

PALMER STATION MONTHLY SCIENCE REPORT
November 2008



*Gliders- the new addition to the Palmer LTER- ready for testing in the local waters.
Photo courtesy of Scott Sternbach.*

NEWS FROM THE LAB

Philip Spindler, Senior Assistant Supervisor of Laboratory Operations

People settled into their routines and projects throughout the month. Our good weather ran out at the end of the month and stalled some field work for a time with strong winds. Schofield's group (B-019-P) completed some more tests and prep work on the gliders. They hope to get their fins wet early December. Aside from that, it has been a very productive month for all.

After a brief visit from some of the crew aboard the H.M.S. ENDURANCE, we were happy to receive two tour ship visits from the KAPITAN KHLEBNIKOV and N.G. ENDEAVOUR. Ernest Shackleton's granddaughter, Alexandria Shackleton, was aboard the K. KHLEBNIKOV, and we all really enjoyed meeting her. The ENDEAVOUR steamed north with one more passenger taking Scott Sternbach home as he ended his project at Palmer Station.

A family-style Thanksgiving meal brought all 25 of us together at the end of the month. Before digging into the amazing meal set before us, we toasted our friends and family back home. We hope you too had a successful month and are looking forward to a fruitful end of the year.

NOVEMBER WEATHER

Louise Hamlin, Research Associate

Warmer than usual temperatures and little snowfall in the first half of the month caused all the accumulated snow to melt away. Following after an unusually clear October, November was cloudy and gusty with the average wind of 12 knots and periods of 40 knot winds common throughout the month. The last week was particularly windy with a maximum gust of 66 knots and maximum sustained winds of 40 knots.

Alternating days of brash ice pack and completely open water have occurred throughout the month, depending on prevailing wind direction. Bergy bits have been common.

The high temperature for November was 6 C on the 30th with a low of -3.5 C occurring on the 4th, resulting in an average temperature of 0.6 C; 1 degree Celsius higher than the average (1996-2008) of -0.6C. Palmer received 58.2 mm of melted and 17 cm of snow precipitation with a maximum snow depth at the beginning of the month of 35 cm.

The following projects conducted research at Palmer Station during November:

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

Weather was favorable for the first half of November, allowing us regular field visits to all of the penguin colonies in the local area as well as Dream and Biscoe Islands. However, the second half of the month brought persistent high winds that prevented all field work for multiple days. Persistent periods of rain and sleet also delayed or prevented some field work this month, as the need for dry weather is associated with some bird-handling activities. We monitored the total number of Adélie adults and nests on Torgersen, Humble, Litchfield, Cormorant and Christine Islands. Breeding chronology and egg production were monitored on a subset of Adélie nests on Torgersen, Humble, Dream, and Biscoe Islands. A subset of Chinstrap nests on Dream Island and a subset of Gentoo nests on Biscoe Island were also monitored for the same purpose. A portion of these subsets of nests were sampled at the 1-egg stage to obtain adult body weights and egg measurements. Timing of the peak egg censuses for each penguin species was determined; a peak egg census was completed for Adélies on all local islands as well as on Dream and Biscoe. The Gentoo peak egg census was completed on Biscoe Island. The Chinstrap peak egg census will be completed in December as weather prevented the completion at the very end of November. We have also been monitoring the number of depredated eggs from all 3 penguin species on all islands.

We have continued our BRSK band resighting and have begun to monitor nests for all Brown Skuas in the Palmer area, as well as on Dream and Biscoe. South Polar Skuas began arriving in

the middle of the month; we began our band resighting and nest monitoring study of them on Shortcut Island. Counts of the blue-eyed shag colonies on Cormorant Island and Elephant Rocks have been completed. Our monitoring of marine mammals continued this month and was highlighted by a very newly-born Elephant seal pup on Biscoe as well as a curious Leopard seal in Hero Inlet. Satellite transmitters for Giant Petrels were tested and deployed, thus beginning our work with this species. An early-season census of Giant Petrel nests was completed on Shortcut Island. Databases were set up for more of our upcoming Giant Petrel work. Lab work has continued with the skua scat analysis, as well as with the processing of new samples. Assistance was provided to the artist/writer grantee on station, Scott Sternbach. Collaborations with LTER colleague Alex Kahl (B-019, Schofield) commenced. A science talk was given in the middle of the month.

RPSC has continued to provide great support for our project this month. Alden Strong and Andy Young created and/or made much-appreciated modifications to some of our field equipment. Wendy Beeler and Russell Freeman continue to provide fantastic meals that we also happily enjoy as left-overs in the field!

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

The relatively calm weather and ice-free water allowed for sampling from both stations (B & E) on 04, 06, 13, 17, and 24 November. Additionally, station B was sampled on 01, 11, 23, 25, and 26 November. At both stations, depth profiles of salinity, temperature, underwater light attenuation, absorption, and backscatter were collected. Following the CTD and optics cast, seawater samples from each station were collected and subsequently prepared for analysis of total chlorophyll, bulk pigment composition, dissolved organic carbon (for B-045), nutrients (for B-045), DNA (for B-045), and flow cytometry (for B-045). Sampling from both stations would not be possible without the rotating volunteers of RPSC support personnel at Palmer Station. Their enthusiasm and dedication in support of the LTER station sampling has been a crucial component of the success of our research thus far this season. Beyond the standard LTER sampling, the Webb Research Slocum gliders (autonomous under water vehicles) were also prepared and tested in the lab in anticipation of a December deployment.

W-484-P: ANTARTICA IN BLACK AND WHITE

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

Personnel on Station: Scott Sternbach

Scott wrapped up his work on station before departing aboard the N.G. ENDEAVOUR on November 20th. He was able to photograph everyone on station, as weather cooperated, especially Fraser's group (B-013-P) in the field. One beautiful evening allowed him to camp overnight on DeLaca Island for some spectacular twilight shots. We look forward to a successful outcome of his work on station.

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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.

Early in the month, there was a hardware failure to the UNAVCO receiver. The failure was traced to the power supply and operations were moved to the secondary power converter. A replacement board will be sent to Palmer aboard LMG 09-01. The total data loss was approximately 6 hours.

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 system 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. Updated AWS processing software on amrc.usap.gov had no unexpected impact.

O-204-P A STUDY OF ATMOSPHERIC OXYGEN VARIABILITY IN RELATION TO ANNUAL TO DECADEAL 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.

Variable winds throughout the month delayed scheduled collections by 1-3 days. One flask was broken during sampling on November 8th. Apart from that, sampling equipment and operations were per plan.

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.

Variable winds throughout the month delayed scheduled collections by 1-3 days. Apart from that, sampling equipment and operations were per plan. All sampling occurred with no problems. 16 HATS flasks were shipped back to Boulder aboard NBP08-12NB.

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.

The VLF_RECORD computer suffered several problems at the beginning of the month. Troubleshooting and continuing issues interrupted data frequently from November 1st through November 17th. Issues were traced to faulty RAM memory. The total volume of data lost was approximately 7 days.

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 Palmer data archive of the recently-discontinued SeaWiFS data, as well as NOAA and DMSP data tapes were sent to Denver on NBP08-12NB. An additional data transfer was added, to atlas.mcmurdo.usap.gov. Incorrect grammar in the controlling file resulted in failed data transfers for 2 days. Apart from this, the system operated normally throughout the month.

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 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. 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.

Replacement batteries were installed in the IMS Uninterruptible Power Supply (UPS). A blank sample was collected per instructions from the PI. 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.

Late in the month there were two short interruptions of data. This issue is still under investigation.

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. Isobaric charts were sent to Nathaniel B Palmer in support of the current cruise.