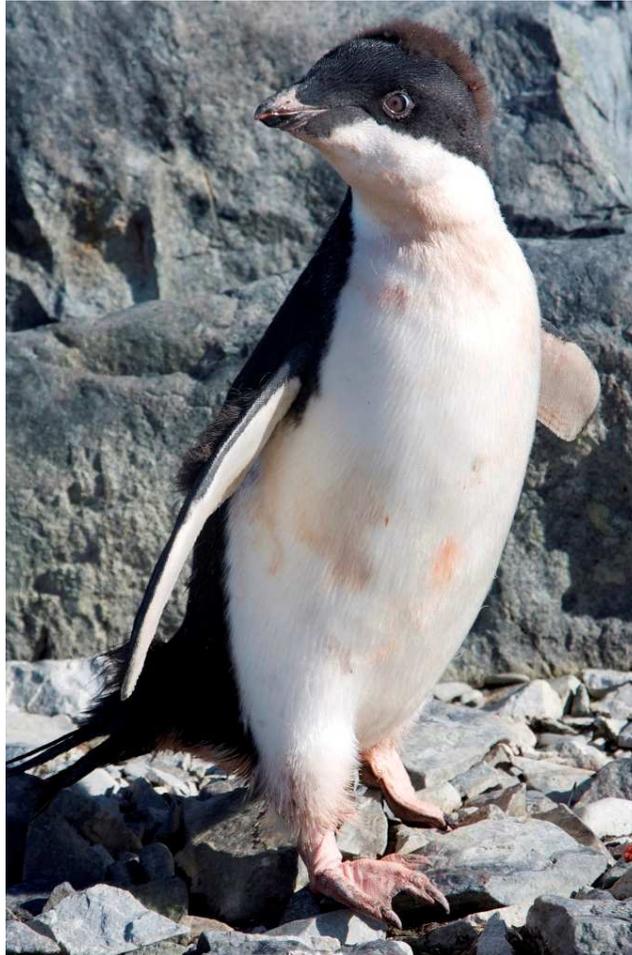


PALMER STATION MONTHLY SCIENCE REPORT
February 2009



Fledging Adélie chick
Photo courtesy of Jon Brack.

NEWS FROM THE LAB

Pat McMillan, Winter Assistant Supervisor of Laboratory Operations

The month began with the return of the *ARSV Laurence M. Gould (LMG)* on February 1st from the Long Term Ecological Research (LTER) cruise. Arriving back to station were Alex Kahl, Elizabeth Leonardis, and 2 new science personnel - Maggie Waldron and Andrew McDonnell. Tawna Morgan departed station on the northbound cruise. We also said goodbye to Norbert Wu, Conor McCracken and Steve Rupp with the *Prinsendam*'s scheduled visit.

The LMG returned on February 19th bringing freshies and the Ross MacPhee science party of 6, who were blown out of their camp at Livingston Island. Literally due to high winds. Andrew McDonnell left with the LMG for the research part of the cruise. Three of the stranded MacPhee team members left on the *Corinthian II*.

This was another busy tour ship month. We had visits from the *Amsterdam*, *M/Y Itasca*, *M/V Akademik Shokalskiy*, *Endeavour*, *Prinsendam*, and the *Corinthian II*. In addition, we had visits from the *S/Y Vaihere* and *S/V Waterbird*.

Science on station was very successful and busy with their work over the month. Monitoring of Adélies and Skuas continued, with the highlight being the Adélie chicks fledging. The HPLC pigment library was completed. They then began processing samples to identify phytoplankton group composition for the season at Palmer and from the LTER cruise. Seawater samples were collected to determine the factors causing changes in bacterial community composition.

The month came to a close as we looked forward to our science talk by Ross MacPhee and more birding work.

FEBRUARY WEATHER

Louise Hamlin, Research Associate

Summer was still in full force in February, with warm weather and relatively dry conditions. Glacier calvings reached their peak this month, with the resounding booms heard all around station. North and westerly winds brought thick brash and bergy bits throughout the local area and made zodiac travel difficult on some days.

The average air temperature for the month was 2.3C, inline with historical averages of 2.3C (1990-2008) and just 0.6C colder than the average for January 2009. The coldest daily low temperature was on the 4th at -2.4C and the warmest was on the 7th at 7.7C.

Palmer received only 50.8mm of melted precipitation versus the average of 75mm. 27 cm of snowfall was recorded.

The following projects conducted research at Palmer Station during February:

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, Kirstie Yeager

February was marked by the return of the Laurence M. Gould at the beginning of the month at the conclusion of the LTER cruise. Rick Smaniotto and Kristen Gorman returned to station for a brief time before departing for the season; Tawna Morgan also headed home. The remaining bird crew continued work throughout the month, hampered occasionally by winds that prevented field operations on some days and a bit of wet weather that delayed specific work requiring handling of downy chicks.

