

PALMER STATION MONTHLY SCIENCE REPORT
April 2008



Blue-eyed shag gazing out into Arthur Harbor. Photo courtesy of Christopher Seliga.

NEWS FROM THE LAB

Christopher Seliga, Winter Assistant Supervisor Laboratory Operations

April was a transitional month, as the winter personnel took over for their summer counterparts and only one research group, B-022-P (Amsler/Baker/McClintock) remained on station as the IPY winter season kicked off. The *Laurence M. Gould* made one port call this month, which assisted G-183-L (Ishman) in collecting sediment samples from the northern Gerlache Strait to the southern Bransfield Strait region before they arrived at Palmer Station.

On station, personnel started getting ready for a very busy and atypical winter season due to IPY. Three more research groups will be coming to station this winter season, starting with B-037-P (Detrich) and followed later by B-005-P (DeVeries) and B-229-P (Murray).

We had some very gorgeous days here toward the later part of April, marked by blue skies with little to no wind. The entire station came together to celebrate Earth Day on April 22nd, by assisting B-022-P as they dove in the waters just off of the pier collecting garbage on the Hero Inlet floor. In all we were able to gather over 300 lbs. of rubbish which was given to our waste management to be shipped off station.

APRIL WEATHER

Payot Scheibe, Research Associate

Daylight is fading fast as we head into winter. The temperatures have stayed relatively cold for most of the month, keeping much of the snowfall we received on the ground. High pressure systems dominated the area a couple of times this month, providing extended periods of sunny, calm weather, especially for the final week of the month.

Some grease ice started to form in the calm backwaters of Hero Inlet, but no significant sea ice is forming yet. Brash ice and bergy bits calved off from the glacier were present throughout the month.

The coldest temperature was on the 28th at -5.0°C and the warmest was on the 6th at 5.5°C . The average temperature for the month was -0.5°C . Palmer received 29 cm of snowfall throughout the month and measured a total 60.2 mm of melted precipitation.

The following projects conducted research at Palmer Station during April:

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: Charles Amsler, Margaret Amsler, Jill Zamzow, Craig Aumack, Gil Koplovitz.

April was a busy month in both the field and the laboratory. In the field, we completed 55 dives to collect macroalgae, invertebrates, and fish for use in laboratory experiments. This total also included four series of paired day and night dives in Hero Inlet late in the month. These dives successfully completed sampling for our day-night comparison of macroalgal-associated amphipod assemblages. Habitat-specific fish trapping for gut content analysis was continued throughout the month. Fish sampling was completed at the main sample sites in Hero Inlet. Smaller numbers of additional samples from other locations will be made during May for comparison to these.

In the laboratory, amphipod feeding bioassays with small macroalgae and with macroalgal and sponge extracts were conducted throughout the month. Studies of the palatability of tunicate tissues and extracts to amphipods, sea stars, and fish were ongoing all month. Behavioral experiments examining amphipod host-choice and the influence of fish on those choices as well as daily and weekly maintenance of our algal-amphipod mesocosm experiment on the west-side aquarium deck were also continued throughout the month.

We are grateful for the generous and professional assistance of numerous RPSC staff. Chris Seliga, Phil Spindler, Amber Bates, Ken Keenan, Adam Swanson, Neal Scheibe, and Scott Walker deserve special thanks for facilitating our laboratory and diving operations.

PALMER STATION RESEARCH ASSOCIATE MONTHLY REPORT
April 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 system was used by surveyors taking measurements around the station without issue.

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.

The system operated well during 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. 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.

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.

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 was inspected and all connections were covered with weather resistant tape. Data collection continued normally.

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.

Early in the month, the system began experiencing signal loss from the antenna. The cable leading from Terra Lab to the antenna on top of the glacier came under suspicion. Several trips along the length of the cable was initiated, but at the time of writing of this report, the source of the problem has not been discovered. Further troubleshooting will continue with the arrival of one of the grantees early next 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.

Early in the month the system stopped collecting data, but restarted automatically. There were no other problems 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 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.

A grantee for this project will be visiting the station early in May to perform annual maintenance.

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.

After installing a new chiller last month, the system underwent three weeks of baseline measurements during the month of April. The RASA unit was returned to normal operation near the end of the month and has been running without problem since then. Inventory of the all available supplies was sent to the responsible sub-contractor.

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 computer had to be rebooted on two occasions after becoming hung up.

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.