Lipke provided efficient and prompt assistance that allowed us to quickly set-up our laboratory and begin research. Lily Glass and

Ken Keenan ably supported our boating needs. Video production and distance learning sessions would not have been possible without the excellent assistance of Jeff Otten and Paul Queior.

B-391-P: REAL-TIME CHARACTERIZATION OF ADELIE PENGUIN FORAGING ENVIRONMENT USING AN AUTONOMOUS UNDERWATER VEHICLE

Mark A. Moline, Principle Investigator, California Polytechnic State University

Personnel on Station: Mark A. Moline, Ian C. Robbins.

The effort began after arrival on the 5th of January with a rapid GPS survey of the local islands and searching for good georeferenced maps of the bathymetry in the area, including the Palmer Basin. We were able to piece together a number of different maps that served this purpose, but recommend a comprehensive map be put together for future science support. The two REMUS vehicles then underwent a final battery cycle (we had conducted 2 for each vehicle during the transit) and conducted compass calibrations in the local area. In support of this we also deployed to transponders (one off of Delaca and other off of Bonaparte point. This ensured acoustic navigation as the vehicle approached Palmer on return trips. For the remainder of the month we conducted 21 missions covering over 550km and almost 100 hours underwater (Figure 1).

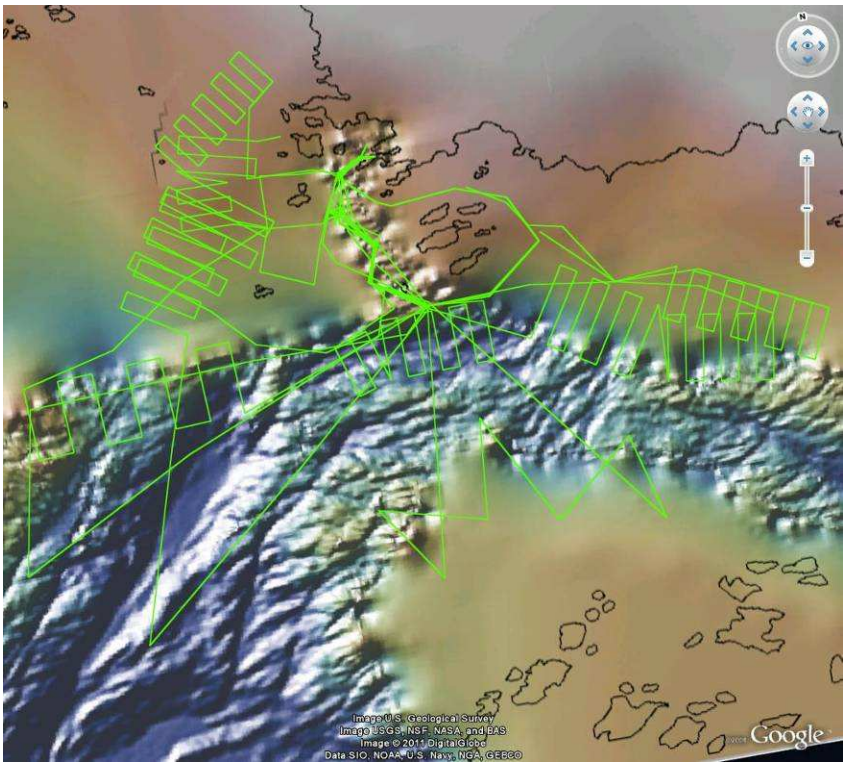


Figure 1. Complete spatial coverage of REMUS missions in the Palmer Area during January, 2011.

The locations of these missions were directed by the location of foraging penguins. In collaboration with B-013-P, satellite tags were placed on 27 penguins during the month to obtain tracks and dive information. Our group worked with B-013-P in both the deployment and retrieval of these tags. Data from the REMUS vehicles included Temperature, Conductivity, Density, CDOM FL, Backscatter, Chlorophyll FL, Multispectral Irradiance/Radiance, and Acoustic Backscatter. The missions were conducted from 0-80 meters in saw tooth patterns to resolve the vertical distribution of the measured parameters. REMUS efforts were also

coordinated with B-019-P glider efforts to ensure optimal use of platforms and overlap of different spatial scales. Our group also participated in glider deployments and recoveries with B-019-P.

The vehicles were able to operate in all weather conditions (Figure 2) and after becoming familiar with the operation in the area, we were able to launch and recover the vehicles in Hero Inlet with minimal boat use. A repeated small leak in one of the vehicles in the second week prevented further operations for that vehicle; however the second vehicle was used continuously over the field season.

