PALMER STATION MONTHLY SCIENCE REPORT
April 2018

Astrolabe Needle in Dalman Bay. *Image Credit: Frank Hegyi*

NEWS FROM THE LAB
Jason Johns, Winter Laboratory Supervisor

PALMER STATION MONTHLY SCIENCE REPORT JANUARY 2018

The beginning of the month was a busy time here at Palmer Station with Antarctic Support Contract (ASC) staff turnover in full swing. We said goodbye to most of the summer population a couple of days into the month with only a few staff and the remaining members of the Amsler/Baker/McClintock diving group bridging over into the beginning of the winter. Mid-month saw the arrival of the ARSV *Laurence M. Gould* for the first of two Detrich fishing cruises. The cruise has been a success bringing many different species of fish and invertebrates back to the Palmer tanks. In addition to this the Countway group successfully operated the Eco-Rosette/CTD from the RHIB *Hadar* on a number of occasions to collect water and microbes and the divers have been busy bringing back all kinds of seaweeds and invertebrates which has made the aquarium a bustling place full of all kinds of life.

The weather was quite fair most days and the water is still completely open which allowed science groups and staff to travel outside the normal boating limits on a number of occasions. The AWS located in the Joubin and Wauwermans islands allow us to have a more accurate picture for inclement weather that may roll into our area. Servicing of these stations was carried out on a handful of occasions, thanks to near perfect conditions and dedicated staff during the shorter days as the sun sinks lower on the horizon bit by bit. Clouds have tended to obscure the stars on most nights but there has been some amazingly clear starry nights on occasion during the month.

Palmer Monthly Met summary for April, 2018

Temperature
Average: 0°C / 32.1 °F
Maximum: 6.4 °C / 43.52 °F on 14 Apr 02:17
Minimum: -4.4 °C / 24.08 °F on 7 Apr 10:43
Air Pressure
Average: 983.3 mb
Maximum: 999.1 mb on 26 Apr 02:21

Minimum: 963.4 mb on 19 Apr 05:44
Wind
Average: 12.3 knots / 14.1 mph
Peak (5 Sec Gust): 55 knots / 64 mph on 17 Apr 23:38 from NNE (19 deg)
Prevailing Direction for Month: NNE
Surface
Total Rainfall: 66.5 mm / 2.62 in
Total Snowfall: 28 cm / 10.9 in
Greatest Depth at Snow Stake: 11 cm / 4.3 in
WMO Sea Ice Observation: 1-5 icebergs with growlers and bergy bits
Average Sea Surface Temperature: -.15 °C / 31.7 °F

Winds peaked at 44 mph on the 17th and the average speed for the month was 14.1mph. The prevailing wind direction for the month was from the north north east. Temperatures peaked at 43.5° F and reached a low of 24.1° F. Several systems have passed through bringing 11 inches of snow. There has been some grease ice and several large icebergs in the area.

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: Charles Amsler, Margaret Amsler, Bill Baker, CJ Brothers, Michelle Curtis, Sabrina Heiser, James McClintock, Andrew Shilling.

Overall, April was a very successful month in both the field and lab. We were able to make 45 dives to collect our focus organisms for this season's work: the red alga *Plocamium cartilagineum*, the amphipod *Paradexamine fissicauda* which commonly associates with *P. cartilagineum*, and the huge brown alga *Himantothallus grandifolius* with its associated gastropod fauna support. These collections facilitated our experimental studies in the lab and aquarium. We made nine dives sampling *P. cartilagineum* along vertical transects near Palmer. We were also able to make 10 dives collecting *P. cartilagineum* over two days with support of the R/V *Hadar*, one day in the Dream Island, Casey Islands, Stayaway Skerries region and the second day in the Joubin Islands and Beaumont Skerries. In addition to our regular diving activities, we also made two dives in support of a station Earth Day cleanup of the pier area.

Throughout the month we maintained a mesocosm experiment examining the impact of gastropods (snails and limpets) on the ecologically dominant brown alga *H. grandifolius*. The mesocosms consist of 10 large aquaria plumbed on the deck outside the aquarium building to allow natural lighting. Five have gastropods at the same densities they occur on *H. grandifolius* in nature (determined based on samples collected last year) and the other five are gastropod-free controls. Each tank has three approximately 100-gram blade sections of different *H. grandifolius* individuals.

