

**PALMER STATION MONTHLY SCIENCE REPORT**  
**November 2007**



*A skua patiently surveys an Adélie colony on Torgersen Island. Photo courtesy of Bob DeValentino.*

**NEWS FROM THE LAB**

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

November began with the arrival of Adélie eggs, and the Skuas were hot on their tails. Though it continued to snow for the majority of the month, warm rain finally washed most of the snow away at the very end of November. Large krill schools were also continuously observed in the area. The abundant food source attracted humpback whales to the area near the end of the month; the timing was only too appropriate for Thanksgiving.

Ship traffic around Palmer also increased over the month. The *ARSV Laurence M. Gould* had a short port call to drop off the bollards. While the ship steamed to Petermann Island for the camp put-in, folks worked hard on station to install the bollards in a day's time. When she returned, the ship tied up to the pier for the first time this season and off-loaded 7,056 gallons of fuel. Along with fuel, the Gould dropped off Kim Baranowski and Kate Keeley. These two artists deployed to Palmer to gather information for their individual projects: *Frozen Field* and *Integrating Science and Creative Writing*, respectively. We also received two visits from tour ships at the end of the month, the *Andrea* and *Clipper Adventurer*.

Thanksgiving was wintry and stormy, yet it was very cozy around the tables with a population of thirty-two. We all enjoyed live fiddling from the station physician, Will Silva. We were

thankful to be on station with a wonderful crew enjoying an excellent feast despite the stormy Antarctic weather. We hope your holiday feasts at home were as enjoyable as ours.

## **NOVEMBER WEATHER**

**Scott Walker, Research Associate**

The month saw a marked change from chilly, windy winter weather with common dustings of snow in the beginning of the month to slightly warmer temperatures and sunny days. The accumulated snow around Palmer was able to withstand the warmer temperatures to the delight to all the skiers on station. The beginning of the month was fairly calm with average winds all below 11 knots and the windiest gust of 49 knots was recorded during the last half of the month.

Days of brash ice blowing into and out of station were common in the beginning of the month but have been replaced with days of mostly open water at the end of the month. A few large icebergs have come in close to station and the glacier is starting to calve more often.

The coldest daily low temperature was on the 4<sup>th</sup> at -6.5C, while the warmest high was on the 19<sup>th</sup> at +6.1C. The last week of the month was particularly warm with several consecutive days with highs above +3C. The average temperature for the month was -0.8 C, which was +2C higher than last month. Palmer received 19.1 mm of melted and 21 cm of snow precipitation with a maximum snow depth of 82 cm near the beginning of the month which was 71 cm more than November last year.

The following projects conducted research at Palmer Station during November:

### **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, Kristen Gorman

Weather has been mostly favorable for performing local work throughout the month of November, allowing us regular field visits to all of the penguin colonies in the local area. A number of days with less than ideal winds/weather have prevented trips to Dream and Biscoe Islands. Heavy brash ice prevented access to some local islands on a few days this month. We monitored the total number of Adélie adults and nests on Torgersen, Humble, Litchfield, Cormorant and Christine Islands. Breeding chronology and egg production were monitored on a subset of Adélie nests on Torgersen, Humble, Dream, and Biscoe Islands. A subset of Chinstrap nests on Dream Island and a subset of Gentoo nests on Biscoe Island were also monitored for the same purpose. A portion of these subsets of nests were sampled at the 1-egg stage to obtain adult body weights and egg measurements. Timing of the peak egg censuses for each penguin species was determined; a peak egg census was completed for Adélies on all local islands as well as on Dream and Biscoe. The Chinstrap and Gentoo peak egg censuses were completed on Dream and Biscoe Islands, respectively. A census of all 3 species was completed on the known

penguin-breeding islands in the Joubins. We have been monitoring the number of depredated eggs from all 3 penguin species on all islands and have made some collections of these depredated eggs for further analysis and collaborations.

