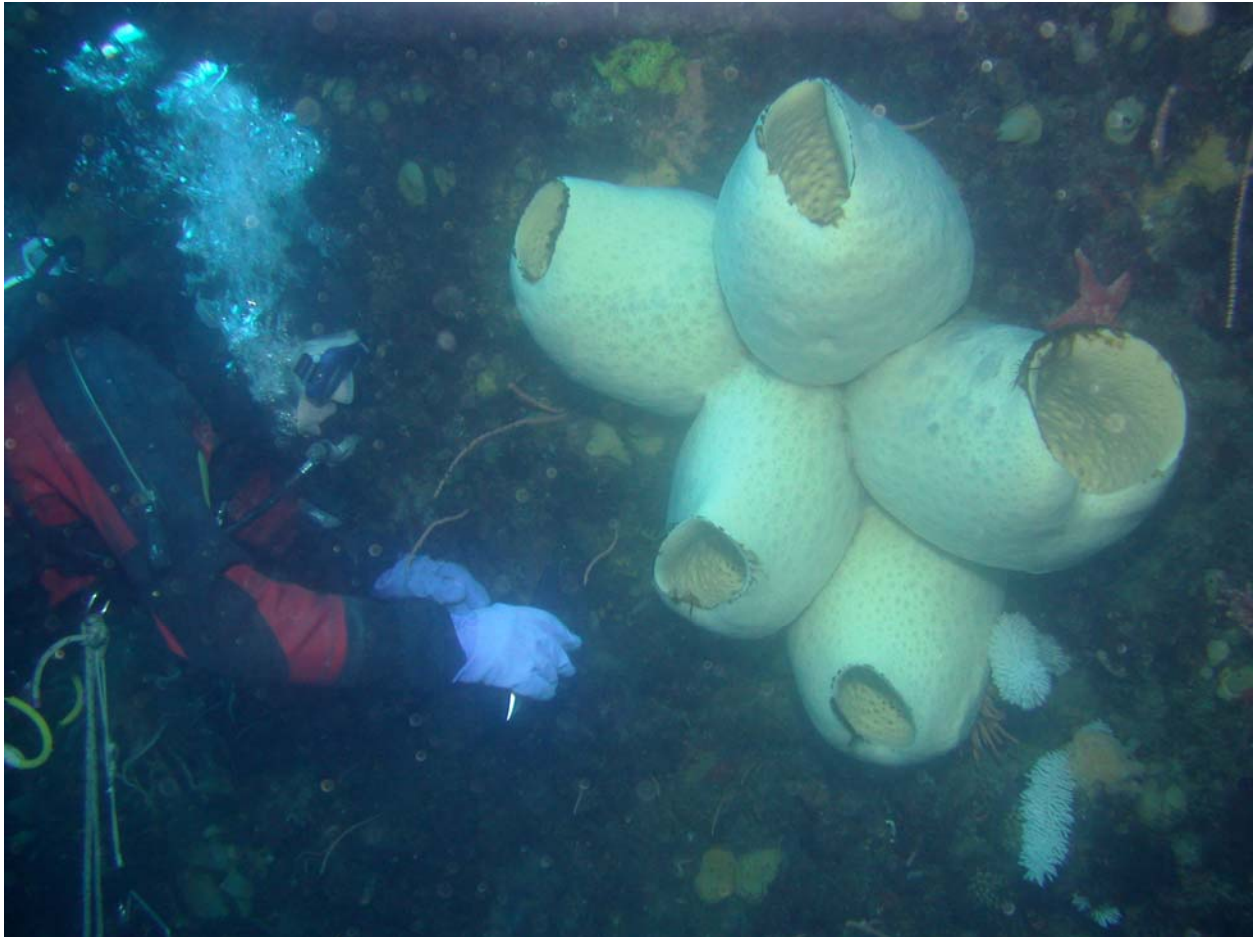


PALMER STATION MONTHLY SCIENCE REPORT

January 2008



*A diver working below Hermit Island with sponge *Scolymastra joubini*. Photo courtesy of Bill Baker.*

NEWS FROM THE LAB

Philip Spindler, Senior Assistant Supervisor Laboratory Operations

January started with a busy port call with the *Laurence M. Gould*, which brought the dive group B-022-P (Amsler/Baker/McClintock) to station. They were up and running soon after with diving, sampling, and running chemical extractions. The time was also the beginning of the month-long LTER cruise. We wished them well as they steamed off into the sunny blue ocean.

The weather was conducive to field work and outdoor projects around station for the first part of the month. It turned for the worse and science lost field days due to bad weather. We all took advantage of the time with indoor jobs and analysis. Foul weather did not deter us from having fun on our days off either. One Sunday we had a scavenger hunt that had the whole station looking for the Hidden Art of Palmer.