The mesocosm tank setup (left) on the aquarium deck. On the right is a photo inside one of the tanks showing the three sections of *H. grandifolius* attached to a rack in a control tank. Photo by Chuck Amsler.

The station gas chromatograph was in constant use throughout the month enabling us to determine which of 14 or more chemical groups (chemogroups) *P. cartilagineum* individuals belong to. With that knowledge, we have been doing feeding experiments assessing the relative palatability of the different *P. cartilagineum* chemogroups. We also continued maintaining season-long experiments established in

March looking at the growth of *P. fissicauda* on the different chemogroups as well as the impact of the different chemogroups on the fecundity and embryonic development of *P. fissicauda.*

Outreach activities continued throughout the month. We continued to post blogs to our UAB in Antarctica web site (http://www.uab.edu/antarctica/) three times per week. The site also features Twitter feeds from team members Sabrina Heiser and Jim McClintock.

We are grateful for the generous and professional assistance of numerous ASC staff in assisting with our activities. Jason Johns, Hannah James, Mike Burns, Andrew Purves, Randy Jones, Carly Quisenberry, and Dave Moore deserve special thanks for facilitating our laboratory and field efforts.

B-028-P: *Antarctic Microbial Networks and DMSP: Linking diversity, biogeochemistry, and functional gene expression*

Dr. Peter D. Countway, Dr. Patricia A. Matrai, Carlton D. Rauschenberg and Karen Romano Young, Bigelow Laboratory for Ocean Sciences, East Boothbay, Maine

2018 Incubation Experiments in the 'Antarctic Ecostat'

The Bigelow Laboratory research team returned to Palmer Station in late March of 2018 to carry out our second season of field research – during the fall to winter transition period. The goal of this second season was to collect samples and conduct experiments in our 'Antarctic Ecostat' (**Fig. 1**) to compare and contrast the results from similar work that we performed during the summer of 2016-17. Our research consisted of water sampling and experiments to test the effects of the phytoplankton metabolite dimethysulfonio-propionate (DMSP) on the structure of the microbial community, the abundance and expression of DMSP degradation genes, and the biogeochemistry of microbial DMSP transformations. Water for the

Figure 1. *The Ecostat loaded with sample bottles. Half of the 4-liter bottles inside the Ecostat (n=6) received a continuous supply of filtered seawater medium, while the remaining bottles (n=6) were incubated in batch mode.*

experiments was collected from a depth of 5 m at Station 'E' and returned to Palmer Station for analysis and experimental setup via the RHIB R/V Hadar. The Eco-Rosette/CTD was deployed from Hadar a total of 28 times on five dates to sample the plankton community and collect the required amounts of water for our experiments. Although we planned to conduct two Ecostat experiments of approximately equal length we extended the length of our first experiment to take advantage of the active microbial community that developed over the course of the first week of our first experiment. The flow-through design of the Ecostat made this option possible – with replenishment of filter-sterilized growth medium the only requirement. We opted for this change in experimental design given the very low levels of plankton biomass (via chlorophyll *a* measurements) in the seawater at station E, low microbial activities (via bacterial production assays) and the relatively short window of time we had to conduct experiments at Palmer Station. Although we were on station for five weeks, a total of one of the five weeks was required for setup/unpacking and breakdown/packing. As in the summer of 2016/17 we were able to observe differences among the plankton communities that were grown at the two different seawater/nutrient/DMSP supply rates and those that were grown in 'batch mode', which did not receive additional inputs of nutrients and DMSP. Our main Ecostat experiment lasted for 19 days, with two short-term 'batch mode' experiments lasting four days each. Although the colder temperatures and high winds that we experienced in April of 2018 made our work somewhat more challenging (compared to Dec-Jan of 2016/17) we were able to accomplish our experimental work with minimal complications. The RHIB R/V Hadar provided an excellent work platform from which to deploy the Eco-rosette, the C-OPS light meter, and a 20 micron plankton net. This work was facilitated by highly professional support that we received from R/V Hadar's operators, MTs Mike and Andrew.

