

PALMER STATION MONTHLY SCIENCE REPORT
January 2007



Leopard Seal hunting Adelies in Arthur Harbor. Photo courtesy of Glen Schulte

NEWS FROM THE LAB

Phil Spindler, Assistant Supervisor Laboratory Operations

January marked the beginning of a new and industrious year for everyone at Palmer Station. Humpback whales off DeLaca Island rang in the New Year and gave the station a show- playing and feeding for hours. We were mesmerized by their rolling, spouting, and flashing of their tails. Days later, the *ARSV Laurence M. Gould* conducted a port call, dropping off the Polar Entomologist research group and loading up for the LTER cruise. New to the cruise this year was the deployment of an Automated Underwater Vehicle (AUV) from Rutgers University. Deployed the morning the LTER cruise left Palmer, this AUV traveled over 400 km down the Antarctic Peninsula, below the Antarctic Circle, making observations the entire trip. The AUV was successfully retrieved at the end of the month.

Back on station, work in the field ramped up immediately and was very productive. With the addition of a fourth group member, Bill Fraser's Marine Bird group was able to split up in two boats and complete much more field work on a day-to-day basis. Within days of their arrival, Dr. Richard Lee's team gathered two tablespoons of *Belgica antarctica* larvae to begin their research of its physiological and molecular mechanisms of stress tolerance. Three members of the LTER group were left behind when the LMG departed to continue the on-station LTER monitoring during the cruise. They promptly set to work with analysis in the labs and sampling in the local area.

Everyone pitched in to help with the busy month of tour ship visits, most of which happened mid-January. This month we welcomed the *Rotterdam* twice, *Corinthian II*, *National Geographic Endeavour*, *Ushuaia* twice, and a visit from Her Royal Highness, Princess Anne. Grantees and station personnel were pleased to educate visitors about the important work and research at Palmer Station. These opportunities provide the perfect setting to educate the public on the valuable scientific research being conducted by the United States Antarctic Program.

In the last half of the month, after the major tour ship activity subsided, everyone continued their day-to-day tasking. With the population at thirty-seven, the twelve grantees on station were well provided for, and support staff accomplished many projects around station. In addition to supporting all geophysical projects, Christina Hammock, Palmer Research Associate, battled the elements on the glacier during her one-day weekend to bring the Very Low Frequency antennae back on line after the signal was lost due to water intrusion. The latter part of the month also saw Arthur Harbor clogged with ice from the continually calving glacier. Leopard seals became abundant in the area as it neared time for penguin chicks to test out their swimming skills. We have seen as many as six seals at one time sleeping on floes in the harbor.

From Palmer Station, we wish you all the best in the New Year.

JANUARY WEATHER

Christina Hammock, Research Associate

January brought the warmest temperatures yet this season, with mostly calm days and a lot of rain in the last week of the month. Several weeks this month saw no freezing temperatures at all. The 17th was the warmest, windiest, and lowest pressure day with a high of +9.9C, gusts at 40 knots, and a low pressure of 965.7mb.

Brash continues to blow in and out of the area surrounding Palmer station and is increasingly fed by the calving glacier. Sea surface temperatures were also warm this month, peaking at +2.5C.

The coldest daily low temperature was on the 7th at -1.0C. The average temperature for the month was 2.7 C, which is about a half degree warmer than last month. Palmer received 21.6 mm of melted precipitation and no snow.

The following projects conducted research at Palmer Station during January:

B-013-P: PALMER, ANTARCTICA LONG-TERM ECOLOGICAL RESEARCH PROJECT: CLIMATE MIGRATION, ECOSYSTEM RESPONSE AND TELECONNECTIONS IN 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, Hannah Lucas, Brett Pickering, Peter Horne, Eric Erdmann

The arrival of the *Laurence M. Gould* on January 5th increased our personnel by three people, Brett Pickering, Peter Horne, and Eric Erdmann. Two of our team members departed on the annual LTER cruise on January 7th, Kristen Gorman and Eric Erdmann. Weather conditions were variable throughout the month of January; while we were still able to work in the field almost every day, a few days of precipitation and/or low visibility postponed some of our work for short periods of time.