The Adelie penguin work continued this month, highlighted by the chicks fledging. Adelie chick counts and measurements of chicks about to fledge were obtained on local islands until all of the chicks departed. The penguin breeding chronology monitoring and sampling concluded just as the month started. We continued to salvage samples for further analysis and collaborations. We also began collecting and processing sediment trap samples, starting with the traps located on Torgersen Island. Our Adelie penguin radio transmitter study on Humble Island will continue into March.

Skua work continued with monitoring and banding of Brown Skua chicks on local islands as well as on Dream and Biscoe Islands. Chick growth measurements and scat collections continue on Shortcut Island for South Polar Skuas. Monitoring of the Blue-eyed Shag colony on Cormorant Island continued and concluded at the end of the month. Our Giant Petrel satellite transmitter work finished up this month with the retrieval of all of our transmitters. Growth measurements of Giant Petrel chicks continue on Humble Island.

Monitoring of marine mammals continued, marked by the numerous fur seals on the area islands as well as a few Humpback sightings in the local area. LTER cruise gear inventories and clean-up were completed near the beginning of the month. Labwork continued with processing of sediment trap samples from the LTER cruise, as well as Skua scat analysis. Data analysis projects continue as well.

RPSC continued to provide great support this month; field volunteers were very helpful and enthusiastic. Special thanks to Pat McMillan for coordinating this assistance.

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

Upon conclusion of the annual LTER cruise, Elizabeth Leonardis and Alex Kahl remained at Palmer Station while the other B-019 members (Oscar Schofield, Mike Garzio, Dove Guo, and Megan Cimino) departed northbound on the Gould. Working with B-045 members Maggie Waldron and Andrew McDonnell, we sampled at stations B & E on 12, 19, and 26 February. At both stations water was collected for subsequent filtration and pigment analyses. Bio-optics data were also collected on 12 February while we had technical issues that prevented bio-optical measurements on 19 and 26 February. In the lab, we also completed the HPLC pigment library and began processing pigment samples for subsequent analysis using ChemTax to identify phytoplankton group composition throughout the season at Palmer and from the LTER cruise. Finally, we have also started preparing our autonomous underwater vehicle, RU05, for one last 7-10 day mission during the month of March.

B-045-P: PALMER, ANTARCTICA LONG-TERM ECOLOGICAL RESEARCH PROJECT: LONG-TERM ECOLOGICAL RESEARCH ON THE ANTARCTIC MARINE ECOSYSTEM: CLIMATE MIGRATION, ECOSYSTEM RESPONSE AND TELECONNECTIONS IN AN ICE-DOMINATED ENVIRONMENT: MICROBIAL/BIOGEOCHEMISTRY COMPONENT

Dr. Hugh Ducklow, Principal Investigator, Ecosystems Center, Marine Biological Laboratory

Personnel on station: Maggie Waldron, with assistance from Andrew McDonnell February 2-19

During the month of February, B-045 sampled twice weekly at Stations B and E, weather permitting, and twice weekly from a large-volume carboy experiment in the 2°C environmental room. The carboys were filled with seawater collected from Station B in early January for a controlled light experiment. The carboy experiment was a continuation of our work in the IPY (B-229) project from last winter. The overall objective is to determine the factors causing changes in bacterial community composition. Water from stations B, E and the carboys was sampled for DOC, chlorophyll, and nutrient analysis, as well as flow cytometry and microbial productivity. We also filtered water onto sterivex cartridges to preserve DNA for community sampling analysis later on. Elevated chlorophyll levels persisted in the dark carboys, whereas bacterial productivity appears to be greatest in the light carboys.

Many thanks to Alex Kahl and Elizabeth Leonardis for their assistance with sampling and chlorophyll analysis and to the RPSC station personnel for their unflagging support. Without them it would not have been possible to accomplish all that we have done during this field season.

**PALMER STATION RESEARCH ASSOCIATE MONTHLY REPORT
February 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).

The station operated normally throughout the month. Data tapes were sent out on LMG 09-01.

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

Matthew 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 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. Sample flasks were shipped out on LMG 09-01 and received on LMG 09-02SB.

**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.

Sampling equipment and operations were per plan throughout the month. Sample flasks were shipped out on LMG 09-01 and received on LMG 09-02SB.

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

Matthew 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 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. Palmer IT assisted in resolving VPN issues, restoring Stanford remote access. Data drives and DVDs were shipped out on LMG 09-01 and drives were received on LMG 09-02.

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 09-01.

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.who.edu/tsg/>.

The webcam and salinograph performed normally during the month.

R-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.

There was an accidental shutdown and restart of the RASA by General Dynamics on February 5th. Replacement tape and filter rolls were installed on February 12th. On February 17th the RA was notified of a problem in with the filter advance. The issue was traced to a broken splice and too-high roller tension in the filter area. The problem was fixed and normal operations resumed on February 18th. A blank filter measurement was taken on February 28th. Also, several short data outages occurred at the end of the month: on February 26th, February 27th, February 28th. Completed samples were sent from station on LMG 09-01 and arrived in Austria on February 19th. Apart from the issues noted, 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.