Analytical Chemistry of DMS(P)(O) Samples at Palmer Station

DMSP and some of the important metabolites resulting from the microbial transformation of DMSP were measured in samples collected from station 'E' and in the incubated samples collected from Ecostat experiments. Measurements of the concentrations of biogenic sulfur compounds (including DMSP/DMS/DMSO) were obtained via gas chromatography during our time at Palmer Station. Despite the fact that our fieldwork was conducted well beyond the traditional phytoplankton 'bloom' season (Dec-Feb), DMSP appeared to be utilized rapidly by the Antarctic bacterial community at Station 'E'. This

suggests the presence of a microbial community that was well-poised to take advantage of this source of carbon and sulfur.

Phytoplankton Community Structure

The dominant types of >20 µm phytoplankton at Station 'E' were similar to our previous field season and included *Thalassiosira*, *Corethron*, *Coscinodiscus* (**Fig. 2C**), *Fragilariopsis, Rhizosolenia*, *and Pseudo-nitzschia.* Unlike the summer of 2016/17, we did not observe *Phaeocystis antarctica* in any of our samples or enrichment cultures. An environmental DNA extract from Station E also tested negative for the presence of *Phaeocystis* via quantitative PCR.

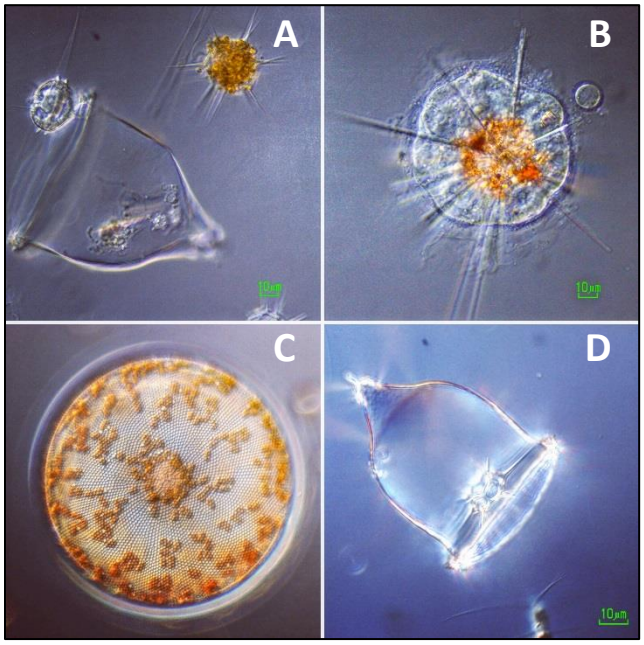

Figure 2. *Plankton from Station E including Tintinid ciliates (A, D), an Acantharian (B), the diatom Coscinodiscus and two silicoflagellates (small cells, panel A).*

In addition to the phytoplankton, we observed heterotrophic protists including Tintinid ciliates (**Fig. 2A, 2D**) and Acantharia – though the Acantharia were observed in only one net tow. Smaller unidentified flagellates were apparent in the enrichment cultures and were likely various types of bacterivorous protozoa. There was a distinct lack of these heterotrophic protists in our net tows during the summer of 2016/17.

Quantitative PCR for Bacterial DMSP Metabolism Genes

We conducted quantitative PCR (qPCR) for several of the bacterial genes involved with the degradation and transformation of DMSP using a handheld qPCR system. The capability to detect the presence of these

