

**PALMER STATION MONTHLY SCIENCE REPORT**  
**February 2008**



*Eric Erdmann and Daniel Jennings measure an Adélie fledgling. Photo courtesy of Daniel Jennings.*

**NEWS FROM THE LAB**

**Philip Spindler, Senior Assistant Supervisor Laboratory Operations**

February was another busy month. It began with the return of the *Laurence M. Gould* as it finished the LTER cruise. The bacterial component of LTER, B-045-P (Ducklow), moved onto station and began their Palmer-based work. Many folks from station were also able to get out and help B-013-P (Fraser) with their work in recording data on fledging Adélie penguins.

We enjoyed our last tour ship visits of the summer season; the *Ocean Nova* and *Ushuaia* both brought enthusiastic guests to station. Each ship enjoyed lovely weather during their visits- a rare thing this season with all its rain, wind, and snow. The weather in February has been particularly unfavorable for field work.

Projects steadily continued on, and the last weeks of February saw the station population jump to 39 with the addition of the rest of B-022-P (Amsler/Baker/McClintock) and the Riggers.

Overall, February was a very productive month for the entire station.

## **FEBRUARY WEATHER**

**Scott Walker, Research Associate**

Summer was still in full force in February, with warm weather and plenty of precipitation. The month included quite a bit of variety with daily low pressure systems passing through, and no measurable snowfall.

The glacier calvings reached their peak this month, often bringing thick brash ice and bergy bits around Palmer. Sea surface temperatures were still warm this month, peaking at +2.0C.

The coldest daily low temperature was on the 10th at -1.5C and the warmest was on the 16<sup>th</sup> at 6.8C. The average temperature for the month was 2.2C, which is the same as last month. Palmer received half as much melted precipitation as last month at 41.4mm.

The following projects conducted research at Palmer Station during February:

### **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, Hannah Lucas, Eric Erdmann, Nick Metheny

February was marked by the return of the Laurence M. Gould at the beginning of the month at the conclusion of the LTER cruise. Nick Metheny and Eric Erdmann returned to station for a brief time; then Nick headed home, along with Kristen Gorman. The remaining crew continued work throughout the month, hampered by winds that prevented field operations on some days and quite a bit of wet weather that delayed specific work requiring handling of downy chicks.

The Adélie penguin work continued this month, highlighted by the chicks fledging. Adélie chick counts and measurements of chicks about to fledge were obtained on local islands. A Chinstrap chick census was completed on Dream Island. The penguin breeding chronology monitoring and sampling finished up this month with the conclusion of the Chinstrap studies. We continued to salvage samples for further analysis and collaborations. Satellite transmitter work for the Adélies finished up at the beginning of the month, but the radio transmitter study on Humble Island continues into March. After the Adélie chicks fledged we began collecting the snow transect markers on Torgersen, Humble, Litchfield, Christine, and Cormorant Islands. We also began collecting and processing sediment trap samples, starting with the traps located on Biscoe Island.

Skua work continued with banding of Brown Skua chicks on local islands as well as on Dream Island, and scat collections continue on Shortcut Island for South Polar Skuas. Monitoring of the Blue-eyed Shag colony on Cormorant Island continued. 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. Kelp Gull limpet trap samples were collected on numerous local islands.

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. Lab work continues with skua scat analysis as well as some sample preparation for further analysis and shipment. Data analysis projects continue as well.

RPSC continued to provide great support this month; field volunteers were very helpful and enthusiastic. We again thank Phil Spindler for his efforts in coordinating this assistance. Bob DeValentino has been very cooperative in assisting us with our sample shipment inquiries. Chuck Kimball continues to provide great support and new ideas regarding our Comms needs.

**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: Alex Lowe (team leader/ Marine Science Institute, University of California at Santa Barbara), Shannon Rich and Helen Dollbaum (Marine Science Institute, University of California at Santa Barbara).

Activity from 01 February to 29 February 2008

The R/V Laurence M. Gould returned from the LTER cruise on 03 February. After an efficient port call, the on-station research personnel changed over, with Natasha Dallin being replaced by Alex Lowe and Helen Dollbaum. The three volunteers have continued weekly sampling.

The LTER hydro-acoustic surveys were conducted twice a week throughout February. The number of krill schools observed decreased during the first two weeks of February. No schools of krill were sampled during the last two weeks of the month, due to the absence of krill. On February 29<sup>th</sup>, a few small schools were observed, signifying the return of krill (followed closely by humpback whales) to the Palmer vicinity. Twice-weekly water sampling continued throughout the month.

The weekly sampling has gone smoothly thanks to the support from the Raytheon Staff and the other grantees.

**B-022-P: THE CHEMICAL ECOLOGY OF SHALLOW-WATER MARINE MACROALGAE AND INVERTEBRATES ON THE ANTARCTIC PENINSULA**

Charles Amsler and James McClintock, Principal Investigators, University of Alabama at Birmingham,  
Bill Baker, Principal Investigator, University of South Florida

Personnel on station: Bill Baker, Charles Amsler, Margaret Amsler, Jill Zamzow, Craig Aumack, Matt Lebar, Alan Maschek, Philip Bucolo.

