

PALMER\_SCIENCE

SCIENCE SITREP - SEP 95

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## P A L M E R   S T A T I O N   A N T A R C T I C A

PALMER STATION  
SCIENCE SITREP SEP 1995

The following science projects were active at Palmer Station during the month:

S-024 "Antarctic marine archaeobacteria; biological properties and ecological significance".

Personnel on Station: Edward DeLong, Alison Murray, Christina Preston.

S-024 (DeLong) and S-005 (DeVries) departed Punta Arenas on the Polar Duke on August 16, 1995 with 14 ASA personnel, originally slated to arrive at Palmer Station on August 21. On the trip south across Drakes Passage, sea ice was encountered at an unusually low latitude, approximately 57° S. Further south, the pack ice between Brabant and Anvers Islands was too thick for the Polar Duke to make headway. The decision was made to head back to Punta Arenas to await a change in the sea ice conditions, and potentially to rendezvous with the R/V NATHANIEL B. PALMER on the second attempt to break into Palmer Station. Before departing, S-005 spent 2 successful days trawling for notothenoids in the Dallman Bay area, and subsequently the Polar Duke attempted to return North. The sea ice had thickened behind the Duke, however, preventing an expeditious return to Punta Arenas. Despite valiant efforts to break through the ice and head back north, the Polar Duke remained in the vicinity of 63° 27' S, on the western side of Smith Is., in drifting pack ice for approximately 9 days (Aug 25 - Sept. 2). Clear leads were finally encountered on the east side of Smith Island, allowing the return north. Although shipboard sampling was not planned for S-024's "4 day transit" to Palmer Station, enough gear was readily accessible such that S-024 could perform surface water sampling for bacterioplankton enumeration and nucleic acid extractions/analyses, during transit back to Punta Arenas. A total of twelve stations were sampled for bacterioplankton counts and nucleic acid analyses. S-005 also collected continuous surface water temperature-salinity data with the Duke's permanently mounted seabird thermosalinograph. The Duke arrived back in Punta Arenas on September 5, approximately 2 weeks after the originally scheduled ETA at Palmer Station. Major lessons for S-024's group on this leg : 1) Nature determines all final scheduling. 2) Late winter Antarctic agenda are likely to be subject to frequent change. 3) Ignore all emails and look out the porthole.

The Polar Duke again departed for Palmer Station from Punta Arenas on September 10, with 27 ASA staff, and S-024 as the sole science group on board. Again, though this year's plans did not originally include shipboard ops, S-024 collected continuous surface water temperature-salinity data along the transect south,

performed 15 XBT casts, and collected bacterioplankton samples at 9 stations in transit south through the Drakes Passage. Two hydrocasts to 1000 m were also conducted in Drake's Passage, just south of the Antarctic Convergence, on September 12th. On this leg, pancake ice was first encountered about 2 degrees further south (59° S) than on the first leg (57° S). The first Antarctic Peninsula operations included a detour for deployment of an ASA construction crew on King George Is. ("COPA" station), but conditions were unfavorable for said deployment. After a hydrocast off the northeast side of King George Is., the Duke headed west along the north side of the South Shetland Islands, entering south into the Boyd Straights, and next the Bransfield Straights along the east side of Smith Is. Surface water temperature and salinity data were collected in transit from King George Is. to Anvers Is., with bacterioplankton sampling conducted at 8 stations during transit. Large scale bacterioplankton concentrations were also performed at 3 stations (500 L, 1500 L, and 1354 L of <1 µm bacterioplankton fraction concentrated). Clear leads were encountered east of Smith and Brabant Islands and through the Bransfield and Gerlache Straights and Neumayer Channel. The Polar Duke arrived at Palmer Station at approximately 15:00 on September 19, about one month past the scheduled ETA at Palmer Station.