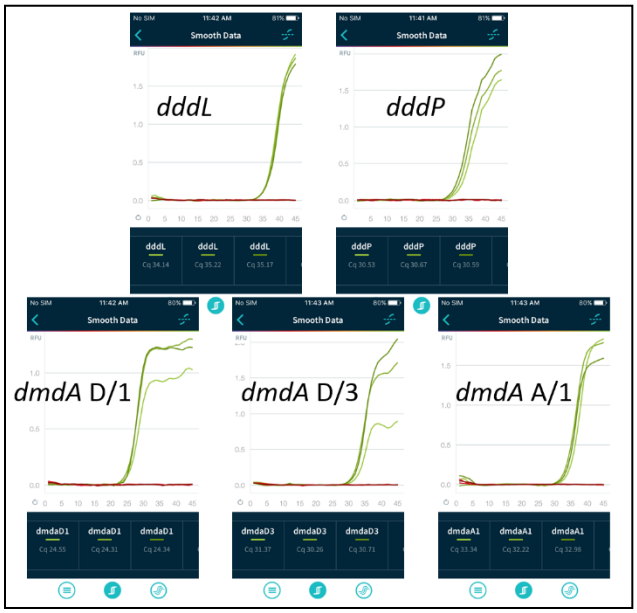

Figure 3. *DNA amplification curves for five different DMSP metabolism genes detected in a single sample collected at Station E. DddL and dddP genes code for DMSP lyases that result in the production DMS gas while the dmdA genes code for enzymes that are active in DMSP demethylation pathways.*

specific DMSP degradation genes enhances our understanding of the fate of DMSP in the Antarctic marine environment and provides clues to the dominant pathways and some of the bacterial taxa involved with these processes. Future work with the DNA/RNA/Omics samples from our Ecostat experiments will involve sequencing the bacterial mRNA transcripts that are activated in response to DMSP addition. These field results provide us with a valuable 'first look' into the diversity and relative abundance of the various DMSP genes. Although these results are qualitative, the relative positions of the amplification curves indicates relative abundance of the genes in this single extract, suggesting that *dmdA* D/1 was the most abundant of the five types of DMSP genes that were tested.

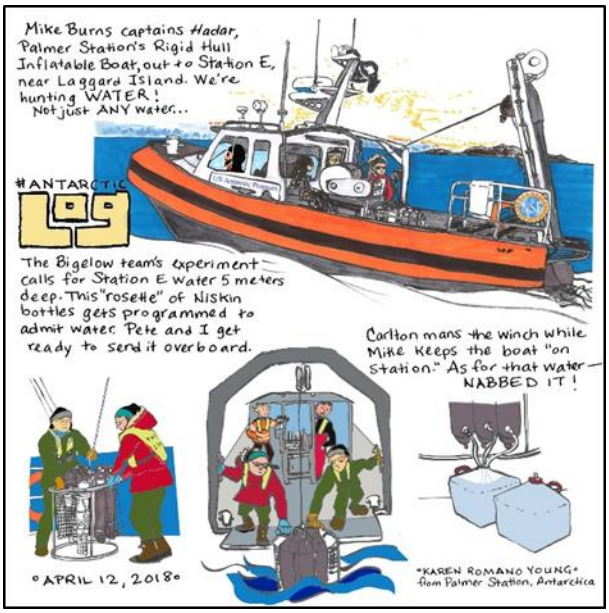

Figure 4. *An example science-based comic by Antarctic Artist and Writer Karen Romano Young depicting a sampling trip to Station E aboard R/V Hadar.*

Outreach and Broader Impacts

This year, the fourth member of our research team was artist/illustrator Karen Romano Young, who was also a recipient of a NSF Antarctic Artists and Writers grant. Karen provided critical assistance in the lab and the field, but also joined us to provide outreach via her science-based artwork and narratives, highlighted on her site #antarcticlog (**Fig. 4**). These materials will ultimately provide Karen with the content for a graphic novel based on Antarctic Science. Karen has been an amazing asset to our group and to the broader Palmer Station community, not only helping us to communicate our science to broader audiences, but also helping all of the other science groups with their outreach objectives as well. Karen's comics will contribute to a greater understanding of

Antarctic science among the general populace and will promote all of the amazing resources that Palmer Station has to offer.

In addition to Young's #antarcticlog, Countway and Matrai each conducted outreach events via two Zoom conference calls to school groups back in Maine. Countway beamed in to a display at an elementary school science fair in Brunswick, Maine, where students and their parents could approach a screen and ask questions about our current research, Palmer Station, or Antarctica in general. It is estimated that several hundred students and their parents attended the event with several dozen direct interactions between Countway and people who stopped to ask him questions. An unknown number of additional people took interest in the display but did not interact. For a second year, Matrai connected with a collective of approximately 100 students from Maine's island school communities through the Weather Blur program (Maine Math and Science Alliance).