We enjoyed several visits with tour ships (*Corinthian II*, *Clipper Adventurer*, *Polar Star*, and *Prinsendam*) and many yachts, including the *S/Y Euronav Belgica*. The crew aboard the *Belgica* retraced the steps of Adrien de Gerlache, and they presented their expedition to station- a very interesting and refreshing point of view.

The end of the month brought renewed vigor as everyone prepared for the return of the LTER cruise. Overall, January was a very busy and productive month. The New Year is certainly off to a great start for us here, and we hope the same is true for you.

JANUARY WEATHER

Scott Walker, Research Associate

January brought the warmest temperatures yet this season, with mostly calm days and a lot of rain. There were only 10 days this month where the temperature dropped below freezing. The 31st was the warmest with a high of +6.7C, and on the 25th the wind gusted to 67 knots.

Brash continues to blow in and out of the area surrounding Palmer station and is increasingly fed by the calving glacier. The smooth façade of our glacier has been washed away by the rain and multiple cracks and crevasses are now visible.

The coldest daily low temperature was on the 16th at -1.5C. The average temperature for the month was 2.2 C, which is about one degree warmer than last month. Palmer received 82.5 mm of melted precipitation and 16 cm snow.

The following projects conducted research at Palmer Station during January:

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, Hannah Lucas, Eric Erdmann, Nick Metheny

The arrival of the *Laurence M. Gould* on January 3rd increased our personnel by two people, Eric Erdmann and Nick Metheny. Heidi Geiss, a member of B-045-P, also arrived on the LMG and collaborated with our field team on numerous projects. These team members departed on the annual LTER cruise on January 5th. Weather conditions were unfavorable for short stretches during the month of January, characterized by periods of high winds and/or precipitation that postponed field operations and prevented access to our farther-ranging field sites on a few occasions, especially mid-month. Large amounts of brash ice impeded access to local areas a few times this month.

Monitoring of Adélie 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. A Gentoo chick census was completed on Biscoe Island. A census of Adélie, Chinstrap, and Gentoo penguin chicks was completed on the known penguin-breeding islands in the Joubins. Breeding chronology monitoring and sampling continued for our selected Adélie, Chinstrap, and Gentoo nests. Adélie 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. The receiver and data-link system installed last season for this transmitter work was utilized again and we continue to make comparisons with our previous system. Samples continue to be salvaged for further analysis and collaborations.

Skua work continued this month, as we started monitoring chick growth of Brown Skuas on local islands as well as on Dream and Biscoe Islands. Similar nest monitoring as well as scat collections continue on Shortcut Island for South Polar Skuas. Another all-island census of Kelp Gulls was completed this month to determine breeding success. 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, with the addition of a 5-island census in the Joubins. The Giant Petrel study on Humble Island continues with chick growth measurements. Samples for collaborative Giant Petrel studies were obtained at various times throughout the month.

Monitoring of marine mammals has continued this month and was highlighted by numerous sightings of Humpback whales. Fur seals have also been seen in increasing number on local islands. Lab work continued with Adélie diet sample processing and sample preparation.

RPSC continues to provide great support for our project; we greatly appreciate all of the volunteers who accompanied us in the field this month, as they enthusiastically assisted us with accomplishing a lot of work! Also, special thanks to Seren Thompson who has saved the day a couple of times this month with various IT issues. Many, many thanks to Ryan Wallace, as he is departing soon...our season thus far has been a great success in part due to his boating support.

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).

The LTER cruise of the Antarctic Peninsula embarked from Palmer Station in early January, leaving two team members to continue monitoring and sampling of the local krill (*Euphausia superba*) population around Palmer Station. We continued monitoring LTER stations B and E, conducting biweekly water sampling (for chlorophyll a content) and CTD (Conductivity, Temperature, Depth) casts.

The dramatic increase in the local abundance of krill observed in late December began to taper off as January began. For the first time since early December we were unsuccessful on two different search events when trying to locate krill schools to trawl from. This decline in local krill abundance observed in mid-January, coupled with three foul-weather days in the fourth week of the month, left us just shy of our 14-school sampling goal for January. We were still able to catch krill from 12 different schools, the same number sampled in December.

We have continued to determine the length frequency of each krill school sampled, the relationship between total animal length versus animal mass, as well as measuring the feeding behavior of a subset of individuals from each school by using gut concentrations of chlorophyll as an indicator of phytoplankton grazing.

Support from RPSC has been excellent, especially from boating coordinators Ryan Wallace and Adam Swanson, carpenter Alden Strong, and instrument technician Ken Keenan.

B-022-P: THE CHEMICAL ECOLOGY OF SHALLOW-WATER MARINE MACROALGAE AND INVERTEBRATES ON THE ANTARCTIC PENINSULA

Charles Amsler and James McClintock, Principal Investigators, University of Alabama at Birmingham,

Bill Baker, Principal Investigator, University of South Florida

Personnel on station: Bill Baker, Craig Aumack, Alan Maschek, Matt Lebar.