Monitoring of Adelie penguin reproduction continued this month, as we obtained crèche dates, continued indicator counts, and completed an all-colony chick census on local islands as well as on Dream and Biscoe Islands. Chinstrap and Gentoo chicks were also counted on Dream and Biscoe, respectively. Adelie foraging ecology studies began this month, which include diet sampling as well as deployment of presence/absence radio transmitters and satellite transmitters/dive depth recorders. A new receiver and datalink system was installed earlier this season for this transmitter work and we have been monitoring this system in comparison with our previous system. Samples continue to be salvaged for isotope analysis. Our snow depth transect work finished up this month as snow has melted off all transect areas on the five local islands with penguin colonies.

Skua work intensified this month, as we started monitoring chick growth of Brown Skuas on local islands as well as on Dream and Biscoe Islands, and continued similar work with our South Polar Skua study on Shortcut Island. We completed another all-island census of Kelp Gulls to determine breeding success, obtaining adult and chick counts. Monitoring of the Blue-eyed Shag colony on Cormorant Island continued. Satellite transmitters continue to be deployed on Giant Petrels, and our all-island Giant Petrel census that began in mid-December has now been completed. The Giant Petrel study on Humble Island continues with chick growth measurements.

Monitoring of marine mammals has continued this month and was highlighted by sightings of Humpback whales. Fur seals have also been seen in increasing number on local islands. Lab work continued with the skua scat analysis, Adelie diet sample processing, and some sample preparation for isotope analysis.

All RPSC staff continued to provide great support this month. Many station personnel have assisted with field work; we appreciate their help, and thank Phil Spindler for making arrangements for this on a regular basis. Chuck Kimball has worked closely and cheerfully with us on a few issues. Steve Barten continues his great work.

B-016-P AND B-032-P PALMER, ANTARCTICA LONG-TERM ECOLOGICAL RESEARCH PROJECT: CLIMATE MIGRATION, ECOSYSTEM RESPONSE AND TELECONNECTIONS IN AN ICE-DOMINATED ENVIRONMENT: PHYTOPLANKTON ECOLOGY AND BIO-OPTICAL COMPONENTS

Dr. Maria Vernet, Principle Investigator, Scripps Institution of Oceanography (B-016-P)

Dr. Raymond Smith, Principle Investigator, University of California, Santa Barbara (B-032-P)

Personnel on station: Katherine Haman

January 5th and 6th were spent loading and setting up labs aboard the LM Gould for the LTER cruise. Once this task was completed and the ship departed, the normal sampling routine got underway. Over the course of January we were able to sample our offshore site, Station E, eight times, on January 1, 8, 11, 16, 19, 22, 26, and 29, and our inshore site, Station B, nine times, on the same days as Station E and also on January 4. Sampling included filtration for particulate carbon and nitrogen, determination of discrete chlorophyll a levels by fluorometry, pigment analysis using high performance liquid chromatography, measurement of dissolved inorganic nutrients, and estimation of primary production. CTD (Conductivity and Temperature outfitted with a transmissometer and fluorometer) and PUV (Profiling Ultraviolet Radiometer) data were also collected in the water column.

Throughout the beginning of January we saw very low phytoplankton biomass levels. On January 1st we found 83 μg of chlorophyll m^{-2} at station E and 184 μg of chlorophyll m^{-2} at station B (all given concentrations are values integrated through the euphotic zone). The chlorophyll level continued to decrease at both stations, dropping to 24.5 μg of chlorophyll m^{-2} at station E and 19.7 μg of chlorophyll m^{-2} at station B on January 22nd. The chlorophyll levels have begun to increase and by the end of January were at 72.2 μg of chlorophyll m^{-2} at station E and 79.5 μg of chlorophyll m^{-2} at Station B. In comparison, chlorophyll levels in January 2006 began low, and increased to near bloom levels of 223 μg of chlorophyll m^{-2} at station E and 256 μg of chlorophyll m^{-2} at station B by the end of the month. Thus it appears this season there is no end-January bloom as there was in the 0506 season, though the data suggest a bloom may be beginning in early February.

Primary production levels throughout January also decreased at both stations. Station E had a primary production level of 1333 mg C m^{-2} on January 1st. This decreased to a low of 678 mg C m^{-2} on January 19th before increasing again to 1101 mg C m^{-2} on January 31st. Station B also followed this same trend, with a primary production level of 2813 mg C m^{-2} on January 1st, decreasing to 452 mg C m^{-2} on January 8th, and then increasing towards the end of the month to 1426 mg C m^{-2} on January 31st.

