

PALMER STATION MONTHLY SCIENCE REPORT
January 2009



*Chuck Kimball at Humble Island putting on the final touches for the datalink.
Photo courtesy of Rebecca Shoop.*

NEWS FROM THE LAB

Pat McMillan, Winter Assistant Supervisor of Laboratory Operations

The month saw the *ARSV Laurence M. Gould (LMG)* arrive on January 4th bringing new staff, the Long Term Ecological Research (LTER) cruise participants, two artists and a freshie resupply. We added eight new people to station- 4 staff members, 2 artists- Cheryl Leonard and Oona Stern, and 2 divers. Cheryl composes music using natural objects such as rocks, feathers, and bones. Oona is a visual artist with interest in ice fractures. Three station science participants

joined the LTER cruise. Underwater photographer Norbert Wu and his assistant Conor McCracken arrived with Kirstie Yeager, a field assistant for the LTER Seabird Component, on the Holland America Cruise Ship *Amsterdam*. Rebecca Shoop, Palmer Area Manager, and Phil Spindler, Sr. Assistant Supervisor of Laboratory Operations, departed station via the same cruise ship.

This was a busy tour ship month. We had visits from the *Endeavour*, *Amsterdam*, *M/V Akademik Shokalskiy*, which had Jonathan Shackelton on board, *S/V Spirit of Sydney*, *S/V Kiwi Roa*, *S/V Vaihere* and *Clipper Adventurer*.

Science on station was very successful and busy with their work over the month. The installation of the datalink on Humble Island was completed. Monitoring Gentoo, Adélie, Skua, and Blue-eyed Shag nests continued. Humpback whales returned to the area the first 2 weeks of the month then tapered off.

The month came to a close as we prepared for the return of the *LMG* and the LTER cruise.

JANUARY WEATHER

Louise Hamlin, Research Associate

January brought the warmest temperatures yet this season, with mostly calm days and a lot of rain. There were only 2 days this month where the temperature dropped below freezing.. The 17th was the warmest with a high of +7.1C. The coldest daily low temperature was on the 3rd at -0.6C. The average temperature for the month was 2.7 C, which is two degrees warmer than last month and 0.3 degrees warmer than the average on record (1989-2008).

Brash continues to blow in and out of the area surrounding Palmer station and is increasingly fed by the calving glacier. The smooth façade of our glacier has been washed away by the rain and multiple cracks and crevasses are now visible. The highest winds were on the 14th of the month, gusting to 58 knots. Winds and precipitation were both average when compared to the record.

Palmer received 65 mm of melted precipitation and 5 cm of snow.

The following projects conducted research at Palmer Station during January:

B-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, Tawna Morgan, Rick Smaniotto, Kirstie Yeager

The arrival of the *Laurence M. Gould* on January 4th increased our personnel by two people, Tawna Morgan and Rick Smaniotto. Kirstie Yeager arrived mid-month on-board the

Amsterdam. Kristen Gorman and Rick Smaniotto departed on the annual LTER cruise on January 6th. Weather conditions were mostly favorable for the month of January except for a couple of short stretches characterized by periods of high winds and/or precipitation that postponed field operations and prevented access to our farther-ranging field sites.

Monitoring of Adelie penguin reproduction 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. A Gentoo chick census was completed on Biscoe Island, and a Chinstrap chick census was completed on Dream Island. A census of Adelie, Chinstrap, and Gentoo penguin chicks was completed on the known penguin-breeding islands in the Joubins. Breeding chronology monitoring and sampling continued for our selected Adelie, Chinstrap, and Gentoo nests. Adelie foraging ecology studies began this month, which include diet sampling as well as deployment of presence/absence radio transmitters and satellite transmitters/dive depth recorders. The receiver and datalink system installed a few seasons ago for this transmitter work was utilized again; a few issues impeded efficient data transfer and thus direct data downloading had to occur for most of the month of January. Samples continue to be salvaged for further analysis and collaborations.

Skua work continued this month, as we started monitoring chick growth of Brown Skuas on local islands as well as on Dream and Biscoe Islands. Similar nest monitoring as well as scat collections continue on Shortcut Island for South Polar Skuas. 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 is being wrapped up with the addition of a 5-island census in the Joubins. The Giant Petrel study on Humble Island continues with chick growth measurements.

Monitoring of marine mammals has continued this month and was highlighted by numerous sightings of Humpback whales early in the month. Fur seals have also been seen in increasing number on local islands. Labwork continued with Adelie diet sample processing and sample preparation.

