

PALMER STATION MONTHLY SCIENCE REPORT
October 2007



Science group B-028 prepares to leave Hero Inlet to conduct their field work. Photo courtesy of Stacie Murray.

NEWS FROM THE LAB

Philip Spindler, Senior Assistant Supervisor Laboratory Operations

After a quick camp put-in on King George Island, the *ARSV Laurence M. Gould* arrived with the first of the season's science groups and the rest of the summer support staff. The population rose to 32, and the station was quickly in full swing with setting projects and science groups in motion. As field teams readied their laboratories and hit the water, support staff prepared anchorage sites to install the ship bollards due to arrive in mid-November. In addition to the bollards, the ship will bring much-needed fuel that can only be transferred to station when the ship is properly moored to the pier.

Summer tried to provide a few nice days, but October was resistant to letting summer break through completely. Snowfall continued throughout the month. The Adélie penguin's clockwork timing has brought them back to the area. Pairing up, they are staking claims and preparing to lay their eggs even if the ground is covered in snow. The heavy snowfall presents a looming problem for egg success since they need the dry rocks, not the wet snow. And so far, the snow appears to be adamant in staying around for a bit longer. Skuas seem to know the nesting season is not in full swing since they were not spotted in the area this month.

Thick brash ice has been a constant sight in the area. With little to no pack ice, B-028-P has concentrated its efforts in working from the water surface instead of beneath it. The ability to largely monitor krill activity so early in the season has revealed a picture of early-season schooling by young of the year.

Everyone at Palmer Station is looking forward to the season as it begins to unfold and pick up with increasing science activity.

OCTOBER WEATHER

Scott Walker, Research Associate

Summer is on the way in, but cooler than usual temperatures and significant snowfall during the month has allowed Palmer Station to enjoy a few more weeks of snow. The windy conditions from last month continued with a maximum gust of 64 knots and maximum sustained winds of 46 knots near the middle and end of the month.

The high winds affected the sea ice, creating alternating days of brash ice and completely open water, depending on prevailing wind direction. The glacier has begun to calve more often creating growlers and bergy bits in Arthur Harbor.

The high temperature for October was 4.8 C on the 3rd with a low of -9.6 C occurring on the 9th, resulting in an average temperature of -2.7 C. Palmer received 23.6 mm of melted and 49 cm of snow precipitation, a full 35 cm more than last year, with a maximum snow depth of 90 cm.

The following projects conducted research at Palmer Station during October:

BP-013-P: LONG-TERM ECOLOGICAL RESEARCH ON THE ANTARCTIC MARINE ECOSYSTEM: AN ICE DOMINATED ENVIRONMENT (SEABIRD COMPONENT)

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

Personnel on station: Jennifer Blum, Kristen Gorman

A relatively smooth crossing of the Drake Passage followed by a successful camp put-in at COPA preceded our October 14th arrival at Palmer Station. Due to the inability of the LMG to tie up, personnel remained on board the LMG until the 15th. Personal and priority cargo were offloaded by zodiac on the 15th. Sea ice conditions proved minimal for the first few weeks after our arrival, although a couple of days of heavy brash ice prevented access to some islands for fieldwork. We were able to collect Adélie penguin counts on all five colony islands: Torgersen, Humble, Litchfield, Cormorant, and Christine. Censuses of Blue-eyed Shags and marine mammals have also been obtained. In between our excursions into the field we unpacked and organized all of our gear and equipment; set up our lab and work areas; prepped files and field notebooks; updated our data sheets and databases; and delved into our lab work by performing skua scat analysis.

The support from RPSC personnel thus far has been great. Ryan Wallace had our boats ready upon our arrival and has been very accommodating. Chuck Kimball and Jeff Otten had everything ready to go for our project and have provided prompt assistance for various small requests. Alden Strong enthusiastically assisted us with some small construction requests.

B-028-P LONG TERM ECOLOGICAL RESEARCH ON THE ANTARCTIC PENINSULA, AN ICE DOMINATED ECOSYSTEM: PREY COMPONENT.