B-016 and B-032 continue to thank FEMC and all the Raytheon personal on station for all the hard work they've done for us. We would also like to thank Ken Keenan for his expertise in PUV and CTD repairs. Thanks also to Steve Barten for all the help and maintenance of the zodiac, Phil Spindler for providing expert laboratory assistance, and

Tim Kramer for putting up with our waste issues. Also, special thanks to Alex Lowe and Nicole Middaugh for being part of Team Field Team Leader 0607! And, one last all around thanks to everyone on Station for making this a wonderful January at Palmer!

B-028- PALMER, ANTARCTICA LONG-TERM ECOLOGICAL RESEARCH PROJECT: CLIMATE MIGRATION, ECOSYSTEM RESPONSE AND TELECONNECTIONS IN AN ICE-DOMINATED ENVIRONMENT: PREY COMPONENT.

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

Personnel on station: Alex Lowe (team leader/ Marine Science Institute, University of California at Santa Barbara).

Activity from 01 January to 31 January 2007

Time in the beginning of the month was mostly consumed by preparing for the LTER Research cruise, which left on January 7th after a very smooth port call. Alex Lowe remained on station with the field team leaders from B-016 and B-045 to continue sampling in the area.

The LTER hydroacoustic surveys were conducted twice a week throughout the month. The number of krill schools seen during the surveys decreased during the month, coinciding with a decrease in chlorophyll measured from water samples. The team was still able to locate krill schools, and, with the help of great volunteers from the Grantee community and RPSC staff, was able to collect the individuals needed to carry on the research.

The majority of the krill caught have been young of the year, averaging 30mm; many mature males and females with spermatophores have also been caught in the schools. The focus of this month's krill catches was whole body fluorescence measurements (which are a measure of recent feeding activity). Length frequencies and length-weight regressions were also calculated for many schools. Chlorophyll sampling and CTD casts were conducted inside and outside krill schools.

The month was not without excitement, nor mishaps, but the RPSC staff was very helpful in finding efficient solutions to problems without having to miss sampling days. Special thanks goes to Steve Barten (Boating coordinator, for doing some midseason preventative maintenance on Rubber Duke III) and Ken Keenan (Instrument technician, for quickly fixing malfunctioning field equipment).

We are looking forward to the safe return of the *R/V LM Gould*, and a new leg of the summer sampling season.

B-045-P PALMER, ANTARCTICA LONG-TERM ECOLOGICAL RESEARCH PROJECT: CLIMATE MIGRATION, ECOSYSTEM RESPONSE AND TELECONNECTIONS IN AN ICE-DOMINATED ENVIRONMENT: MICROBIAL/BIOGEOCHEMISTRY COMPONENT

Hugh Ducklow, Principal Investigator, School of Marine Science, The College of William and Mary

Personnel on station: Nikki Middaugh

The month of January brought the *L.M. Gould* for the annual LTER cruise. Matthew and Kristen joined the team on the Gould and left Nicole on station to sample from stations B and E. She also conducted the last of four nutrient addition experiments.

In January, the fourth nutrient addition experiment was completed as well as the routine weekly sampling at stations B and E, weather permitting. For the 10 day nutrient addition experiment, 50 liter carboys were filled with surface water from Station B and incubated in the -1.5 °C cold room. Carbon (glucose) and nitrogen (ammonium chloride) were added three times, in a ratio of 4:1 respectively, over the course of the experiment to specific carboys. Each carboy was sampled daily to monitor the effects of these additions on the bacterial community. Due to the lack of phytoplankton and grazers in the water, the bacterial response was similar to experiments conducted in the beginning of the season and differs from the third nutrient addition experiment which was sampled during a phytoplankton bloom. These results will help in conducting grazing pressure/nutrient addition experiments for the 2007-2008 season at Palmer Station. Water was also filtered through Sterivex cartridges to collect the community DNA, and frozen for analysis in the states to determine the effects, if any, of the nutrient additions on the community. This fourth experiment was intended to be conducted during the yearly phytoplankton bloom that normally occurs in mid January; however, contrary to previous seasons, there was no bloom mid January. The bloom seems to be developing in early February.

We would like to thank Palmer RPSC personnel for all of their support this month. Their continuous and tireless support allows for such complex science to be completed in a remote field station.