B-022 arrived on Station 3 Jan 08 after a very smooth crossing. Our early deployment was intended to get a jump on diving operations, which has gone well for the month. We did our first dive 7 Jan and completed 31 by the end of the month, including two new dive sites found from careful analysis of the recent bathometric work done in the vicinity. One unexpected result of Jan dive ops was our fortuitous observation of the outgrowth of brown algal endophytes which had been difficult to detect in our prior, late season, deployments. The weather in the first week was quite cooperative for dive operations with sunny days and smooth seas. The remaining three weeks were bumpier and colder but, with the exception of several days, were suitable dive days. Lab staff were able to get our lab up and running for sample processing, despite considerable demands on their time. Isotopic feeding experiments with one sponge species were initiated. All-in-all a very successful month for B-022.

W-486-P: FROZEN FIELD.

Kim Baranowski, Principal Investigator, Brooklyn, New York

During the month of January, Kim completed several artworks, continued to update her project website, and began her project dissemination.

With the assistance of the Dr. Bill Baker and his dive team, Kim completed 2 paintings of Antarctic marine life. These works represented a Giant Antarctic isopod and a yet unidentified octopus. These paintings are the beginning of a series she is creating of local underwater

species. She also completed an eighth drawing for her series on Antarctic Peninsula birds. Kim worked alongside Scott Walker, Research Associate, in order to create a GPS map of her project's site-specific installation sites.

She composed several new entries for her web-based "Field Journal". Kim also interviewed Palmer Station staff for the 'Antarctic Profiles' section of the site which introduces polar careers to students.

As part of the dissemination of her NSF project, Kim wrote a cover story for Time for Kids Magazine. It was featured in two of the January 2008 publications. The article included information about NSF-sponsored research on the continent. The Time for Kids Website offered teacher's materials including several worksheets that covered Antarctic geography and fauna based on her stories. In addition, Kim was interviewed by 10-year old "kid reporter" Jennifer Falliaco. Jennifer's interview can also be viewed on the Time for Kids site.

Kim has started project outreach by corresponding with students in New York City, Florida, Illinois, and Michigan. In these emails she has answered general questions about the continent, the USAP, and her personal experiences on the ice.

The last three months of research Kim has been able to conduct and the work that it has informed will enable her to mount three exhibitions in 2008. Once back in the states she will continue her outreach by conducting school workshops and university lectures. She is incredibly grateful for the warmth and generosity of the incredible people of Palmer Station and for the wonderful opportunity to participate in the National Science Foundation's Antarctic Artists and Writers Program.

O-264-P: COLLECTION OF ATMOSPHERIC AIR FOR THE NOAA/GMD WORLDWIDE FLASK SAMPLING NETWORK

Dr. David Hofmann (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 Palmer Physician collects weekly air samples for Carbon Cycle Greenhouse Gases Group and fortnightly samples for Halocarbons & other Atmospheric Trace Species Group.

Samples were taken on station by the Physician without any issues.

PALMER STATION RESEARCH ASSOCIATE MONTHLY REPORT
January 2008

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. A new computer system and additional hardware will be arriving in early February to replace the existing system.

Data was sent manually after a couple routine computer restarts after Windows Update installations and on the first day of the new year.

The roving GPS system and its associated base station was utilized multiple times for surveying the glacier and other areas on station.

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).

Preparations are being made to have the power rerouted from the T5 building to the TerraLab to the seismic vault. This switchover will require a visit to the vault and some work in the vicinity. The PIs for both the USGS and IMS has been notified work being done in the next few weeks.

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 PI is sending a new system to replace the current system on station. Installation will be preformed by the RA and should arrive early in February.

The system is running normally.

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

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.

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

A new station is currently being shipped to Palmer Station. The RA, with assistance of the riggers, will configure and install the station once it arrives on station.

The Bonaparte station is not reporting at this time.

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.

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 in support of a new VLF installation in Alaska.

The VLF antenna cable was serviced several times. A new survey of the cable through the backyard was added to the site map for location of the cable. Re-drilling of the posts is planned for early February.

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. The SeaWifs (Orbview-2) satellite is currently off-line since January 3. There is no information on when that satellite will be operational again.

LTER images generated by the system were sent to LTER scientists daily.

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 RA worked with the PI to determine difficulties with data transfer to the Stanford systems.

A new system is currently being shipped to replace the current setup. The new system will send data real-time to UCLA for subsequent analysis.

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 system has operated well throughout 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 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.

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 and detector assembly. This replacement item is expected to be on station mid February.

The seismic monitoring station operated normally during the month. Quarterly filter samples were shipped to Vienna for archival.

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 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 is archived locally and forwarded twice each month to the University of Wisconsin for archiving and further distribution. Synoptic reports are automatically generated every four 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.