Concluding remarks

We have completed two successful Antarctic field-seasons and are grateful to the entire Palmer Station community and the other grantees for their support of our project and many interesting scientific discussions. We expect to have a busy final year of the project back at Bigelow Laboratory – focused on the processing of samples for molecular analyses and analyzing the large amounts of biogeochemical data. To date, we have generated approximately 5 million DNA sequences to characterize changes in the microbial community within our experimental treatments using water from Station 'E'. Countway presented these preliminary data at the 2018 Ocean Sciences meeting in Portland, OR this past February. We will begin the DMSP gene abundance and metatranscriptomic portions of this project during the summer of 2018 and expect that our work will yield novel information about microbial diversity and functional gene diversity in the coastal waters near Palmer Station.

B-037 ANTARCTIC NOTOTHENIOID FISHES: SENTINEL TAXA FOR SOUTHERN OCEAN WARMING

H. William Detrich, Principal Investigator
Marine Science Center, Dept. of Marine and Environmental Sciences, Northeastern University

Personnel on Station April 1-30: Frank Hegyi

Personnel on Station since April 17: Thomas Desvignes, Juliette Auvinet, and Henrik Lauridsen
Due to unfortunate accidents, PI Detrich and team member Nathalie Le François were unable to deploy to Palmer Station in April.

Antarctic notothenioid fishes have evolved a remarkable suite of characters, including the acquisition of macromolecular antifreezes by most species and the loss of red blood cells and hemoglobin by the "white-blooded" icefish family, as the Southern Ocean (SO) cooled to the freezing point of seawater (–1.9°C) over the past 25-40 million years. Today, these cold-adapted stenotherms are threatened by rapid warming of the SO, the temperature of which is likely to increase by 2-4°C over the next two centuries. The major goal of the B-037 research program is to assess the molecular and organismal consequences of this warming by analysis of the effects of elevated temperature regimes on gene expression in developing embryos of red- and white-blooded Antarctic notothenioids (notothens and icefishes, respectively). In addition, B-037 is exploring the genomic basis for the loss of red blood cells and hemoglobin by Antarctic icefishes and the compensatory adaptations that have ameliorated these losses.

On April 17, B-037 team members Desvignes, Auvinet, and Lauridsen arrived at Palmer Station to join Hegyi. Together, they worked to prepare the B-037 aquarium and lab spaces in anticipation of the arrival of fish. On April 19th, Desvignes, Hegyi, and Lauridsen sailed on the *ARSV Laurence M. Gould* to conduct the first fishing trip of cruise LMG18-04. The goals were to set traps near Astrolabe Needle (ASPA 153, Eastern Dallmann Bay) to catch reproductive specimens of the Bullhead notothen, *Notothenia coriiceps* and to trawl overnight southwest of Low Island (ASPA 152, Western Bransfield Strait) to capture reproductive adults of Blackfin icefish, *Chaenocephalus aceratus*. Baited traps were set in Dallmann Bay at 150 m on April 20th, after which five trawls were performed at Low Island during the night of April 20th to 21st. Trawling yielded twenty large specimens of the Blackfin icefish and an excellent catch of ~60 large reproductive Bullhead notothen. After trawling, the *LMG* headed back to the trapping location and recovered 25 fish, including 18 large specimens of the Bullhead notothen. Unloading of the fish to the Palmer Aquarium on April 22nd was accomplished rapidly by the expert personnel of the *LMG* and the ASC.

When *N. coriiceps* and *C. aceratus* individuals reach reproductive ripeness, we will collect milt from males and eggs from females, mix them, and then activate fertilization by addition of seawater. Zygotes (fertilized eggs) will be placed in our incubators that we are installing in Environmental Room 1. Control embryos from each species will be incubated at –1°C, whereas experimental embryos will be raised at +4°C. Embryos will be sampled at intervals during the 6-7 months required to reach the hatching stage. Control and experimental embryos will be analyzed for potential perturbation of gene expression by high-throughput RNA sequencing (RNAseq) at our home institutions.

On April 27th, Desvignes, Hegyi, and Lauridsen departed Palmer Station on board

the *LMG* to conduct our second fishing trip of the cruise and headed south to the Banana Trench on the east side of Lavoisier Island and to the Hugo Island Deep. These locations were selected because they yield rare icefishes and closely related dragonfishes. Several specimens of plunderfish, two species of dragonfish, and two species of icefish were collected.