B-256-P: PALMER, PHYSIOLOGICAL AND MOLECULAR MECHANISMS OF STRESS TOLERANCE IN A POLAR INSECT

Drs. Richard E. Lee, Jr. and David L. Denlinger, Principle Investigators, Miami University, Oxford, Ohio and Ohio State University, Columbus, Ohio.

Personnel on station: Richard Lee, Dave Denlinger, Joshua Benoit, Michael Elnitsky, Glen Schulte

With the help of the support staff at Palmer Station we were able to begin field collection and laboratory studies almost immediately upon arrival. Our project focuses on mechanisms of stress tolerance in the southernmost insect, the wingless fly *Belgica antarctica*. During our first

collecting trip on January 7th, we found both adults and larvae. However, contrary to the previous two seasons, we found no large aggregation of adults and egg masses later that month. Instead, we found evidence that adults had emerged and laid eggs several weeks earlier, likely due to warm temperatures during November and December, 2006. Large numbers of midge larvae were found in diverse microhabitats ranging from moss beds to mats of terrestrial algae to guano-rich sites adjacent to penguin rookeries. As part of our long-term monitoring of microclimate conditions experienced by *B. antarctica*, we recovered and successfully downloaded temperature data from all ten temperature loggers deployed last year at sites on Norsel Point, Torgersen Island, Stepping Stones Island and Bonaparte Point.

Again this season our research focuses on larval mechanisms of freezing tolerance, cryoprotective dehydration, osmoregulation and water balance. Molecular studies centered on the collection of RNA for studying differential gene expression in response to various types of environmental stress. Other experiments further investigated our discovery last season that larvae, but not adults, continuously produce heat shock proteins.

Our outreach efforts continue to connect the science activities of our team and other research projects on station with teachers and their students. Our website www.units.muohio.edu/cryolab/, maintained by Juanita Constible at Miami University, provides K-12 classroom activities based on national and state standards, and a FAQ section. Field team member Glen Schulte, a high school teacher from Cincinnati, heads up our outreach efforts this year. He developed a second website, www.edonice.org, with activities, photo galleries and Podcasts. He also conducted several video conferences in which students could ask questions during these live interactive sessions.

We are grateful to station personnel for their support and helpfulness during our third field season. Phil Spindler and Ken Keenan provided efficient and prompt assistance that allowed us to quickly set-up our laboratory and begin research. The distance learning sessions would not have been possible without the excellent assistance of Lora Folger and Curt Smith. We thank Jeff Otten and Chuck Kimball for communication, computer and networking support, and Steve Barten for boating support.

PALMER STATION RESEARCH ASSOCIATE MONTHLY REPORT January 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. Throughout the month, 15-second epoch interval GPS data files were collected continually at station PALM, compressed, and transmitted to the NASA/CDDIS in Reston, VA.

The GPS base station continues to operate using the spare base station receiver with apparently normal data, but unconfirmed configuration settings. Plans to change the base

station receiver from the obsolete Ashtech Z-12 backup to the new Trimble NetRS are on hold pending receipt of directions from the new project PI. Data was sent manually after a couple routine computer restarts after Windows Update installations and on the first day of the new year. GPS data transfer failed one time, resulting from down network at NASA. Data transfer resumed normally after network came back up

The roving GPS system and its associated base station operated well throughout the month.

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.

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 is running normally. A website was developed and posted to the Palmer Station Intranet displaying the relevant Automated Weather Station data that is locally decoded on the project computer. Early in the month, the project was assisted with navigating to their local computer. Later in the month, the RPSC IT department moved the project computer from the palmer domain to the usap domain. Since the project had not been informed of this change, it was moved back to the original domain until the change is approved by the project.

O-204-P A STUDY OF ATMOSPHERIC OXYGEN VARIABILITY IN RELATION TO ANNUAL TO DECADEAL VARIATIONS IN TERRESTRIAL AND MARINE ECOSYSTEMS.

Ralph Keeling, Principal Investigator, Scripps Institution of Oceanography

Air samples are collected on a semiweekly basis by the Station Physician.

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.

O-264-P COLLECTION OF ATMOSPHERIC AIR FOR THE NOAA\CMDL WORLDWIDE FLASK SAMPLING NETWORK.

David Hofmann, Principal Investigator, Climate Monitoring and Diagnostics Laboratory, National Oceanic and Atmospheric Administration

The National Oceanic and Atmospheric Administration (NOAA) Climate Monitoring and Diagnostics 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. Air samples are collected on a weekly basis by 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 was also forwarded to UCSB for B-032-P (Smith).