The brown Skuas arrived in early November, thus beginning our skua work. We have been resighting leg bands and have begun to monitor nests for all brown Skuas in the Palmer area, as well as on Dream and Biscoe. South polar Skuas began arriving locally in the middle of the month; we began our band resighting and nest monitoring study of them on Shortcut Island. We have completed counts of the blue-eyed shag colonies on Cormorant Island and Elephant Rocks. Our monitoring of marine mammals continued this month and was highlighted by a couple of sightings of very vocal leopard seals in the Palmer area and in the Joubins. Lab work has continued with the skua scat analysis, as well as with the processing of new samples. Satellite transmitters for Adélies and Giant Petrels were tested and one deployed on a Giant Petrel, thus beginning our work with this species. Databases were set up for more upcoming giant petrel work.

RPSC has continued to provide great support for our project this month. Rebecca Shoop arrived and has been very accommodating. Stacie Murray and Rosemary Garafolo continue to make sure we have incredible food to take with us into the field, which makes all the difference on long field days (Rosemary will be leaving us in a few days and will be sorely missed)! Ryan Wallace, Phil Spindler, Ken Keenan, and George Ryan have all been very helpful and diligent with their OSAR monitoring in relation to our project. Ryan Wallace continues to efficiently and enthusiastically provide us with whatever we need.

### **B-028-P LONG TERM ECOLOGICAL RESEARCH ON THE ANTARCTIC PENINSULA, AN ICE DOMINATED ECOSYSTEM: PREY COMPONENT.**

Robin Ross and Langdon Quetin, Principal Investigators, Marine Science Institute, University of California at Santa Barbara

Personnel on station: Langdon Quetin (team leader/PI), Shannon Rich, Albert Kao and Natasha Dallin (Marine Science Institute, University of California at Santa Barbara).

Activity during November 2007

Sampling has gone well this month, but, despite the lack of pack ice, our work has been limited periodically due to weather. We began occupying LTER Stations B and E, to sample chlorophyll a, an index of phytoplankton concentrations, and to deploy a CTD to measure conductivity and temperature with depth in the water column. During the same days we sample stations B and E we also conduct acoustic transects between stations A-E and F-J. Our aim is to complete the above activities twice a week, and this month we managed 6 days of successful sampling.

Work on the Antarctic krill (*Euphausia superba*) continues to go well. We completed three growth experiments on krill young-of-the-year, probably our last for this year. We continue to catch krill from individual schools in the area and determine the length frequency, length versus

weight relationships and preserve individuals for CHN analysis. We also began sampling individual schools to assess their feeding activity relative to food concentrations as measured by chlorophyll a. While difficult, this work is providing information that suggests feeding rates of krill in the laboratory are an underestimate. We managed to sample four schools for feeding activity in November and expect this work to intensify in the next two months. We currently have a large number of young-of-the-year krill in one of the six-foot tanks in the aquarium building and are beginning to fill the other six-foot tank with adults. These krill will be maintained throughout the season.

Thanks to the entire RPSC crew at Palmer Station for our continued success and the supportive environment at the station.

### **W-486-P FROZEN FIELD.**

Kim Baranowski, Principal Investigator, Brooklyn, New York

Kim Baranowski deployed on November 1st and arrived at Palmer Station on December 10th.

Since arriving at the station she has completed four paintings for a series based on Antarctic fauna. She has also temporarily installed three sculptures and has begun drawings of the marine life housed in the station's aquariums. Kim has also created an extensive website dedicated to the project with field journal dispatches, an Antarctic glossary, and profiles of current grantees and support personnel.

Kim was scheduled to depart Palmer on the LMG on December 4th, but requested an extension from Kim Silverman, National Science Foundation Antarctic Artists and Writers Director. Rebecca Shoop and Bob Farrell determined that there is sufficient space on the LMG on the February 4th sailing and that the station can support an extension of the project. Phil Spindler has also secured lab space for her use until the later sailing. On November 29th, Kim Silverman granted an extension of her time at Palmer and she will now remain at the station until February 4th.

During the next two months she plans to continue to draw specimens from the BioLab aquarium. She will also study nearby algae and lichens that have been obscured by the season's late snowfall for a series of prints on Antarctic flora.