Since returning on April 30th, the team has been sampling the rare specimens to support future research. Meanwhile, males and females of *N. coriiceps* and *C. aceratus* have been kept under observation for reproductive maturity, which would enable us to proceed with in vitro fertilization to generate embryos. We anticipate the broodstock of our two species will mature by mid-May.

One of the compensatory adaptations of Antarctic icefishes is an extensive ramification of blood vessels to facilitate the delivery of oxygen. Lauridsen is applying ultrasound and vascular cast technologies to explore the evolution of icefish retinal vasculature. This work will include microCT (computed X-ray tomography) to be performed at his home institution in Denmark.

We are also studying the chromosomal rearrangements that may have driven, in part, speciation during the notothenioid radiation. Auvinet is preparing mitotic chromosome spreads from multiple species for use in mapping these rearrangements.

The Broader Impacts of our research program include the production of videos to document the life and work of polar scientists. These videos are targeted to middle schoolers, a critical demographic for recruitment to STEM fields, including polar research. Hegyi, cinematographer from Boston, has been recording and producing a series of six science documentaries (~5 min each) to showcase our research program to this audience. Some topics include 1) the history of Antarctic Exploration, 2) life at Palmer Station and some “fun polar facts,” 3) evolution, DNA, and the surprising emergence of the hemoglobinless white-blooded icefishes, and 4) climate change and the risk of mass extinctions of Antarctic fauna as the SO warms. Since his deployment on LMG18-03, Hegyi has accumulated many hours of footages and begun the production phase, including editing and animation.

We thank the ship and station personnel for their exceptional help in making our early field season a great success.

PALMER STATION

RESEARCH ASSOCIATE MONTHLY REPORT

March 2018

W. Lance Roth

G-090-P: GLOBAL SEISMOGRAPH NETWORK (GSN) SITE AT PALMER STATION.

Kent Anderson, Principal Investigator, Incorporated Research Institutions for Seismology (IRIS)

Station PMSA is one of more than 150+ sites in the GSN, monitoring seismic waves produced by events worldwide. Real-time telemetry data is sent to the U.S. Geological Survey (USGS). The Research Associate operates and maintains on-site equipment for the project.

The system operated normally throughout the month.

A-111-P: THE NEXT GENERATION OF GEOSPACE RESEARCH FACILITIES AT PALMER STATION

Andrew Gerrard, Principal Investigator, New Jersey Institute of Technology

The ionosphere-thermosphere-magnetosphere (ITM) region of Earth's atmosphere, which is part of the larger geospace environment, is the portal through which the solar wind can enter and impact our planetary system. Though space weather research over the past decades has greatly increased our understanding of a wide variety of phenomena associated with ITM physics, the sum of these individual processes occurring in the geospace environment does not replicate the rich diversity and scope of this complex region. Thus, a more holistic approach to ITM research is necessary, one that integrates clustered instrumentation at multiple locations to simultaneously look at the interactions within the entire system. Using coordinated and collaborative instrumentation currently installed in Antarctica, researchers will study interrelated ITM phenomena observed at high latitudes. The goal of this research effort is a better understanding of the energy transfer and modulation of the geospace system.

The system operated normally throughout the month.

A-119-P: CONTINENTAL-SCALE STUDIES OF MESOSPHERIC DYNAMICS USING THE ANTARCTIC GRAVITY WAVE INSTRUMENT NETWORK (ANGWIN)

Michael Taylor, Principal Investigator, Utah State University

The Antarctic Gravity Wave Imaging Network (ANGWIN) is a cooperative effort of six international Antarctic programs to collect continent-wide gravity wave measurements. This network capitalizes on existing optical and radar measurement capabilities at McMurdo, Palmer, South Pole, and six other research stations: Halley (UK), Syowa (Japan), Davis (Australia), Rothera (UK), and Ferraz (Brazil). Infrared (IR) all-sky mesospheric OH (hydroxyl) imagers are installed at Davis, McMurdo, and Halley stations. The network quantifies the properties, variability, and momentum fluxes of short-period (less than one hour) mesospheric gravity waves and their dominant sources and effects over the Antarctic continent. An all-sky near-IR imager is also installed at Palmer Station to augment the existing instrumentation and create a capability for studying gravity wave properties at each site.