Early in the month, the Bonaparte Point AWS station started transmitting data without any intervention. The station stopped transmitting again at the end of 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.

VLF data acquisition computers were restarted a few times during the month after routine Windows Update installations. A few short periods of anomalous data were reported to the project. Extra periods of interesting data were archived. One period of failed data transfer was linked to a down server at Stanford. Data transfer resumed normally after the remote server came back up. Late in the month, the data transfers began to take much longer than normal and the project was assisted in correcting the issue.

Planning for project tasking for riggers was completed. The ground cable was found to have worn areas that were exposing the inner conductors. Preparations were made to replace the ground cable, including finding replacement cable and measuring the length required.

The VLF antenna cable was serviced several times. Most poles on the glacier have melted out and the cable has been placed laying over the downed poles. New holes were drilled for all melted-out junction box poles and adjacent poles after data wash-outs resumed. The top pole holding the guy wire was also re-drilled.

Mid-month, the VLF failed to resume normal data acquisition after daily housekeeping period. The system was completely restarted and shut down but problem remained. Analog electronics were suspected as having suffered from a short in the cable. The pre-amp power supply was found to be producing anomalous voltages and was fixed by replacing an internal fuse. A badly corroded connector on the antenna cable on glacier was found and cleaned. The cable was tested for shorts and the pre-amp power supply was connected and powered. The power supply worked normally, but a broken pin on the corroded connector caused an open in the cable and the system was not powered. The pre-amp regulator board was bench tested and found to be operational. A replacement connector was soldered to the VLF antenna cable to replace the broken connector. The pre-amp regulator board was reinstalled and successfully powered by the pre-amp. The system resumed normal operations a couple days after the problem began.

Late in the month, the VLF antenna was found to have a worn area of the E-W loop cable. The project was informed and plans were made to repair the worn area.

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).

The system operated well throughout the month. A few satellites' statuses were investigated after they failed to be captured normally. LTER images generated by the system were sent to LTER scientists daily. A new image set was created to match the daily MODIS Palmer subsets.

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 well throughout the month. The CD-ROM drive was replaced after it failed. Plans were made to add Styrofoam to the magnetometer hole and re-align the instrument. Project was assisted with data ftp to local computer.

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.who.edu/tsg/>.

The system has operated well throughout the month. Data quality issues were resolved by adjusting flow through the instrument.

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. An air filter was received, set up, and installed.

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 had two problems this month that did not result in any data loss. The first was low-frequency noise in the spectrograms which was traced to the motor blower. The noise was reduced by tightening the bolts of the motor on to the vibration isolators. The second problem was anomalous meteorology data which was traced to the MetPac electronics. The problem will be fixed by a replacement mother board or a new meteorology system.

Quarterly air samples were shipped to Vienna for archival and project data was added to the new cargo system. The project was added to the email distribution list for the *R/V LAURENCE M. GOULD* ship schedule. Consumables were ordered.

TIDE GAGE

The Research Associate operates and maintains on-site equipment for the project. Tide height, seawater temperature, and salinity are monitored on a continual basis by a gage mounted at the Palmer Station pier.

The tide gauge operated fine throughout the month. The new tide gauge data acquisition computer information was added to the exemption list for the computer vulnerability scans. The computer was also assigned a static IP address to facilitate the exemption. Possible replacements for the tide gauge data acquisition system were investigated. A website displaying local tides was written and added to the Palmer intranet.

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 six 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. Weekly weather data summaries were sent to the Antarctic Sun. Visible satellite images of the southern LTER grid region were also sent to the *R/V LAURENCE M. GOULD*.

The generation of daily sea surface temperatures as recorded by the tide gauge was added to the normal monthly weather reporting. The copying of PalMOS data files to the Research Associate network folder was automated. Spare MAWS Vaisala data logger was received from E/R/R. Failure of synoptic email messages to be received by NOAA was investigated and problem was found to be a result of a down network at NOAA. Emails resumed as normal after network came back up.

MAWS and PalMOS data acquisition computers were restarted a few times throughout the month after routine Windows Update installations. After one update, the PalMOS computer required an administrator log-in to operate. Problem was fixed by installing a stand-alone version of the update. Intermittent occasional short periods of data loss resulted.