### **W-489-P INTEGRATING SCIENCE AND CREATIVE WRITING**

Kate Keeley, Principal Investigator, Colorado Springs, Colorado

On station I have had everything I need to do my work. These past few weeks have been invaluable, and I have a much better understanding of what the scientists do and why. I have packed more than penguin photographs, scribbled notes, and journal entries in my luggage. As I prepare to leave Palmer, I find that I have more questions than before I arrived. I am overflowing with fresh perspectives and new ideas. The fluttering in my stomach suggests that I have been changed by these people and this place.

Thanks to the scientists who study this land and the sea that surrounds it, I have a better understanding of the interconnectedness and fragility of life. I have seen how objectively they observe, how meticulously they record data, how carefully they ponder before drawing conclusions. I have also benefited from the dedicated and enthusiastic assistance of the teams that support science in Antarctica. I am comforted by their unselfish passion for our planet. I appreciate their patience and their willingness to share their knowledge.

Looking back, I am embarrassed by my ignorance. Even those parts of my not knowing that have been erased by this journey still cause me shame. I thought it would be colder on this most southern continent. I thought this would be a black and white world, not one infused with brilliant blue-green or patched with rich shades of orange and yellow. I thought we had plenty of time to fix the hurt we are inflicting on the earth. I did not think I would miss the stars. I did not know I would be pierced to the core of my being by the sharp cries of the glacier dying.

Whether I am walking the coast, or sitting by a window and writing, or boating to one of the islands to observe the scientists, I hear the glacier crying. She breathes the burning air, and her lungs collapse. She groans. She turns her face to the sun and loses clumps of hair to the fire. She presses into the earth, sloughing skin in giant handfuls. She screams. I fear her passing. Tears brighten my eyes.

I have come too close, sounds of the glacier dying will echo forever inside my head. I touched her. I cannot pull away—the palms of my hands are frozen to her skin.

My time here has been invaluable, and I have the tools I need to begin writing. My soul stepped onto the peninsula sleepy and complacent, it leaves wounded and afraid, but fear makes me stronger. And while I know the earth has plenty of time to heal, the knowledge that my own people teeter on the edge of extinction scares me.

My eyes drink in blue ice glimmering, waves crashing the shore, a giant petrel balancing on the wind. Will my words reflect the truth as beautifully as these waters reflect the glacier and the sky? This question I can answer but, even realizing the futility of the task, still I know that I must try.

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

### **November 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.

Issues concerning security scan “vulnerabilities” on the GPS receiver continued to be unresolved. After several communications with Network Engineer and Information Security personnel, a risk acceptance request was submitted for the receiver.

**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 DP (data processing) system for the Seismic system (located in TerraLab) was reset remotely once during the month due to a process hang. No data loss occurred since data was stored on the DA (Data Acquisition) system.

**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 system 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. 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 for intercomparison purposes with out any issues.

### **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 is forwarded to UCSB for B-032-P (Smith).

The Bonaparte station operated normally with only a few non-reporting days in November.

### **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 throughout 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, 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 system ran normally during the month. All legacy scripts from the old TeraScan system have been adapted to the new system. A request to NASA for Ocean Color images was placed to support the upcoming LTER cruise.

### **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 system performed normally throughout 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 fluorometer was determined to have a faulty power supply. An external plug-in transformer power supply is being used in place of the on-board power supply. Firmware for the webcam was updated to the latest version. The webcam and TSG system performed normally during 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 are 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.

## **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 RASA system is in a standby mode awaiting the replacement of the cryogenic chiller. This replacement item is expected to be on station early January.

The seismic monitoring station operated normally during the month.

## **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. 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 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.

The ceilometer has not been functioning properly this month. The sensor has been cleaned and power cycled. Further inspection of the sensor will be performed this month.

The present weather was replaced with a newly cleaned and calibrated unit from OSI. The new unit is not reporting weather properly. Communication between the RA and OSI is on going and a few tests are scheduled for the first clear day on station.