

PALMER STATION MONTHLY SCIENCE REPORT
October 2008



*Scott Sternbach at work around Palmer Station.
Photo courtesy of Homero Campos.*

NEWS FROM THE LAB

Philip Spindler, Senior Assistant Supervisor of Laboratory Operations

Lingering winter activities concluded October 22nd with the arrival of the *R/V Laurence M. Gould*. A short port call brought two summer science groups, Fraser (B-013-P) and Schofield (B-019-P), and the last counterparts to winter personnel. The *L.M. Gould* achieved successful field camp put-ins with the Peter J. Lenie field station (Trivelpiece, B-040-E) on King George Island and Cape Shirreff (NOAA) on Livingston Island. This is the last we will see of the *L.M. Gould* until January 3rd, when it returns to commence the Long Term Ecological Research cruise.

The *L.M. Gould* departed October 23rd, leaving 26 people on station: 21 support staff and 5 grantees. Though we won't see the *L.M. Gould* until January, we began minor preparations for the tour ship season to start mid-November.

Science activities got underway for the summer, and station personnel settled into science support and projects around Palmer Station. Scott Sternbach was excited to receive more subjects for his portraits, particularly the science field team members. Sunny and calm days

toward the end of the month greatly increased his successes. Schofield's group brings something interesting and new to the work being done from Palmer and the LTER cruise; autonomous underwater vehicles (gliders) to measure salinity, temperature, turbidity, and optical qualities of the surrounding waters. Fraser's group quickly got down to business with their fieldwork counting and monitoring wildlife in the area.

We wrapped up the month with a fun Halloween celebration, and we look forward to a successful summer season.

OCTOBER WEATHER

Louise Hamlin, Research Associate

In the first half of the month, warmer than usual temperatures and no snowfall caused all the accumulated snow to melt away. Temperatures cooled down to normal for the last half of the month and a few inches of snow accumulated on the occasional non-windy days. The last week was particularly windy with a maximum gust of 59 knots and maximum sustained winds of 46 knots.

The sea ice surrounding station broke up completely and blew out after the opening of a lead from the *R/V Laurence M. Gould*'s mid-month arrival. Alternating days of brash ice pack and completely open water have occurred since, depending on prevailing wind direction.

The high temperature for October was 6.4 C on the 18th with a low of -10.6 C occurring on the 1st, resulting in an average temperature of -0.5 C; a full 5 C higher than the average of September. Palmer received 46.2 mm of melted and 14 cm of snow precipitation with a maximum snow depth at the beginning of the month at 62 cm.

The following projects conducted research at Palmer Station during October:

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, Kristen Gorman

A successful camp put-in at COPA followed a relatively smooth crossing of the Drake Passage, though the Cape Shirreff camp put-in was delayed until the northbound *L.M. Gould* trip. Our morning arrival at Palmer Station on October 22nd was accompanied by excessive winds, thus preventing the *L.M. Gould* from tying up until mid-afternoon.

A complete lack of pack ice in the area has allowed thorough access to local islands for our fieldwork this month, though progress has been slowed by days with excessive brash ice as well as a few days with winds exceeding the boating limits. We were able to collect Adélie penguin

counts on all five colony islands: Torgersen, Humble, Litchfield, Cormorant, and Christine. A trip was made to Biscoe Island to check the status of Adélie and Gentoo penguins. Brown Skuas arrived at the end of the month thus band-resighting and monitoring have begun. 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; received and unpacked cargo; set up our lab and work areas; prepped files and field notebooks; updated our data sheets and databases; and delved into some of our lab work

The support from RPSC personnel thus far has been great. John Fonseca had both of our boats ready to go upon arrival and has made some improvements/modifications to the set-up of our operation.

