

Overview of Science Programs

CTD measurements

There was at least one (almost always only one) CTD/rosette cast at each SBI station, using USAP-owned SeaBird 911+ CTDs. There was a dissolved oxygen sensor on the CTD. Although the O₂ data were not processed, availability of the O₂ traces during the down cast was of great assistance with guiding bottle sampling in these waters. Also, the unprocessed CTD oxygen profiles were useful in assessing the bottle oxygen measurements. In addition to the P, C, T, and O₂ data from the CTD, there were transmissometer, fluorometer, Haardt fluorometer, and PAR sensor data from the SeaBird. The Palmer's CTDs were used, augmented with some ODF and SBI sensors. ODF calibrated the pressure sensors in advance of the cruise.

The investigator for the Haardt fluorometer is Dr. Ron Benner (University of South Carolina; benner@biol.sc.edu; 803-777-9561). He was not on the cruise. ODF looked after this instrument.

There was a lowered-ADCP on the rosette. The PI supplying the lowered ADCP was Dr. Robert Pickart (WHOI; rpickart@whoi.edu; 508-289-2858). The person responsible for the lowered ADCP and hull-mounted ADCP data during the cruise was Dr. Eric Johnson (Earth and Space Research; ejohnson@esr.org; 206-726-0501 ext.12).

The CTD was mounted on an RPSC 24-place rosette frame, with SeaBird pylon, and outfitted with 24 10-liter ODF-constructed bottles owned by RPSC. ODF will supply a Simrad xxxxxx altimeter as part of the underwater package.

The RPSC CTD contacts were Karl Newyear (NewyeaKa@usap.gov) and Paul Olsgaard (OlsгааPa@usap.gov). ODF CTD contacts were Robert Palomares (ET; rpalomares@ucsd.edu; 858-534-1907), Kristin Sanborn (data processing; kris@odf.ucsd.edu; 858-534-1903), and Marie Beaupre (data processing; marie@odf.ucsd.edu; 858-534-1906).

bottle sampling depths

Bottle sampling depths on this cruise were focused on obtaining samples from cores of principal water masses, well-mixed layers, 20-meter or less bottle spacing through the halocline, primary extrema of T/S/O₂, and near-bottom. Standard sampling depths applied to a degree.:

salinity

The CTD exhibited stable conductivity behavior, and thus primary salinities came from processed CTD data. Salinity samples were drawn and analyzed to

calibrate the CTD. This ranged from a minimum of 2 samples to a maximum of about 12. ODF used the Palmer's Autosol.

oxygen

A dissolved oxygen value was obtained from each level sampled with the rosette. There were 3422 oxygen analyses. ODF supplied the equipment and personnel for dissolved oxygen analyses. The primary contact is Susan Becker (SIO/ODF; susan@odf.ucsd.edu; 858-534-9831).

nutrients

A 6-channel suite of nutrient values was acquired from each level sampled with the rosette. The total was 3422 nutrient analyses. ODF supplied the equipment and all chemicals. The primary contact is Susan Becker (SIO/ODF; susan@odf.ucsd.edu; 858-534-9831).

chl-a and other pigments

Samples for pigment analyses were drawn from a subset of the rosette bottles and analyzed on board by a two person team from the University of Alaska, Fairbanks. The primary contact is Dr. Dean Stockwell (dean@ims.uaf.edu; 907-474-5556).

DOM sampling

Samples were drawn, frozen, and stored for Dissolved Organic Matter for return to shore. Equipment, any chemicals, and one person will be provided by the University of Miami (Jeremy Mathis; jtmathis@hotmail.com). Freezer storage space is required for the samples. The pre-cruise contact is Dr. Dennis Hansell (University of Miami; dhansell@rsmas.miami.edu; 305-361-4078).

18O/16O sampling

Sampling containers were provided for oxygen-18 samples. The requested samples were collected and returned to shore for analyses. The data contact is Dr. Lee Cooper (lcooper1@utk.edu; 865-974-2990; fax 865-974-7896).

plankton tows

A total of 90 vertical bongo tows were completed aboard the 2003 SBI cruise. Of these, 12 tows were to depths of 1000 meters while the rest were to depths of 100 meters or shallower. These tows resulted in 180 preserved zooplankton samples along the arctic coast in two distinct size fractionations (>335 μm and >153 μm). Another 150-160 samples were preserved for molecular analysis. Dry weight percentage at three different size ranges (>1050 μm , 1050>x>550

μm , and $550 > x > 202 \mu\text{m}$) was also calculated at 80 sites from both fractionations. The data contacts are Dr. Sharon Smith (University of Miami; ssmith@rsmas.miami.edu; 305-361-4177) and Leopoldo Llinás (University of Miami; llinas@rsmas.miami.edu; 305-361-4702).

stable isotopes

Over 400 samples were taken for isotopic analysis ($\delta^{13}\text{C}$ and $\delta^{15}\text{N}$). Of these, 180 were organic particulate (POM) samples. The rest were a variety of zooplankton collected from individual bongo tows including the copepods *Calanus glacialis*, *Calanus hyperboreus*, *Metrida longa*, and *Paraeuchaeta norvegeica*. The data contact is Dr. Ken Dunton, University of Texas, dunton@utmsi.utexas.edu.

The plankton and stable isotope teams note that the number of sampling locations and opportunities far exceeded their expectations. As such, the 2003 summer cruise aboard RVIB Palmer was considered a huge success by both the zooplankton ecology and marine botany representatives.

underway systems

Multibeam sonar data was acquired. A display available in the vicinity of the CTD operator, and the multibeam data were recorded (without post-processing), and the data provided to JOSS.

An underway measurement suite including centerline depth to bottom, seawater temperature & salinity, fluorometry, ADCP, standard meteorological parameters, position, time, ship speed/heading/etc., and other routine parameters was carried out by RPSC technicians.

TEA

Jim Rogers, a science teacher from Polson, Montana, was on board experiencing oceanographic field research first hand as part of NSF's Teachers Experiencing the Antarctic and Arctic program. He stood watch as a sample cop, and worked on other TEA activities. Contact information: phone 406-883-3611; jrogers@polson.k12.mt.us.

JOSS

The cruise was supported ashore by the SBI team at the Joint Office for Science Support at UCAR. This included data catalogs, data distribution, cruise maps, cruise reports, etc. Contact: Jim Moore, JOSS; jmoore@ucar.edu; 303-497-8635.

marine mammal survey

Marine mammal surveys were carried out transparent to the CTD survey program on a not-to-interfere basis. The primary marine mammal program was helicopter-borne sweeps on specified tracks with a team of two observers. Contact: John Bengtson, NOAA; john.bengtson@noaa.gov; 206-526-4016.

Raytheon Polar Service Corporation (RPSC)

There were 9 RPSC technicians on the cruise, each working 12-hour shifts: one Marine Projects Coordinator (MPC), one marine science technician, 3 marine technicians, two network/computer techs, and two electronics techs.

RPSC techs supervised rosette launch and recovery.

RPSC techs handled underway data logging, including systems maintenance and routine review of data for reasonableness.

RPSC techs carried out multibeam sonar data logging, including system maintenance and routine oversight of data for reasonableness.

Network assistance and email was handled by the RPSC techs.

Hazmat laboratory wastes were collected in RPSC-provided containers. RPSC handled the paperwork.