The system operated normally throughout the month.

A-373-P: TROPOSPHERE-IONOSPHERE COUPLING VIA ATMOSPHERIC GRAVITY WAVES

Vadym Paznukhov, Principal Investigator, Boston College

The goal of this project is to enhance the comprehensive research understanding of troposphere-ionosphere coupling via Atmospheric Gravity Waves(AGWs) in the Antarctic region. Both experimental and modeling efforts will be used on the Antarctic Peninsula to investigate the efficiency and main characteristics of such coupling and will address several questions remaining in the current understanding of this coupling process.

The system operated well throughout the month.

O-264-P: A STUDY OF ATMOSPHERIC OXYGEN VARIABILITY IN RELATION TO ANNUAL 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_2 (detected through changes in O_2/N_2 ratio), which can help to determine rates of marine biological productivity and ocean mixing as well as terrestrial and oceanic distribution of the global anthropogenic CO_2 sink. The program involves air sampling at a network of sites in both the Northern and Southern Hemispheres. The Research Associate collects samples fortnightly from Terra Lab.

Air samples were taken twice this month. Two boxes of flasks were received.

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

Don Neff and Steve Montzka, Principal Investigators, 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. The Research Associate collects weekly air samples for the CCGG group and fortnightly samples for the HATS group.

CCGG samples were taken once a week in favorable winds and HATS Air samples were taken every other week. A new HATS sampler pump was used for both samples this month.

O-264-P: ULTRAVIOLET (UV) SPECTRAL IRRADIANCE MONITORING NETWORK

James Butler, Principal Investigator, National Oceanic and Atmospheric Administration / Global Monitoring Division; Boulder, CO

A Biospherical Instruments (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. A BSI GUV-511 filter radiometer, an Eppley PSP Pyranometer, and an Eppley TUVR radiometer also continuously measure hemispheric solar flux within various spectral ranges. The Research Associate operates and maintains on-site equipment for the project.

The system had an issue rebooting every hour but was resolved. Bi-weekly calibrations were completed as necessary.

T-295-P: GPS CONTINUOUSLY OPERATING REFERENCE STATION.

Joe Pettit, Principal Investigator, UNAVCO

Continuous 15-second epoch interval GPS data files are collected at station PALM, compressed, and transmitted to the NASA-JPL in Pasadena, CA. The Research Associate operates and maintains on-site equipment for the project.

The system has operated normally throughout the month.

T-312-P: TERASCAN SATELLITE IMAGING SYSTEM

The TeraScan system collects, processes, and archives DMSP and NOAA satellite telemetry, capturing approximately 25-30 passes per day. The Research Associate operates and maintains on-site equipment for the project. The TeraScan weather and ice imagery is used for both research and station operations.

The system crashed but with the help of a recovery disk it is back online.

T-998-P: INTERNATIONAL MONITORING STATION (IMS) FOR THE COMPREHENSIVE NUCLEAR TEST BAN TREATY ORGANIZATION. (CTBTO)

Managed by General Dynamics

The IMS Radionuclide Aerosol Sampler and Analyzer (RASA) is part of the CTBTO verification regime. The automated RASA continually filters ambient air and tests for particulates with radioisotope signatures indicative of a nuclear weapons test. The Research Associate operates and maintains the instrument.

The system has operated normally throughout the month. A command request for an example sample was completed and will be mailed out.

OCEANOGRAPHY

Daily observations of sea ice extent and growth stage are also recorded, along with continuous tidal height, ocean temperature, and conductivity at Palmer's pier.

Observations of sea ice around station were made daily and the tidegauge worked well throughout the month.

METEOROLOGY

The Research Associate acts as chief weather observer, and compiles and distributes meteorological data. Weather data collected using the automated electronic system is archived locally and forwarded once per 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 and emailed to the National Weather Service for entry into the Global Telecommunications System.

The local weather station (PAWS) is working well. Both remote AWS systems were visited and maintained. They have since gone offline and reason is still a mystery. Observations are archived on the AMRC website: ftp://amrc.ssec.wisc.edu/pub/palmer/