

PALMER STATION MONTHLY SCIENCE REPORT
July 2009



*Calm day over Arthur harbor.
Photo courtesy of Neal Scheibe*

NEWS FROM THE LAB

Phil Spindler, Senior Assistant Supervisor of Laboratory Operations

June is the first month since September 2007 that Palmer Station experienced the absence of active science groups on station. However, the station is not without its active science projects; long term data collection in the labs, aquarium, and all the projects in TerraLab continue their work year-round. The weather stations on Gamage Point, Bonaparte Point, and Hugo Island are accumulating useful information as well. The sixteen crew members on station are catching up on inventory, maintenance, and cleanup.

To stay sharp, the crew engaged in emergency training throughout the month in varied weather conditions. They conducted a fire drill in darkness and blowing snow, ocean search and rescue training with high sea swells, spill response training in frigid temperatures, and glacier search and rescue training on a picture perfect calm day, so all the bases were covered.

JULY WEATHER

Neal Scheibe, Research Associate

This year, July was calm and cooler than normal with the max temperature never getting above the freezing point. The minimum temperature this month was -13.3°C on the 26th and a high of -0.1°C came on the 18th. The average temperature of -6.1°C is slightly below the average for July (-5.4°C). The average wind speed for the month was 9 knots, with the historical average being 12 knots for July. A high pressure system at the end of the month resulted in even more placid conditions.

July is traditionally one of the snowiest months, but precipitation was low for the month and remains low for the year. The snowfall amount was only 40 cm for July compared with 47 cm average. We have accumulated a mere 132cm of snow so far for the year compared with the 15-year average of 202cm and also behind last year's record low pace of 147cm. There were no major snow storms during the month, with the largest one-day snowfall being 7cm on the 18th.

The average sea surface temperature for the month was -1.6°C. Sea ice has been forming during most of the month, although it has broken up near month's end, with most of the sea ice being back in Arthur Harbor and Hero Inlet. The protected pockets of open water acted as mirror pools for the surrounding scenery. Southwesterly winds midmonth brought a number of impressively large bergs to the area where they remain around station at month's end.

PALMER STATION RESEARCH ASSOCIATE MONTHLY REPORT

JULY 2009

Neal Scheibe

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 during the month. A radio call was made to Vernadsky Station to request the status of the G-096-L global positioning system solar panels, which were installed by UNAVCO. The batteries for the system were showing decreased voltage and snow buildup on the solar panels was the suspected cause. No snow was on the panels, which the Vernadsky crew has been keeping clear during the winter.

The uninterruptible power supply (UPS) battery failed during the week, causing an audible alarm. Most of the components plugged into the power supply were moved to another UPS. A computer remains on the UPS with the faulty battery. A new UPS is being sent by the grantees. No data collection was disturbed by the battery fail, but the computer remaining on the UPS with the faulty battery will not have a power backup for long in the event of a power outage.

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.

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

Mathew 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 for the duration of 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.

**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 occurred normally during the month.

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

Mathew 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 system collected data normally throughout 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.

The system collected data normally during the month. Changes were made to the data transfer scripts to automatically create the necessary folders for copying data from the computer to the shipment hard drive.

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 system operated normally throughout the month.

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.whoi.edu/tsg/>.

The webcam and salinograph performed well during the month.

T-513-P: ULTRAVIOLET (UV) SPECTRAL IRRADIANCE MONITORING NETWORK (UVSIMN)

Charles Booth, Principal Investigator, Biospherical Instruments, Inc

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.

The UV monitor collected data normally during 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 system operated normally throughout 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 rain gauge and present weather sensor were found to have faulty heaters, relating to last month's discovery of a tripped circuit breaker. The heaters on both units have failed due to sea spray entering into the electronics. New heating units will be required as no spares are on hand. Currently the rain gauge is being melted manually on a daily basis by the Research Associate. Scheduled inspections were carried out of the Gamage Point tower.