Figure 2. REMUS being prepared for a mission off Janus Island

All data currently resides for public access at www.marine.calpoly.edu/auv with some preliminary figures of location and the depth distribution of the various parameters. At the request of and in support of B-026-P, B-239-P, and B-019-P, we are extracting those REMUS data in proximity to stations B and E as those groups routinely sampled those stations on Mondays and Thursdays. B-026-P is particularly interested in the light data in comparing the distributions of Rhodopsin-containing bacteria. B-239-P is interested in examining the relationship between B and E and the underlying physical oceanography underlying the dynamics at each station. REMUS missions overlapped with the Monday Thursday sampling schedule on 9 occasions, so there is good temporal/spatial coverage.

Outreach efforts included weekly 1-hour Skype video calls to the Santa Lucia School in Templeton, CA. About 40 students participated in these calls focusing on this project and were supplemented with worksheets and activities during each week. One additional video call was made to engineering undergraduates at California Polytechnic State University, CA. This call examined the details of the REMUS vehicle hardware and software. The PI participated in 3 other video calls of other groups at Palmer. The PI provided tours to two small tour boats at Palmer and also participated in a Q&A aboard the Crystal Symphony to 800 passengers. In addition, the PI taped an informal interview of life and science in Antarctica for the “Good Morning Show” aboard the Crystal Symphony. Finally, the PI presented a science lecture to the Palmer residents highlighting the recent efforts of the program.

Both Ian and I would like thank the science groups for their support, especially Matthew Oliver of B-019-P, Donna Fraser and the rest of the B-013-P team. Our constant interaction ensured a well coordinated integrated project. I would also like to thank the other scientist on station for their insights and support. Finally, we would like to thank the RPSC coordination in Denver and the Palmer Station staff for their excellent support, interest and professionalism.

PALMER STATION
RESEARCH ASSOCIATE MONTHLY REPORT
January 2011
Brian Nelson

G-295-P GPS CONTINUOUSLY OPERATING REFERENCE STATION.

Bjorn Johns, Principal Investigator, UNAVCO

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

The GPS operated normally for the duration of the month.

G-090-P GLOBAL SEISMOGRAPH NETWORK (GSN) SITE AT PALMER STATION.

Kent Anderson, Principal Investigator, Incorporated Research Institutions for Seismology (IRIS)

The Research Associate operates and maintains on-site equipment for the project. Station PMSA is one of more than 143 sites in the GSN monitoring seismic waves produced by events worldwide. Real-time telemetry data is sent to the U.S. Geological Survey (USGS).

Data collection occurred normally during the month. A brief reset was required to free a frozen monitor.

A-132-P FABRY-PEROT INTERFEROMETER

Qian Wu, Principal Investigator, National Center for Atmospheric Research

The Research Associate operates and maintains on-site equipment for the project. The Fabry-Perot Interferometer observes mesospheric and thermospheric neutral winds and temperatures at Palmer Station.

The Fabry-Perot Interferometer was turned back on in mid-January. Some small hiccups with the focus control have required reboots and data loss, fortunately only on cloudy nights when the data is not useful anyway.

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

Mathew Lazzara, Principal Investigator, University of Wisconsin

The Research Associate operates and maintains on-site equipment for the project. The AMRC SDI 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 ingestor operated normally for the duration of 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 inter-annual variations in atmospheric O_2 (detected through changes in O_2/N_2 ratio), which can aid in determining rates of marine biological productivity and ocean mixing. The results are also used to help determine the terrestrial and oceanic distribution of the global anthropogenic CO_2 sink. The program involves air sampling at a network of sites in both the Northern and Southern Hemispheres. Palmer Station is especially well situated for resolving signals of carbon cycling in the Southern Ocean.

The Research Associate collects samples fortnightly from both TerraLab and the VLF Building. A goal is that all sampling will eventually be moved to TerraLab. Samples taken from the station are sent to Scripps where the analysis of O_2 and CO_2 content takes place.

Sampling equipment and operations were per plan throughout the month. An inconsistent sample taken back in November prompted a flush of the air intake.

O-264-P: COLLECTION OF ATMOSPHERIC AIR FOR THE NOAA/GMD WORLDWIDE FLASK SAMPLING NETWORK
James Butler (Principle 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.

Palmer Station is one of many sites around the world providing data to support these projects. The Research Associate collects weekly air samples for Carbon Cycle Greenhouse Gases Group and fortnightly samples for Halocarbons & other Atmospheric Trace Species Group.

Carbon Cycle and Halocarbon sampling occurred normally during the month.

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

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

The weather station ran normally during the month.

A-109-P ANTARCTIC EXTREMELY LOW FREQUENCY/VERY LOW FREQUENCY OBSERVATIONS OF LIGHTNING AND LIGHTNING-INDUCED ELECTRON PRECIPITATION.
Robert Moore, Principal Investigator, University of Florida

Extremely Low Frequency/Very Low Frequency (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. Lightning source currents are estimated or directly measured by experimental observations of individual natural and rocket-triggered lightning flashes in North America. Together, the North American and Antarctic data sets are used to experimentally identify and analyze the components of lightning and the effects of lightning, such as lightning-induced electron precipitation, that are observed in the Antarctic, more than 10,000 km distant.