Alison, Chris, and Ed (team S-024) unpacked and set up shop Sept. 20 - 21. Sampling at Palmer Station for S-024 started on September 22. An icehole was drilled at the approximate location of LTER's "Station A" (determined by GPS) in Arthur Harbor. Ice thickness was approximately 24 inches. Station A sampling for S-024 includes bacterioplankton collection, concentration, and enumeration, and subsequent molecular biological/ecological analyses. Small scale collection (20 l) for nucleic acid analyses on site at Palmer Station, and larger scale collection (100 l) for analyses back at UCSB are performed. Surface water just under the pack ice, and deeper water samples (34 m) are collected every 2 - 4 days, during weather windows that allow for ice operations. As part of an informal collaboration, S-024 is also collecting samples on a weekly basis for Wade Jeffrey (S-200) at "Station A", for study of the effects of UV induced DNA damage on different picoplankton size fractions. A second station, located further off Palmer Station in the channel between Litchfield and Breaker Islands was established on September 30. Ice thickness was over 24 inches, and many small krill were observed swimming in water just under the pack ice at this site. A similar sampling strategy was adopted at this site with large and small scale collections at the surface and 45 m water depth. Three large scale < 1 µm bacterioplankton concentrations (1440L, 1600 L, and 1800 L) of near shore Arthur Harbor water have also been conducted for subsequent lipid and nucleic acid analyses at UCSB. Preliminary results on nucleic acid samples extracted from September 1995 Arthur Harbor samples indicate high levels of archaeobacterial nucleic acids in surface waters, consistent with our previous observations in late winter 1993. In addition, our first attempts at fluorescent in situ hybridization with archaeobacterial-specific rRNA-targeted probes have proven successful, and confirm PCR data on archaeobacterial presence. We are now beginning to gather quantitative data on archaeobacterial cell numbers in Arthur Harbor. Plans are to continue sampling by skis and sleds on the ice as weather permits, and switch to boating ops when ice operations are no longer possible. All in all, the weather, ASA staff, and ice have been very obliging, allowing for a great if somewhat belated start at Palmer Station for project S-024.

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S-091 PALMER IRIS SEISMOLOGY. R. Butler/G. Holcomb, U.S. Geological Survey, Albuquerque, NM.

No personnel were on station.

The system has been operated by the station science technician. Seismic events throughout the month were recorded. On 04 September, an unplanned power outage resulted in a brief shutdown of the IRIS system. On 19 September critical elements of the system were connected to an uninterruptible power supply.

S-106 VERY LOW FREQUENCY (VLF) REMOTE SENSING OF THUNDERSTORM AND RADIATION BELT COUPLING TO THE IONOSPHERE.  
U. Inan, Stanford University.

No personnel were on station.

The system has been operated by the station science technician. Synoptic, narrow band and broad-band recordings of VLF signals were made on a daily basis. On 04 September an unplanned power outage resulted in a clock error, causing synoptic recordings to halt for approximately four hours.

S-254 CHLORINE- AND BROMINE-CONTAINING TRACE GASES IN THE ANTARCTIC. R.A. Rasmussen, Oregon Graduate Institute of Science and Technology, Portland, Oregon.

No personnel were on station.

No samples were collected as the station awaited the arrival of PD95-6/7. All samples were retrograded on PD95-7 NB.

S-257C COLLECTION OF ATMOSPHERIC AIR FOR THE NOAA/CMDL WORLDWIDE FLASK SAMPLING NETWORK.  
J.T. Peterson, NOAA, Boulder

No personnel were on station.

No air samples were collected as the station awaited the arrival of PD95-6/7. All samples were retrograded on PD95-7 NB.

S-275 UM/DOE-EML REMOTE ATMOSPHERIC MEASUREMENTS PROGRAM.  
J. Prospero/T. Snowdon, University of Miami; C. Sanderson/N. Chui, EML/DOE N.Y.

No personnel were on station.

The system has been operated by the station science technician. One sample filter was exposed for the duration of each week, and a weekly schedule of calibration, background, and sample counts was maintained. An unplanned power outage on 04 September resulted in a brief halt to counting and filtering activities.

T-312 TERASCAN SATELLITE IMAGING SYSTEM. R. Whritner, Scripps Institute of Oceanography, La Jolla, CA.

No personnel were on station.

The system has been operated by the station science technician.

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The TeraScan system collected, archived, and processed DMSP and NOAA telemetry, maintaining a schedule of 15 passes per day. AWS data was collected from the Bonaparte Point and Hugo Island automatic weather stations in support of the LTER project. Infrared and passive microwave imagery was provided in support of R/V POLAR DUKE and R/V NATHANIEL B. PALMER science and operations.

T-513 UV MONITORING EXPERIMENT. C. Booth, Biospherical Instruments, Inc.

No personnel were on station.

The system has been operated by the station science technician. Throughout the month, raw irradiance data were collected daily and transmitted to BSI. Preliminary irradiance data and inferred ozone abundances were produced in support of science. Absolute calibrations of the UV monitor were performed on 08 September and again on 27 September. The schedule of data scans was expanded in response to the seasonal lengthening of daylight hours, and the UV monitor's sensitivity was reduced due to increases in solar irradiance.