

**PALMER STATION MONTHLY SCIENCE REPORT**  
**March 2008**



*Fog sets in around Torgersen and Litchfield islands. Photo courtesy of Stacie Murray.*

**NEWS FROM THE LAB**

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

March was a month of change, highlighted by two port calls with the *Laurence M. Gould* that brought in visiting science groups and winter personnel. After a successful 30-day cruise, Drs David DeMaster and Craig Smith hosted a slide show at Palmer presenting on their work in the Antarctic Peninsula.

On station, science groups wrapped up their summer field seasons and departed at the end of March. The five-day port call at the end of the month allowed many visitors a window of time to complete tasks on station. Kathryn Rowe (A-357-P) installed a new magnetometer during this period. The dive group continued their work with a very productive month.

Winter weather has noticeably arrived with cooler temperatures, shorter days, and accumulating snow. It marks an exciting time where summer personnel look forward to their travels, and winter personnel look forward to their time in a gorgeous land. This winter will undoubtedly be exciting and busy with IPY winter science in the works.

## **MARCH WEATHER**

**Scott Walker and Payot Scheibe, Summer/Winter Research Associate**

Winter is on its way with cooler temperatures and a number of significant snowfalls this month. Several large storm systems swept through the Drake producing some windy conditions during the month.

The glacier continues to calve, often bringing thick brash ice and bergy bits around the area. Sea surface temperatures cooled significantly this month to an average of 0.8 °C.

The coldest temperature was on the 23rd at -2.9 °C and the warmest was on the 11<sup>th</sup> at 6.6 °C. The average temperature for the month was 1.3 °C, up from 0.0 °C a year ago. Palmer received 11 cm of snowfall throughout the month and measured a total 82.6 mm of melted precipitation.

The following projects conducted research at Palmer Station during March:

### **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, Hannah Lucas, Eric Erdmann

Weather continued to hamper some field operations this month, with winds delaying trips to some of the more distant islands as well as wet weather interfering with specific work that required handling of downy chicks. Despite some delays the planned field work for this month was completed.

Adélie work concluded this month, as the radio transmitter project on Humble Island came to a close. Equipment was removed from the island and data files processed. Sediment trap contents were collected from Adélie colonies on local islands and Chinstrap colonies on Dream Island. Repairs were made to a few of the traps. Sediment trap sample processing continued until the end of the month.

Skua work continued throughout the month, as we finished the Brown Skua chick growth monitoring and continued South Polar Skua scat collections on Shortcut Island. Giant Petrel chick banding was completed on all local islands. Growth measurements of Giant Petrel chicks continue on Humble Island. We commenced preparations and training for RPSC winter personnel who will be continuing some measurements for this project.

Marine mammal monitoring continued, highlighted by a few sightings of Leopard Seals preying on Gentoo penguins. Lab work continued and intensified throughout the month as all samples were processed. Items were removed from the grantee milvan and either packed up for winter storage in the PA warehouse or placed elsewhere on station. All samples and associated

paperwork were prepped and sent north for evaluation and analysis. Project cargo was packed up and sent north. Data analysis and organization projects, end-of-season inventories, and Lab/Polar Haven/boathouse organization/clean-up were also main activities. An end-of-season out-brief with science and station management was attended.

RPSC continued to provide great support this month. Special thanks to Ken Keenan for assisting with many minor tasks and questions, to Bob DeValentino for continuing his efforts with our sample shipments, and to Adam Swanson for his always-cheerful cooperation, particularly in regards to coordinating island access for cache change-outs. A final thank-you to *all* RPSC personnel on station this summer; the work ethic and positive spirit exhibited throughout the season has been greatly appreciated.

**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, Alan Maschek, Philip Bucolo, Gil Koplovitz.

March was a busy month in both the field and the laboratory and included significant changes in project personnel. Koplovitz arrived to join the field team with LMG08-03 on 26 March while Baker and Maschek headed north with LMG08-02 on 13 March and Bucolo left with LMG08-03 on 31 March.

In the field, we completed 46 dives to collect macroalgae, invertebrates, and fish for use in laboratory experiments. Habitat-specific fish trapping for gut content analysis was successfully initiated during the last week of the month.

In the laboratory, amphipod feeding bioassays with small macroalgae and with sponge extracts were conducted throughout the month. Set-up of our algal-amphipod mesocosm experiment, with ten 24 x 24 x 24 inch aquaria on the west-side aquarium deck, was completed mid-month with both daily and weekly maintenance occurring thereafter. Behavioral experiments examining amphipod host-choice and the influence of fish on those choices were conducted throughout the month. During the last week of the month, aquaria were prepared for sea star and fish bioassays to be conducted beginning in early April. Isotopic feeding experiments with sponges were concluded.

We are grateful for the generous and professional assistance of numerous RPSC staff. Phil Spindler, Ken Keenan, Adam Swanson, 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

The month of March turned out to be very productive for our project and collection of samples for our collaborators. Kristen Myers was able to conduct another six day mesocosm experiment investigating the impact of nutrient additions on the community structure of the bacterioplankton. We continued to collect surface samples from Station B for the following properties: bacterial production, abundance, community DNA, dissolved organic carbon, chlorophyll a, carbon:nitrogen, ratio. We were able to sample three times a week until the second week in March.

Our sampling included large volume collections for environmental genomic work in collaboration with Alison Murray and Joe Grzyski, 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.

**PALMER STATION RESEARCH ASSOCIATE MONTHLY REPORT  
March 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.

New equipment was received and installed to further enhance the data collection at the PALM site. No issues were encountered during setup and the system operated smoothly 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 system operated well throughout the month recording worldwide seismic events and localized calving.

All duties were turned over to the incoming RA.

**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 installed to enhance the data collection abilities on station.

The new system operated well during the month.

All duties were turned over to the incoming RA.

**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 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.

A significant difference in CO<sub>2</sub> concentrations between the two sampling stations was noted by the PI and additional diagnosing by the RA determined that there was a leaky connection inside the pump unit. This leak caused air from inside TerraLab to mix with the outside air and in turn increased the CO<sub>2</sub> in the sample. The fitting was replaced without any issues.

### **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.

All duties were turned over from the Palmer Physician to the incoming RA.

### **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 new station has been installed and is operational. An additional PVC pipe will be installed in the next few weeks to protect the seawater temperature probe cable from ice.

All duties were turned over to the incoming RA.

## **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.

The VLF antenna cable was serviced several times. Re-drilling of the posts occurred twice during the month.

The system operated well during the month.

## **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 well throughout the month.

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.

A new system was installed by the PI during a port call here at Palmer Station. The new magnetometer and computer equipment enhances the data collection abilities and provides real time data streaming to UCLA.

All duties were turned over to the incoming RA.

### **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. A complete cleaning of the instrument will be performed during turnover.

### **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.

All duties were turned over to the incoming RA.

## **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 new chiller and detector were received and installed. Baseline measurements for the instruments are currently being performed for station re-certification for the CTBT. These measurements will take three weeks to complete.

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.