

PALMER STATION MONTHLY SCIENCE REPORT

AUGUST 2015



Iridescent nacreous clouds, also known as polar stratospheric clouds, linger above the glacier on an early August morning.

(Image Credit: Cynthia Spence)

NEWS FROM THE LAB

Emily Longano, Winter Laboratory Supervisor

After several months of darkness and below freezing temperatures, wildlife has begun to return to the Palmer area. Several sheathbills have been seen lurking around the boardwalks, and seal trails have been spotted around station, throughout the backyard, and even on the glacier. We eagerly wait to see if we will witness a seal giving birth and nursing the cub on the nearby ice.

The weather has been quite erratic this month changing between full sea ice cover to open water after winds that reached a season record of 78 knots (90 mph). The open water allowed ASC science staff to make a trip to Litchfield Island to check on scientific instruments measuring the mosses.

AUGUST 2015 WEATHER

Lance Roth, Research Associate

	Date	
Temperature:		
Average		-3.7°C / 25°F
Maximum	06 Aug	2.7°C / 37°F
Minimum	21 Aug	-23.0°C / -9°F
Pressure:		
Average		988.0 mbar
Maximum	24 Aug	1008.7 mbar
Minimum	15 Aug	926.3 mbar
Wind:		
Maximum (2 minute average)	5 Aug	61 knots from 74 degrees
Peak (5 second gust)	5 Aug	78 knots/89.8mph
Average speed		22.9 knots/26.4mph
Daily prevailing directions		N, NE, NE, NE, E, NE, NE
Surface:		
Total Rainfall		0 mm
Total Snowfall		30 cm
Greatest depth at snow stake	28 Aug	54 cm
Sea ice (end of month)		11-20 large icebergs young ice 10-30cm thick covering 9/10 th or more.

The month of August was quite windy with prevailing winds out of the north and an average wind speed of 22.9 knots (26.4mph). Temperatures remained below freezing for most of the month with an average temperature of -3.7°C (25°F) creating dense sea ice in the inlet. One high wind event on August 5th initiated the break up most of this sea ice, but it quickly froze over again as the wind died down.

There was no rain due to below freezing temperatures, but we received a total of 30 cm of snow. The maximum temperature was 2.7°C (37°F) on August 6th, and the minimum temperature was -23.0°C (-9°F) on August 21st. The highest 5 second wind gust was 78 knots (90 mph) recorded on August 5th.

Sea ice was observed in Hero Inlet and Arthur Harbor for most of the month. High winds broke up the ice on August 5th, but it quickly returned on August 11th and has remained for the rest of the month. The tide gauge on the pier measured an average sea surface temperature of -1.8°C (28.8°F). The minimum sea temperature recorded was -1.8°C (28.8°F), which was observed several times throughout the month, and the maximum sea surface temperature was -1.5°C (29.3°F) on August 7th and 8th.

August 1, 2015



August 8, 2015



Both photos were taken at the same location looking out towards Torgersen Island.
(Image Credit: Julian Race)

PALMER STATION
RESEARCH ASSOCIATE MONTHLY REPORT
AUGUST 2015
Lance Roth

B-005-P: IMPACTS OF LOCAL OCEANOGRAPHIC PROCESSES ON ADELIE PENGUIN FORAGING OVER PALMER DEEP: COASTAL OCEAN DYNAMICS APPLICATIONS RADAR (CODAR)

Josh Kohut, Principal Investigator, Rutgers University

The CODAR system consists of three transmitters/receivers located on Anvers Island, Wauwerman Island and on Howard Island in the Joubins. The data from all three transmitters is compiled on computers in Terra Lab and plots of the surface currents over the Palmer Deep are generated.

The CODAR system operated normally throughout the month.

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. The vault was entered by the station electrician multiple times during the month in order to complete work the new Meteorological installation.

A-109-P: ANTARCTIC EXTREMELY LOW FREQUENCY/VERY LOW FREQUENCY (ELF/VLF) OBSERVATIONS OF LIGHTNING AND LIGHTNING-INDUCED ELECTRON PRECIPITATION (LEP).

Robert Moore, Principal Investigator, University of Florida

ELF/VLF radio wave observations at Palmer Station are used to provide a deeper understanding of lightning and its effects on the Earth's inner radiation belt. The Research Associate operates and maintains on-site equipment for the project.

The VLF functioned normally this month. The antenna was checked twice. The ELF is fully functional and operating without any problems. The hard drives were swapped out with new drives. A box of full hard drives was recovered and will be held until further directions are given.

O-202-P: ANTARCTIC METEOROLOGICAL RESEARCH CENTER (AMRC) SATELLITE DATA INGESTOR.

Mathew Lazzara, Principal Investigator, University of Wisconsin

The AMRC 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 Research Associate operates and maintains on-site equipment for the project.

The data ingestor computer system operated normally throughout the month.

O-264-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 O₂ (detected through changes in O₂/N₂ 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 CO₂ 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.

The air samples were taken twice this month.

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.

Samples were collected for the carbon cycle and the halocarbon and trace species projects. A few sampling periods were missed this month due to unfavorable wind conditions.

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 operated normally throughout the month. Absolute scans were performed as scheduled.

O-283-P: ANTARCTIC AUTOMATIC WEATHER STATIONS (AWS).

Mathew Lazzara, Principal Investigator, University of Wisconsin

AWS transmissions from Bonaparte Point are monitored using the TeraScan system and the University of Wisconsin's Data Ingestor system. Data collected from this station is freely available from the University of Wisconsin's Antarctic Meteorological Research Center (AMRC) website. The Research Associate monitors data transmissions for the project and performs quarterly maintenance on the station at Bonaparte Point.

The system operated normally throughout the month. Daily quality checks of the downloaded data were performed as scheduled.

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 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 is having issues with tracking that may have been due to cold temperatures. Further investigation will take place to find the cause of the dropouts in the data.

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. The Research Associate maintains the on-site system.

The magnetometer has functioned 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 has functioned normally throughout the month.

B-466-P: FLUORESCENCE INDUCTION AND RELAXATION (FIRE) FAST REPETITION RATE FLUOROMETRY (FRRF)

Deneb Karentz, Joe Grzyski, Co-Principal Investigators, University of San Francisco

The focus of this project is to identify and evaluate changes that occur in genomic expression and physiology of phytoplankton during the transition from winter to spring, i.e., cellular responses to increasing light and temperature. A Fast Repetition Rate Fluorometer (FRRF) with a FIRE (Fluorescence Induction and Relaxation) sensor is installed in the Palmer Aquarium. The Research Associate downloads data and cleans the instrument on a weekly basis.

The system had to be shut down due to technical difficulties. Data is no longer being collected, and the instrument will need to be sent back for repair.

T-998-P: INTERNATIONAL MONITORING STATION (IMS) FOR THE COMPREHENSIVE NUCLEAR TEST BAN TREATY ORG. (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 operated normally throughout the month. Filters were prepared for future shipment.

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.

Daily observations of the ice around station were made. The new tide gauge is operating normally.

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 twice each month to the University of Wisconsin for archiving and further distribution. Synoptic reports are automatically generated every three hours by the Palmer Meteorological Observing System (PalMOS) and emailed to the National Weather Service for entry into the Global Telecommunications System.

PalMOS operated normally throughout the month. The new PALMOS meteorological instruments have all been installed on the new tower and are currently powered on and operational. Conduit for the data cable is being installed and upon completion the system should be fully operational and online.