

**LMG 0701**  
**Situation Report**  
**07 – 13 January, 2007**

This is the 15<sup>th</sup> annual summer cruise of the Palmer, Antarctica Long Term Ecological Research project. Together these cruises form a time series of oceanographic, meteorological, ecological and biogeochemical observations in the PAL study grid of hydrographic stations on the continental shelf along the west Antarctic Peninsula. The cruise departed Punta Arenas, Chile on 01 January and conducted a port call at Palmer Station on 5-7 January, departing the Palmer dock to begin our cruise at 1100 hours on 7 January. Just prior to departure we deployed the Webb-Slocum glider, equipped with temperature, conductivity, optical and depth sensors at Station E near Palmer Station. The glider mission is to sail along the xxx.100 line of stations in our grid, from 600.100 in the north to 200.100 in the south, profiling water column structure in a high resolution section between 0-100 meters depth. The glider reported a slow leak shortly after deployment, and we recovered and redeployed it on 8-9 January. The glider is presently running between our stations 400.100 and 300.100, sending us frequent updates and providing a breathtaking view of the upper water column structure.



**Figure 1.** Webb-Slocum Rutgers Glider during deployment on 07 January off Palmer Station.

We take this opportunity to thank many individuals from AGUNSA (Santiago and Punta Arenas), RPSC (Denver, Punta Arenas, Palmer Station and aboard LMG), and the ECO Captain, officers and crew who helped to get us off and running on schedule and well-prepped for work. It's a large and complicated operation and takes the hard work and unselfish, can-do attitude of everyone involved. Thanks!

Individual science group reports follow.

**B-013. Seabird Component** (Bill Fraser, PI).

**Field Team Members:** Eric Erdmann and Kristen Gorman

The port call at Palmer Station prior to leaving for the cruise went very smoothly. We thank Station Manager, Joe Pettit, for his efforts, as well as the Palmer Boating Coordinator, Steve Barton, Palmer Lab Supervisor, Phil Spindler, and the Logistics crew, Cathy Borowski and Bob Devalentino for their support.

The first week of our work this cruise consisted primarily of at-sea observations of seabirds. We worked the 500 and 600 lines, and experienced an array of conditions from stormy weather to calm seas. We observed greater numbers of birds near the shelf break, a phenomenon we generally observe during the LTER January cruise. In addition, we observed several whales along the 500 and 600 lines including Humpbacks and Minke. There has been no sea-ice to report during the cruise, this is consistent with conditions at Palmer Station earlier in the season. We have seen an increased number of Light-mantled Sooty Albatross along the 500 and 600 lines in comparison with last year's census.

**B-016: Phytoplankton Ecology and Marine Optics** (Maria Vernet, PI).

**Field Team members:** Wendy Kozlowski (field team leader), Ryan Burner, Diane Chakos, Mary Engels, Julie Schram, Tyler Thigpen and Tristan Wohlford.

The specific goals of this group are to map optical properties on the Palmer LTER grid and make spatial (X, Y and Z) measurements of phytoplankton and the physical and chemical properties influencing their ecology. Measured properties include simulated *in situ* primary production rates, active phytoplankton fluorescence, discrete chlorophyll, pigments (HPLC), nutrients and particulate organic matter. Daily CTD casts along the LTER grid measure physical characteristics of the water column, and are used to collect water at light-based depths. These are combined with measurements of downwelling irradiance, upwelling radiance, surface PAR, surface ultraviolet radiation and the above biological parameters.

Transfer of lab equipment from Palmer Station to the LMG went smoothly, thanks to the help and organization of the Palmer RPSC staff. The first week of sampling allowed a total of 17 stations along the 600 and 500 lines. With average to low integrated euphotic zone production and biomass (estimated by chlorophyll a), the 600 line showed the typical onshore to offshore gradient seen on the grid this time of year. One exception to that trend was the high levels of both production and chlorophyll a at station 600.140, but with no associated drop in nutrients observed. Further analysis of pigments at that location will allow prediction of species present and provide understanding for the variance seen.

**B-028 Zooplankton and Micronekton.** (Langdon B. Quetin and Robin M. Ross (co-PIs), **Field Team Members:** Kelly Moore, Sam Hammond, Dana Nakase, Shannon Rich

The zooplankton and micronekton component of the Palmer LTER addresses questions on the community composition, distribution and abundance of the biomass dominants in the epipelagic layer and the secondary production of one of the key species, Antarctic krill. At each station simultaneous oblique net tows and bioacoustic transects are conducted to quantify the zooplankton community. Both in situ growth rate and spawning frequency and egg production experiments are conducted on board with Antarctic krill to quantify secondary production. At this juncture in the Palmer LTER we are able to compare our current catches with the long-term average distribution and abundance or climatology. During the first week of the cruise, the community composition had some distinct differences from the climatology. From 1999 through 2005 we found salps up onto the middle and sometimes inner shelf stations on our most northern line (600 line). In 2007, salps were not found until we reached the outer shelf. In addition in the northern area of the study region (600 and 500 lines), ice krill (*Euphausia crystallorophias*) was found at stations far seaward of the climatology – out to the \*.120 station in abundance. Ice krill is in general associated with the colder continental shelf waters. The catches of Antarctic krill have been dominated by young-of-the-year, as predicted due to the high reproductive effort the previous summer (2006). Experiments for both growth (n=5) and spawning (n=4) have been conducted with krill from stations both on the outer and inner shelf on both lines. Spawning frequencies on these northern lines is low, but detectable, ~ 4 - 6% per day, suggesting that spawning was not greatly delayed by conditions this austral spring.

**B-045: Microbial Ecology and Biogeochemistry.** (Hugh Ducklow, PI).

**Field Team members:** Matthew Erickson, David Kirchman, Kristen Myers, Julian Ma, Noelle Yochum. Helping from Palmer Station: Nicole Middaugh.

The overall goals for our group are to document spatial and temporal variations in selected biogeochemical and microbial properties (dissolved oxygen and dissolved inorganic carbon, dissolved organic matter, bacterial abundance) and processes (bacterial production and organic matter sedimentation). During the first week of the cruise we completed sampling from the surface to the bottom at stations along the 600 and 500 lines of the PAL-LTER Grid. Sampling is coordinated with the 016/032 groups using the CTD-Rosette system. We successfully recovered the sediment trap mooring near Hugo Island, and redeployed it for recovery next January. Our group also supervises deployment of current drifters at selected stations along the grid, in collaboration with Dr R. Beardsley (WHOI), and XCTDs at intermediate stations for the LTER physical oceanography group (D Martinson, LDEO).

Preliminary observations suggest a large sedimentation event occurred in late February, 2006 and that bacterial production rates were somewhat enhanced inshore on the 600 and 500 lines.