Robin Ross and Langdon Quetin, Principal Investigators, Marine Science Institute, University of California at Santa Barbara

Personnel on station: Langdon Quetin (team leader/PI), Shannon Rich, Albert Kao and Natashia Dallin (Marine Science Institute, University of California at Santa Barbara).

Activity from 14 to 31 October 2007

Our field team arrived at Palmer Station on the 14 October on the *Laurence M. Gould* after assisting with season-opening logistics at COPA field camp in Admiralty Bay. All of our team were quickly oriented to the station and laboratory procedures, and completed the boating courses soon after arrival. Thanks to everyone at the station, we have been able to promptly and efficiently move into the laboratories and meld smoothly into station life.

Though brash ice continues to be an intermittent boating issue, we have had only two days of pack ice in the area since our arrival. This has allowed us an early start to the season with our zodiac operation but has limited our diving in pack ice. We have completed 4 dives (two checkout dives, one dive on the Bahia Paraiso and one dive under pack ice in Hero Inlet).

We have collected two lots of krill, one from beneath pack ice in Hero Inlet and one from a school near Cormorant Island. Krill from both collections were primarily spawned last season and in the furcilia 6 and juvenile stages. We completed a series of measurements on both catches (wet weight, dry weight, total length, telson length, uropod length) for comparison with previous seasons. We also completed two experiments on krill growth and found that the intermolt period for krill from the school in the water column was twice as long as for the krill feeding on the underside of the pack ice. We have also completed one set of our standard acoustic transects (Stations A-E, F-J), finding no krill schools.

The lack of ice early in the season enabled us to dive on the Bahia Paraiso in relatively clear water. The ship continues to disintegrate. We found more holes opened in the hull, especially on the seaward side, and more debris below the cargo hatch. Each year, the Bahia Paraiso appears to be slowly settling onto its superstructure, rotating the hull toward being completely upside down. The ship continues to be a haven for algal and marine invertebrate species.

Thanks to another great RPSC crew at Palmer Station, we are off to an early start and look forward to a successful season.

PALMER STATION RESEARCH ASSOCIATE MONTHLY REPORT

October 2007

On October 10th Palmer Station experienced a station wide power outage for approximately twenty five minutes. During this outage many projects were affected. Due to this event, procedural changes and equipment staging have been modified so that the RA can better respond to a power event.

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. The 15-second epoch interval GPS data files were collected continually at station PALM throughout the month. Transmission of these files to the NASA/CDDIS data center in Reston, VA occurs on a daily basis.

The core components of the GPS system was not affected by the power outage but a single powered splitter was not protected. Data collection during the outage was disrupted during the outage. The splitter has since been added to the UPS system and the system should fair well in another outage due to the low power requirements of each of the components.

The roving Trimble was powered up and tested in the backyard to assure that it will be ready for science group use.

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

Rhett Butler, 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. Data files are recorded to tape and also sent real-time to the U.S. Geological Survey (USGS).

The DP (data processing) system for the Seismic system (located in Terra Lab) was affected by the power outage and lasted only 5 minutes on the UPS. Once power was restored the system was powered up and began to transfer queued data from the DA (data acquisition) system located in the seismic vault. No data loss occurred.

The DA system also was adversely affected during a security sweep later in the month. The system stopped communicating with the DA system. A reboot of the system was required and queued data from the DA system was transferred to the USGS. No data loss occurred but the data was significantly delayed.

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

Charles Stearns, 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 receiver, extracting Automated Weather Station information and low-resolution infrared imagery and sending the results to AMRC headquarters in Madison, WI.

The system operated normally throughout the month except for the power outage where the unit lost power. The system has been temporarily placed on a spare UPS until the PI can provide a dedicated UPS unit.

**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 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 CO₂ 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. Samples taken from the station are sent to Scripps where the analysis of O₂ and CO₂ content takes place.

Samples were taken on both the new and old systems for intercomparison purposes with out any issues.

O-283-P ANTARCTIC AUTOMATIC WEATHER STATIONS (AWS).