Data collection continued normally throughout the majority of the month. See A-306-P below for more details.

A-306-P GLOBAL THUNDERSTORM ACTIVITY AND ITS EFFECTS ON THE RADIATION BELTS AND THE LOWER IONOSPHERE.
Umran Inan, Principal Investigator, Stanford University

Stanford University has been operating a Very Low Frequency (VLF) receiver antenna at Palmer Station since the 1970's. By receiving naturally and manmade signals between 1 and 40 kHz, the Stanford VLF group is able to study a wide variety of electromagnetic phenomenon in the ionosphere (uppermost layer of the atmosphere ionized by solar radiation) and magnetosphere (the area surrounding the earth dominated by the Earth's magnetic field and particles trapped by it. Many of these studies relate to the energetic releases associated with lightning. For example, Palmer Station's unique location enables it to pick up small bits of radiation from lightning strikes as far away as Africa, the USA, or the Pacific Ocean.

Data collection continued normally throughout the majority of the month. On the 31st, an intermittent short began causing fuses to blow. The system is currently down for troubleshooting. Also, encroaching crevasses near the antenna have required the safe area on the glacier to be moved. The VLF antenna is now out-of-bounds, and discussion to move it is underway.

T-312-P TERASCAN SATELLITE IMAGING SYSTEM.

The Research Associate operates and maintains on-site equipment for the project. Throughout the month, the TeraScan system collected, archived, and processed DMSP and NOAA satellite telemetry, capturing approximately 25-30 passes per day. A weekly 85GHz SSM/I ice concentration image was produced and transferred to UCSB for B-032-P (Smith).

A tape write fault interrupted data archival early in the month. The problem has been fixed.

A-357-P EXTENDING THE SOUTH AMERICAN MERIDIONAL B-FIELD ARRAY (SAMBA) TO AURORAL LATITUDES IN ANTARCTICA
Eftyhia Zesta, Principal Investigator, University of California Los Angeles

The three-axis fluxgate magnetometer is one in a chain of longitudinal, ground-based magnetometers extending down though South America and into Antarctica. The primary scientific goals are the study of ULF (Ultra Low Frequency) waves and the remote sensing of mass density in the inner magnetosphere during geomagnetically active periods. Palmer's magnetometer is also a conjugate to the Canadian Poste de la Baleine station, allowing the study of conjugate differences in geomagnetic substorms and general auroral activity. The station Research Associate maintains the on-site system.

The system collected data normally during the month.

B-390-P: THERMO-SALINOGRAPH
Vernon Asper, Principal Investigator, University of Southern Mississippi

Sea water is pumped continuously through a thermosalinograph (TSG) sampling system, recording the temperature, conductivity, salinity, and fluorescence. The real-time data, including graphs and web camera images of the ocean in the vicinity of Palmer Station, are compiled by a local server into web page format and relayed to a mirror site at Woods Hole Oceanographic Institute, which is a collaborator in the project. The URL for the WHOI mirror site is http://4dgeo.whoi.edu/tsg/.

The thermosalinograph operated normally during the month.

T-998-P: IMS RADIONUCLIDE MONITORING
Managed by General Dynamics

The International Monitoring System (IMS) radionuclide sampler is part of the Comprehensive Test Ban Treaty (CTBT) verification regime. The automated Radionuclide Aerosol Sampler and Analyzer (RASA) unit pumps air continuously through a filter for 24 hour periods, collecting particulates in the .2-10 micron range. The filter is then tested for particulates with radioisotope signatures indicative of a nuclear weapons test. The station Research Associate operates and maintains the instrument.

The system operated normally throughout the month. Fourth quarter samples from 2010 were sorted and packaged, and will ship in early February.

ULTRAVIOLET (UV) SPECTRAL IRRADIANCE MONITORING NETWORK (UVSIMN)

A 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, while the sun is above the horizon. A BSI GUV-511 filter radiometer, which has four channels in the UV and one channel in the visible for measuring Photosynthetically Active Radiation (PAR), is located next to the SUV-100.

The UV monitor collected data normally for the month and all scheduled calibrations were carried out.

TIDE GAGE

The Research Associate operates and maintains on-site equipment for the project. Tide height and seawater temperature are monitored on a continual basis by a gauge mounted at the Palmer Station pier. Although salinity (conductivity) is also recorded by the tide gauge, the measurements are incorrect and should not be used. Correct salinity data can be found on the TSG system.

The tide gauge operated normally during the month.

METEOROLOGY

The Research Associate acts as chief weather observer, and compiles and distributes meteorological data. At the end of the month a summary report is prepared and sent to interested parties. 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 NOAA for entry into the Global Telecommunications System (GTS).

Scheduled inspections were carried out at the Gamage Point tower.

The ceilometer saga continues, as time allows. Communication with the weather station has been achieved, but only intermittently.