We greatly appreciate the volunteers who accompanied us in the field this month, particularly Ryan Wallace who provided some critical assistance for the first part of January. Special thanks to John Fonseca for his outstanding boat support, and Chuck Kimball for his extra assistance with our Humble Island datalink.

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

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

No science was done on station, as they were on the LTER cruise from Jan 4 to Feb 1.

W-480-P: ICE FRACTURES: A STUDY OF ICE SCHELVES AND ICE SHEETS

Oona Stern, Principal Investigator

Personnel on Station: Oona Stern

The aim of this project is to observe the form and structure of ice in the Antarctic, with a focus in particular on how ice breaks up and the forms and shapes it takes in doing so. The relationships between stable structures, and the fragmented parts is also of interest. Various forms of ice were observed from the surface and from the sea. Ice accessible for observation at Palmer Station includes bergs, bergy bits, growlers, brash ice, pancake ice and more. These observations will later be used in the studio to develop a public sculptural installation which can communicate the conditions of Antarctic ice.

Oona was able to accomplish what she expected to do. The support was excellent!

W-482-P: ANTARCTICA: HIDDEN MUSICAL WORLDS

Cheryl Leonard, Principal Investigator

Personnel on Station: Cheryl Leonard

January was a month of adventure and wonder as I explored the natural sounds in the Palmer Area. Daily zodiac forays in the company of Oona Stern and station personnel allowed me to access islands including Old Palmer, Breaker, DeLaca, Torgersen and Jacob's. On the islands and in the ocean I searched out and recorded sounds from birds, marine mammals, the sea, glacier ice and sea ice, using both open-air microphones and hydrophones. Excursions to the backyard and up onto the Marr Ice Piedmont yielded wind recordings and sounds from the calving and melting glacier.

Among the highlights of my time at Palmer Station were two trips down into glacier crevasses and an evening spent camping out on Old Palmer Island. In addition to making field recordings I did some onsite musical improvisations on stones and ice. I also collected several stones from Breaker and Torgersen Islands, limpet shells, and rocks to use as musical instruments in future live performances.

Throughout my stay, in addition to logistical support, station personnel volunteered many valuable recording ideas. Without their detailed knowledge of the region and interest in my project I could never have achieved as much as I did in just one month.

Y-608-P: IPY: POLES APART: VISUAL DOCUMENTATION OF THE MARINE ECOSYSTEMS OF THE POLAR REGIONS

Norbert Wu, Principal Investigator

Personnel on Station: Norbert Wu, Conor McCracken

Poles Apart: Visual Documentation of the Marine Ecosystems of the Polar Regions is a collaborative effort by a team of documentary film makers, photographers, scientists and educators with the aim of instructing a wide audience on the critical importance of polar marine ecosystems. This will be achieved through the development of a library of still and moving imagery which will then be disseminated across a spectrum of different outlets to reach as wide a potential audience as possible.

Our first season at Palmer has resulted in thousands of still images and hours of video footage so far. I thank everyone at Palmer Station for their gracious help and support during my first season here.

**PALMER STATION
RESEARCH ASSOCIATE MONTHLY REPORT
January 2009**

Louise Hamlin

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 system operated normally throughout the month.

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).

On the 28th of the month the terminal locked up unexpectedly and was restored by a power cycle. Apart from that, the station operated normally throughout the month.

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

The 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 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.

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 O₂ and CO₂ content takes place.

Sampling equipment and operations were per plan throughout the month. Samples were shipped out on LMG 09-02NB.

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

Dr. David Hofmann (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.

Sampling equipment and operations were per plan throughout the month. Samples were shipped out on LMG 09-02NB.

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

Charles Stearns, 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 station transmitted data normally during the month.

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 operated normally throughout the month. Per request from Stanford, complete continuous data was saved for January 22- January 25. Data drives and DVDs were shipped out on LMG 09-02NB.

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 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).

The NASA MODIS subset for Palmer was increased to enhance scientific activities on and around the peninsula. This subset is available via the internet for science groups on and off the ice.

The system operated normally throughout the month. Data tapes were shipped out on LMG 09-02NB.

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 magnetometer operated well 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 webcam and salinograph performed normally during the month.

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 is made available on a daily basis on the project's website at <http://www.biospherical.com/nsf>.

The Power Distribution Unit associated with BSI, bsi3 stopped responding to pings on January 5 and the PI was notified. The UV monitor operated normally throughout the month. Lamp calibrations were completed successfully.

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 errant energy signature identified by General Dynamics in December in the energy region 136-144 keV was investigated and determined to be of cosmogenic origin. No further action by the Research Associate is required. The monitoring station operated normally during the month.

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).

The weather station operated normally throughout the month. Scheduled inspections were carried out of the Gamage Point tower.