PALMER STATION MONTHLY SCIENCE REPORT
September 2007

Offloading station cargo for summer opening. Photo courtesy of David Minor.

NEWS FROM THE LAB

David Minor, Winter Assistant Supervisor Laboratory Operations
Philip Spindler, Senior Assistant Supervisor Laboratory Operations

September opened smoothly with the winter staff preparing for their summer counterparts. The *ARSV Laurence M. Gould* was prevented from tying up to the pier after three mooring points failed. Everyone came together for an otherwise successful port call in unloading cargo via zodiac operations. Members of O-204-P (Keeling) and T-312-P (Lubin) received all their supplies and had adequate time to successfully complete their site visits.

Station staff worked together to transition into summer operations. The *ARSV Laurence M. Gould* departed back to Punta Arenas, leaving eighteen on station to continue preparations for arriving summer science groups.

Just a few elephant seals, cormorants, giant petrels, and adelie penguins have been spotted in the area. As the wildlife returns, they are surely looking forward to their inquisitive biologists' arrivals as much as we are.

SEPTEMBER WEATHER
Lana Cohen and Scott Walker, Research Associate

Snowfall for September was right in line with average snowfall (44 cm compared to the average 42 cm). Melted precipitation was a bit up for August measuring 57 mm compared to the average of 52.7 mm, but the year-to-date accumulation was still far behind the averages measuring 284.7 mm compared to 554 mm. Interestingly, year-to-date snowfall is not significantly lower than the average (265 cm compared with 288 cm). The last week of September was particularly windy with a recorded maximum gust of 64 knots and maximum sustained winds of 52 knots.

The monthly average temperature for September was -2.4ºC, slightly warmer than the 15-year average for August of -5.1ºC. The high temperature this month was +4.2ºC and the minimum temperature was -12.7ºC.

Sea surface temperatures remained steady at -1.80ºC throughout the month. The sea ice surrounding the station during the month of September was typically areas of brash ice with some short lived areas of pack ice. Open areas of water became more prevalent as we progressed through the month.

PALMER STATION RESEARCH ASSOCIATE MONTHLY REPORT
September 2007

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. The 15-second epoch interval GPS data files were collected continually at station PALM throughout the month. Transmission of these files to the NASA/CDDIS data center in Reston, VA occurred without incident throughout the month.

The system operated normally throughout the month, and all the rover batteries were charged.

All duties were turned over to the incoming RA.

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 functioned normally throughout the month. During turnover operations the vault was entered and the masses were centered within acceptable limits. The bell jars were pumped down. Batteries were checked loaded and unloaded and were found to be within acceptable limits.

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 receiver, extracting Automated Weather Station information and low-resolution infrared imagery and sending the results to AMRC headquarters in Madison, WI.

The SOP for this project was requested by Matthew Lazzara so that he could update the document with specific commands for monitoring the system from the console. System checks on Sodas became inoperable after the new TeraScan system was installed. The RA will continue to work on these "check scripts" this month.

The system operated normally throughout 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 inter-annual variations in atmospheric O_2 (detected through changes in O_2/N_2 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_2 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_2 and CO_2 content takes place.

A grantee from the project arrived at the end of the month to install the new mast and sampling system in Terra Lab. The installation went well and samples were taken on both the new and old systems for comparison purposes. Samples will continue to be taken at both samplers until further notice.

All duties were turned over to the incoming RA.

O-264-P COLLECTION OF AIR FOR THE NOAA ESRL/GMD WORLDWIDE FLASK SAMPLING NETWORK.
David Hofmann, Principal Investigator, Earth System Research Laboratory, Global Monitoring Division, National Oceanic and Atmospheric Administration

The National Oceanic and Atmospheric Administration (NOAA) Earth System Research Laboratory continues its long-term measurements of carbon dioxide and other climate relevant atmospheric gases. The Palmer Station air samples are returned to the NOAA laboratory for analysis as part of NOAA's effort to determine and assess the long-term buildup of global pollutants in the atmosphere. Data from this experiment will be used in modeling studies to determine how the rate of change of these parameters affects climate.

Samples were taken according to schedule throughout the month, except for one sampling period missed for the halocarbon flasks. One CCGG and one HATS flask crate were sent out on LMG07-12.

All duties were turned over to the Station Physician.

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 were also forwarded to UCSB for B-032-P (Smith).

The Bonaparte Point AWS operated normally up to 24-Sep where data collection stopped. The RA traveled to Bonaparte Point and cycled the power on the station. After further review the RA found that the station was operating properly and the issue was a custom TeraScan script that was not functioning because of the installation of the new TeraScan system. The RA will continue to debug the scripting issues.

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 ran normally except for one instance where the synoptic data computer froze up and required a hard reboot. Recurring noise seen in the spectrograms was discussed with the PIs, but is not enough to be a concern at this point. Windows updates were applied to VLF_BBC and VLF_Extra and both systems were rebooted without issue. Windows updates on vlf_record will be coordinated with the PI this month.

All duties were turned over to the incoming RA.

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). Sea ice images were provided to the LMG for cruise support.

The new TeraScan system was installed during the turnover procedures. Legacy scripts had to be modified to get the system running properly once the SeaSpace representative departed. The RA will continue to work on the scripts this month.

All duties were turned over to the incoming RA.

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 system performed normally throughout the month. 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 TSG debubbler and tubing were cleaned, and the outlet tubing was replaced during a seawater outage for a plumbing project. The PIs were notified of several seawater outages during the month.

All duties were turned over to the incoming RA.

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 are made available on a daily basis on the project's website at http://www.biospherical.com/nsf.

The annual three lamp absolute scan was performed on 24-Sep and was completed without and issues. The UV monitor operated normally throughout the month except for one instance of the GUV logger software stalling and needing to be restarted.

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 equipment operated well throughout the month. Third quarter samples were prepared for retro shipment in September. The 2nd quarter samples were sent out on LMG07-12. The semi-annual blower motor lubrication was performed. Windows updates were applied to the PC and it was rebooted.

All duties were turned over to the incoming RA.

TIDE GAUGE

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 cannot be used.

Windows updates were performed and the system was rebooted without and issues. The tide gauge system ran normally throughout the month.

All duties were turned over to the incoming RA.

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 are archived locally and forwarded twice each month to the University of Wisconsin for archiving and further distribution. Synoptic reports are automatically generated every six hours by the Palmer Meteorological Observing System (PalMOS) and emailed to the NOAA for entry into the Global Telecommunications System (GTS). Isobar images are sent to LMG for cruise support.

With help from the Communications Tech the ceilometer was fixed and is now operating normally. The problem was some mis-wiring in the ceilometer itself. Wires were switched at the Zeno terminal block to work around the problem.

Windows updates were applied and the system was rebooted. The system initially did not function but after a hard reboot the system operated properly.

The MAWS barometer was replaced with the recently calibrated spare, but it was reading ~25mb too low, so the “old” barometer was put back in, pending a barometric standard being sent down to calibrate the barometer.

The MAWS temp/humidity sensor was replaced with the spare, and the humidity values now correspond much better with the PalMOS T/RH sensor.

Meteorological data was provided at PI request.

All duties were turned over to the incoming RA.