

**PALMER STATION MONTHLY SCIENCE REPORT**  
**June 2009**



*Alpenglow from Palmer Station.  
Photo courtesy of Sean Bonnette*

**NEWS FROM THE LAB**

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

The beginning of June was busy as the O'Brien (B-036) and Nowacek (B-249) science groups wrapped up their work and prepared to head north. But that was no time to rest for the folks left on station. People cleaned up and prepared for the semi-annual "Haz Run". It sounds like a 5k Fun Run, but in fact it is a busy time for support personnel to pack up and ship off all hazardous waste accumulated on station over the past two years.

The last ship of the season arrived on June 19 with site visitors, including Bo Hosticka (T-998-P: IMS Radionuclide Monitoring). Most visitors were on station to help with the Haz Run and conduct other inspections on station.

While in the area, crew from the *Laurence M. Gould* visited Hugo Island on behalf of Domack (C-515) to conduct a little maintenance on the deployed GPS station there. The *LMG* headed north on June 26, leaving just 16 support personnel on station until it opens again at the end of September.

## **JUNE WEATHER**

### **Neal Scheibe, Research Associate**

June was a clear, calm month compared to past seasons. The average temperature for this month was  $-4.0^{\circ}\text{C}$ , with a low of  $-9.5^{\circ}\text{C}$  near the middle of the month and a high of  $1.6^{\circ}\text{C}$  early on. The peak wind gusts for the month were recorded on the 11<sup>th</sup> at 64 knots and the average wind speed was 10 knots.

Several days of clear skies led to beautiful sunrises and sunsets throughout the month. The precipitation for June was only 1.8 mm, compared to the 15-year average of 48 mm. Cumulative precipitation for the year is 216 mm, compared with 395 mm historically. Most of the snow arrived in one storm on the 18th that dropped 13 cm of the 33 cm that fell in June.

June's average sea surface temperature was  $-0.9^{\circ}\text{C}$ , with the coolest temperatures at the end of the month. Very little sea ice or ice of land origin was seen during the month, with pancake ice forming just as the month ended.

## **PALMER STATION RESEARCH ASSOCIATE MONTHLY REPORT**

### **JUNE 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. The Trimble receiver was removed from Palmer Station and given to the R/V LAURENCE M. GOULD to take to Hugo Island in an attempt to replace the suspected faulty receiver there. The trip to Hugo Island could not be completed by month's end and the need for replacing the receiver there will be reevaluated at a later date as there is no ship traffic for the remainder of the winter. The old Hugo Island receiver is currently at Palmer Station and operating normally.

#### **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 most of 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 throughout 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 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.

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 O<sub>2</sub> and CO<sub>2</sub> 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 (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 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.**

Umrans 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. Data-containing hard drives were shipped to Stanford for analysis.

### **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 data archiving to the tape drive stalled on several occasions during the month, requiring restarting of the writing processes, but no data was lost. The old digital audio tape (DAT) drives were replaced with digital linear tape (DLT) drives for archiving purposes, which has solved the problems with the stalled drives and allows great storage capacity per tape. Images were sent to the R/V Laurence M. Gould to aid in determining ice locations and concentrations in support of two science groups that are on the vessel: B-036 (O'Brien) and B-249 (Nowacek).

### **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. The battery was replaced on the uninterruptible power supply.

### **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. There was a site visit by Bouvard Hosticka for maintenance of the equipment. A new cover was installed over the chiller hose that protrudes through the back panel of the RASA instrument. The cover provides extra shielding against noise and debris entering the system. Extra grounding was added to the outer panels of the RASA to enhance noise reduction further.

## **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 weather station operated normally for most of the month, with one exception. There was a power outage on the evening of June 24. The circuit breaker tripped causing loss of power, and therefore data loss. There were several similar occurrences last winter. Scheduled inspections were carried out on the Gamage Point tower.