GP8-01-RB
NOAA Ship Ronald H. Brown
Arica, Chile - Panama City, Panama
October 29 - December 5, 2001

Chief Scientist: Mr. Brian Lake
Survey Department: CST Jonathan Shannahoff
CTD Personnel: CST, Mike Ronanye, Miri Skoriak (salinities)
Final Processing: K. McTaggart

ACQUISITION:

Sixty-six CTD profiles were collected on this cruise. Twenty-seven profiles were collected from 8S to 12N along 110W. Twenty-nine profiles were collected from 12N to 8S along 95W. And ten profiles were collected along the ship's trackline to Panama. Eight casts were deep (3000 m), and the rest were to 1000 m.

PMEL's Sea-Bird 9plus CTD s/n 09P8431-0315 measuring pressure (s/n 53960), temperature sensors (s/n 1370, 1455), and conductivity sensors (s/n 1180, 1177) were used for all casts.

The CTD was mounted in a custom 24-bottle frame with Sea-Bird rosette sampler s/n 163. The CTD data stream was passed through Sea-Bird 11plus deck unit s/n 367 (ship's) with factory settings. An analog signal was recorded onto the audio portion of VCR tape as a backup. Digitized data were sent to the ship's Gateway G6-200 personal computer equipped with Sea-Bird's SEASAVE for Windows acquisition software (Win32 v1.10) where calibrated data were displayed in graphical form in real-time, as well as stored in raw form onto hard disk. Backups of the raw data were made on Zip disks and CD-ROM and returned to PMEL for post-cruise calibration and processing.

SALINITIES:

6 samples were taken each cast, except for the last 10 where only 3 samples were taken each cast. During deep casts, two bottles were tripped at depth and a sample taken from each. Salinity analysis was performed using Guildline Autosal 8400B salinometer s/n 61.668 (aka Dallas) and new Ocean Scientific International Autosal computer interface, ACI2000. IAPSO standard seawater batch #P139 (Nov, 2000) was used for all casts. Analysis was performed by CST Shannahoff and ABS Miri Skoriak. Laboratory operating temperature 24 degrees Celsius. Only two samples could not be accounted for, one from cast 0201 and one from cast 0411. Salinity run containing casts 0201-0221 is extremely salty.

Excel worksheets of all salinity runs were merged into one and an average salinity value for each bottle computed post-cruise. The reformatted file is called ALLSALT.TXT.

POST-CRUISE CONDUCTIVITY CALIBRATIONS:

Data were acquired at sea with the wrong configuration set up in the .CON file. TAO1.CON listed primary TC pair to be T1455 and C1177, and secondary TC pair to be T1370 and C1180. Actually, these pairs were the reverse on

the underwater package. Post-cruise, TAO2.CON with the correct configuration was used to reprocess all the casts.

Post-cruise calibrations from Sea-Bird showed that T1370 had drifted by about 1 mdeg before the cruise. Because this trajectory was much faster than T1455, it was decided to calibrate and reduce the secondary data. GP801S.CAL was created post-cruise using SBECAL and ADDSAL programs.

Final pressure and temperature calibrations were pre-cruise. A viscous heating correction of -0.0006 C and a historical drift correction of zero was applied to temperature sensor s/n 1455.

Conductivity fit coefficients were determined using Matlab program CALCOS1. CALCOP programs did not better the fit.

number of points used	259
total number of points	347
% of points used in fit	74.64
fit standard deviation	0.002488
fit bias	-0.013317874
min fit slope	1.0003299
max fit slope	1.0003988

Slope and bias correction values were applied to CTD data and converted directly into netCDF format using CNV_EPS; and to bottle file data using CALMSTR and CLB_EPS.

FINAL PROCESSING:

The following are the standard SEASOFT processing modules used to reduce Sea-Bird CTD data:

DATCNV converts raw data to engineering units and creates a bottle file if a Sea-Bird rosette sampler was used. Both down and up casts are processed, as well as primary and secondary temps and conds.

ROSSUM averages the bottle data specified in the DATCNV output and derives salinity, theta, sigma-t, and sigma-th. Bottle data are used to calibrate the CTD post-cruise.

ALIGNCTD advances secondary conductity by 0.073 seconds. The deck unit does this automatically for primary conductivity.

WILDEDIT makes two passes through the data in 100 scan bins. The first pass flags points greater than 2 standard deviations; the seond pass removes points greater than 20 standard deviations from the mean with the flagged points excluded.

FILTER applies a low pass filter to pressure with a time constant of 0.15 seconds, and to conductivity with a time constant of 0.03 seconds. In order to produce zero phase (no time shift) the filter is first run forward through the file and then run backwards through the file.

CELLTM uses a recursive filter to remove conductivity cell thermal mass effects from the measured conductivity. In areas with steep temperature gradients the thermal mass correction is on the order of 0.005 psu. In other areas the correction is negligible. The value used for the thermal anomaly amplitude (alpha) is 0.03. The value used for the thermal anomaly time constant (1/beta) is 7.0.

LOOPEDIT removes scans associated with pressure slowdowns and reversals. If the CTD velocity is less than 0.25 m/s or the pressure is not greater than the previous maximum scan, the scan is omitted.

BINAVG averages the data into 1 db bins. Each bin is centered around a whole pressure value, e.g. the 1 db bin averages scans where pressure is between 0.5 db and 1.5 db.

DERIVE uses 1 db averaged pressure, temperature, and conductivity to compute salinity, theta, sigma-t, sigma-th, and dynamic height.

TRANS converts the data file from binary to ASCII format.

Program CNV_EPS applies post-cruise temperature corrections and conductivity calibration coefficients, recomputes the derived variables in DERIVE, and converts the ASCII data files to netCDF format. CNV_EPS skips bad records near the surface (typically the top 3 m) as well as any records containing -9.990e-29, and copies back raw data to the surface (0 db) within 10 db. Because the SBE module LOOPEDIT does not handle package slowdowns and reversals well in the thermocline where gradients are large, CNV_EPS removes raw data records where a sigma-theta inversion is greater than -0.01 kg/m3. Data are linearly interpolated such that a record exists for every 1 db. When data are copied back to the surface, the WOCE quality word is '888'; when interpolated over greater than 2 db, the WOCE quality word is '666'. The WOCE quality word consists of a 1-digit flag for pressure, temperature (ITS-90), and salinity.

Program CALMSTR applies post-cruise temperature corrections and conductivity calibration coefficients and recomputes the derived variables in ROSSUM. CLB_EPS converts the ASCII bottle data file into individual cast netCDF data files (excluding those flagged as bad). There is no bottle file for casts 0171 (CTD bad), 0201, 0211, and 0221. The following bottles were flagged as bad and omitted from their bottle files: cast 7 sample 104, cast 11 sample 103, cast 14 103, cast 27 109, cast 31 111, cast 40 109, cast 42 109, cast 45 samples 101 and 102, cast 51 105, cast 53 102, and cast 65 109.

Final CTD and bottle files were moved to DISK$EPIC1:[HAYES.DATA.GP801.CTD] and included in the MySQL data management tables on January 28, 2002.