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

Personnel on station: Dr. L. Alex Kahl and Elizabeth Leonardis, Institute of Marine and Coastal Sciences, Rutgers University

After helping to open the Peter J. Lenie (*Copacabana*) field station on King George Island, and attempting to also open the Cape Shirreff field station on Livingston Island, we (Alex and Elizabeth) arrived at Palmer Station on 23 October. The lab was established and all boating training completed by the beginning of our second week on station. We commenced seasonal sampling at traditional LTER stations B and E on 31 October aboard *Bruiser*, our dedicated sampling zodiac, to collect water samples. Our lab is set-up to begin regular processing - during the months of November and December - of samples for analysis of total chlorophyll, bulk pigment composition, dissolved organic carbon (for Ducklow, B-045-P), nutrients (for B-045-P), DNA (for B-045-P), and flow cytometry (for B-045-P). Measurements for primary production rates and efficiency will start when the *R/V Nathaniel B. Palmer* delivers the rest of our supplies.

Finally, B - 019 would not be operating without the excellent and timely support of the Palmer Station RPSC staff. Their hard work and dedication towards ensuring the success of the science they support is appreciated.

W-484-P: ANTARTICA IN BLACK AND WHITE

Scott Sternbach, Principal Investigator, LaGuardia Community College, Long Island City, NY

Personnel on Station: Scott Sternbach and Homero Campos

October has been a month of opportunity, change and productivity. The ability to stay beyond mid-October was made possible by an extension by the NSF. Homero Campos left on LMG08-12. He has been my assistant and was crucial to my productivity from the beginning of my creative activities here at Palmer. Homero has been missed but his loss has opened up the opportunity to work directly with station personnel. With a rotating schedule of “assistants”, I

have been able to draw upon the knowledge base of each individual who accompanies me in the field. In addition each person gains knowledge about the creative and technical processes that go into making professional quality images. With each loss there has been an opportunity for gain.

The arrival of two science groups has also added to the opportunities for me at Palmer. Jen Blum and Kristen Gorman (Fraser, B-013-P), and Alex Kahl and Elizabeth Leonardis (Schofield B-019-P) arrived on LMG08-12. Both groups immediately began their research work and with this work came visual opportunities. Successful portraits and documentation of fieldwork took place almost as soon as work had begun.

The exploration of many of the islands within boating limits began as weather cooperated. Janus, DeLaca, Old Palmer and Torgersen were regularly visited when winds dropped below 20 knots. DeLaca Island has been a place of special interest to me given its rugged topography, tern and petrel populations. An overnight camping trip to Old Palmer allowed me to photograph during twilight and dawn, opportunities that otherwise would not be available during regular boating hours. Station support for all of my activities has been near perfect and reflects the dedication of all station personnel.

PALMER STATION RESEARCH ASSOCIATE MONTHLY REPORT October 2008

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 project operated normally for 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).

The project operated normally for 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 for most of the month. There was an error with the ingestor computer near the end of September which caused it to not download all of the satellite images. This problem was also noted at McMurdo and was traced to a data interference problem with SEAWiFS data. Per instructions from Andy Archer, SEAWiFS data collection was ceased on October 26th.

**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 every two weeks for intercomparison purposes. New flasks were received on station while full flasks were shipped back to San Diego. During sampling on October 26th a sampling flask was broken.

**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 Palmer Physician collects weekly air samples for Carbon Cycle Greenhouse Gases Group and fortnightly samples for Halocarbons & other Atmospheric Trace Species Group.

All sampling occurred with no problems. New flasks were received on station while full flasks were shipped back to Boulder.

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.

There were two short data interruptions this month due to servicing of the uninterruptible power supply (UPS).

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.

Windows updates were applied and the computers were rebooted.

Data was shipped to Stanford via DVDs and external hard drive. Several data interruptions of 2 to 36 hours have been encountered throughout the month of September. It appears these are attributable to the lengthy file transfer times between VLF computers. The RA is revising the automatic scripts to manage this problem until the transfers can be eliminated under the new hard drive-only archiving plan.

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.

Cruise support SSM/I images generated by the system were sent to LMG and NBP staff daily. Starting October 30th, these images will only be sent when the ships are at sea; this change has substantial cost savings.

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 UV monitor operated normally throughout the month. The 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.

Quarterly samples were shipped to Vienna on the LMG 08-12NB ship. 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.

Windows updates were applied and the system was rebooted.

The tide gauge equipment has operated normally this 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 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.

Windows updates were applied and the system was rebooted.

Meteorological data was provided at PI request.