B-022 continued to collect and process samples through February, assisted by the arrival of another four group members (C. Amsler, M. Amsler, Bucolo, Zamzow) on 19 February with LMG08-02. Lebar redeployed on 5 February with LMG08-01.

Diving has been hampered by weather and low underwater visibility, although February was as active as January with 34 dives completed. In the aquarium, tanks for our mesocosm experiment have been set up. Amphipod feeding bioassays with macroalgae and sponges have begun while sponge isotopic feeding experiments are coming to a conclusion. The early phases of studies of the influence of fish on amphipod host choice are coming along well.

We are grateful for the generous and professional assistance of numerous RPSC staff. Phil Spindler, Ken Keenan, Adam Swanson, Ryan Wallace, and Scott Walker deserve special thanks for facilitating our laboratory and diving operations.

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

Hugh Ducklow, Principal Investigator, The Ecosystems Center, MBL, Woods Hole, MA

Personnel on Station: Matthew Erickson, Ecosystems Center, MBL, Woods Hole, MA  
Kristen Myers, Ecosystems Center, MBL, Woods Hole, MA

We arrived on station February 5, 2008, after a successful PAL LTER cruise. Much of the first week consisted in unpacking and organizing the research laboratory and materials. Our work was delayed for several days during the second week by weather and equipment failure. Sampling commenced February 15<sup>th</sup>, as we collected water from Station B for the following environmental parameters: bacterial production, abundance, activity, community DNA, dissolved organic carbon, chlorophyll a, carbon:nitrogen ratio. Bacterial production was approx. 12 pM Leucine hr<sup>-1</sup>, which is comparable to measurements during this time period from previous years. Additionally, we collected 400L of water from this station to begin a six day mesocosm experiment investigating the role of nutrient additions on the community structure of the bacterioplankton.

We have continued to sample Station B for the above parameters three times per week, weather permitting. This sampling is in conjunction with large volume collections for environmental

genomic work in collaboration with Alison Murray and Joe Grzymiski, Desert Research Institute, Reno, NV. To date, we have collected five 400 L samples from which we concentrate the bacterial biomass 1000 fold. These samples will be used to analyze the gene expression of the bacterioplankton community.

We sincerely thank all of the Raytheon Polar Services support staff here on station, and back home in Denver, for their amazing dedication and hard work.

### **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 (N<sub>2</sub>O) 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.

Samples were taken on station by the Physician without any issues.

### **PALMER STATION RESEARCH ASSOCIATE MONTHLY REPORT February 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/CDDIS in Reston, VA. A new computer system was received to replace the current system.

Data was sent manually after a couple routine computer restarts after Windows Update installations and on one scheduled satellite outage.

The roving GPS system and its associated base station was utilized multiple times for surveying the glacier and other areas on station.

**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 well throughout the month recording worldwide seismic events and localized calving.

**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.

New equipment was received to replace the current equipment on station.

The system operated well during the month.

**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 O<sub>2</sub> (detected through changes in O<sub>2</sub>/N<sub>2</sub> 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 CO<sub>2</sub> 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 O<sub>2</sub> and CO<sub>2</sub> content takes place.

Samples were taken on both the new and old systems every two weeks for intercomparison purposes. The system operated normally.

### **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 was also forwarded to UCSB for B-032-P (Smith).

The new station has arrived on station. The RA, with assistance of the riggers, will configure and install the station later this month.

The Bonaparte station is not reporting at this time.

### **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 computers were restarted a few times during the month after routine Windows Update installations. A few short periods of anomalous data were reported to the project.

The VLF antenna cable was serviced several times. A new survey of the cable through the backyard was added to the site map for location of the cable. Re-drilling of the posts occurred twice during the month.

The ground plate was raised from Hero Inlet and found to be disconnected. The cable and plate were replaced with assistance from the station electrician. The new cable was routed along the utilidor for the RF shack to prolong the life to the cable. The old cable and plate was removed from the backyard and set for disposal.

### **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 ORBVIEW-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).

The system operated well throughout the month. The SeaWifs (Orbview-2) satellite has been off-line since January 3. There is no information on when that satellite will be operational again.

Cruise support SSMI images generated by the system were sent to LMG scientists daily.

### **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 well throughout the month. Updates to the FTP server were applied to make the system compliant with current IT Security mandates.

A new system is currently being shipped to replace the current setup. The new system will send data real-time to UCLA for subsequent analysis.

### **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 system has operated well throughout 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.

### **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 is in a standby mode awaiting the replacement of the cryogenic chiller and detector assembly. This replacement item is expected to be on station mid March.

The seismic 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 system ran normally throughout 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).

Isobaric charts were sent to R/V LAURENCE M. GOULD in support of the current cruise. MODIS Chlor-A and visible satellite images of the LTER grid region were also sent to the R/V LAURENCE M. GOULD.