Charles Stearns, Principal Investigator, University of Wisconsin

The Research Associate monitors data transmissions for the project. AWS transmissions from Bonaparte Point were monitored using the TeraScan system. AWS data received is forwarded to UCSB for B-032-P (Smith).

The Bonaparte Point AWS operated normally up to 10-October where data collection stopped. The RA traveled to Bonaparte Point, inspected all enclosures for water incursion, tested battery voltage and cycled the power on the station. The station resumed data transmission.

A replacement AWS station for Bonaparte Point and Hugo island is being tested at the University of Wisconsin and will be sent to replace the existing stations.

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.

VLF data acquisition ran normally throughout the month except for the power outage where the system lost power. Once the power was restored the system was powered on and resumed normal data collection with minimal loss of data. Windows updates were applied to all systems and were rebooted without issue.

T-312-P TERASCAN SATELLITE IMAGING SYSTEM.

Dan Lubin, Principal Investigator, Scripps Institution of Oceanography

The Research Associate operates and maintains on-site equipment for the project. Throughout the month, the TeraScan system collected, archived, and processed DMSP, NOAA and ORBVUEW-2 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). Sea ice images were provided to the LMG for cruise support.

The system ran normally during the month and was unaffected by the power outage. Two additional tape drives were added to the system to allow for backups and tape archiving without having to pause satellite acquisition. Legacy scripts from the old TeraScan system are still being adapted to the new system.

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 through 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 performed normally throughout the month except for the power outage where the system lost power. The system has been temporarily placed on a spare UPS. The PI plans to ship down a UPS for the system.

The RA was informed that the PI and her student have been unable to access the magnetometer data via ftp from UCLA for the past 11 months. After a week of debugging the RA was able to determine that it was an issue with the workstation at UCLA and the sheer number of files on the magnetometer system. To make the data accessible to the student the RA transferred the files to a server at UCLA and archived the files on the local machine.

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/>.

Data collection stopped during the power outage but resumed normal operation after the power and seawater flow was restored. Weekly modifications in the seawater input have been made to maintain a suitable flow through the device.

T-513-P: ULTRAVIOLET (UV) SPECTRAL IRRADIANCE MONITORING NETWORK (UVSIMN)

Charles Booth, Principal Investigator, Biospherical Instruments, Inc

The Research Associate operates and maintains on-site equipment for the project. 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. Data from the GUV-511 instrument are made available on a daily basis on the project's website at <http://www.biospherical.com/nsf>.

The UV monitor operated normally throughout the month. The system was unaffected by the power outage.

T-998-P: IMS RADIONUCLIDE MONITORING

Michael Pickering, Principal Investigator, 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 RASA system was able to respond to the power outage by pausing the blower. Once the power was restored the system resumed normal operation.

Later in the month the RASA system cryogenic chiller was unable to maintain the temperature necessary to accurately collect data. The system was placed in a standby mode and the RA was asked to pump down the cold head of the detector. The chiller was then restarted and temperature was checked. Since the chiller was still not able to reach the necessary temperature a new chiller is being sent out. The system will remain in a standby mode with the chiller operational until the new chiller can be installed. The estimated time of arrival for the new chiller is December.

The seismic monitoring station operated normally during the month and was unaffected by the power outage. There were a few data delays due noted that corresponded to the USGS system down time.

TIDE GAUGE

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 cannot be used.

Windows updates were performed and the system was rebooted without and issues. The tide gauge system ran normally throughout the month and no significant data loss occurred during the outage.

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 are archived locally and forwarded twice each month to the University of Wisconsin for archiving and further distribution. Synoptic reports are automatically generated every six hours by the Palmer Meteorological Observing System (PalMOS) and emailed to the NOAA for entry into the Global Telecommunications System (GTS). Isobar images are sent to LMG for cruise support.

The ceilometer has not been functioning properly this month. The sensor has been cleaned and power cycled. Further inspection of the sensor will be performed this month.

Windows updates were applied and the system was rebooted.

Meteorological data was provided at PI request.