

GP2-00-KA
NOAA Ship Ka'imimoana
San Diego, CA - San Diego, CA
April 11 - May 19, 2000

Chief Scientist: Mr. Ben Moore
Survey Department: CST Dennis Sweeney
CTD Personnel: D. Sweeney
Final Processing: K. McTaggart

ACQUISITION:

Fifty-seven CTD profiles were collected on this cruise. Twenty-eight profiles were collected along 95W from 12N to 8S; 27 were collected along 110W from 8S to 12N. Two test casts made enroute to the 95W line were not processed. The majority of CTD casts were to 1000 m; 5 deep (3000 m); and 5 were shallow casts (200 m).

The ship's Sea-Bird 9plus CTD s/n 09P10493-0405 measuring pressure (s/n 61183), temperature (s/n 2027, 2026), and conductivity (s/n 1537, 1536) was used for all casts (PMC18.CON, new calibration).

The CTD was mounted in a custom 24-bottle frame with Sea-Bird rosette sampler s/n 88. The CTD data stream was passed through Sea-Bird 11plus deck unit s/n 376 with factory settings. An analog signal was recorded onto the audio portion of VCR tape as a backup. Digitized data were sent to a Dell 5133 personal computer equipped with Sea-Bird's SEASOFT acquisition software (version 4.216) 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 QIC-80 1/4" cartridge tapes and returned to PMEL for post-cruise processing. Cruise data were also archived on 8 mm tape and CD-ROM.

Secondary TC data were used for casts 19 and 20. Primary TC data was approximately .01 fresh of the bottles, likely owing to biofouling. Secondary TC data were calibrated using all secondary burst data. Salinity samples were not collected on shallow casts, nor on cast 38.

SALINITIES:

Seawater was collected at 6-12 depths each cast and salinity samples drawn. Two salinity samples were taken from the deepest Nisken. Duplicate samples were analyzed on a subsequent day from the rest. Salinity analysis was performed using Guildline Autosol 8400B salinometer s/n 61.663. IAPSO standard seawater batch #P136 dated April, 1999, was used for all casts. Standard laboratory operating temperature was approx 24 degrees Celsius.

POST-CRUISE CONDUCTIVITY CALIBRATIONS:

GP200S.CAL of primary (s/n 2027, 1537) sensor data (not including any duplicate salts) was created at sea. It's completeness and correctness were scrutinized and ammended where needed.

Final pressure and temperature (s/n 2027) calibrations were pre-cruise. Drift (0.000357 C) and viscous (-0.0006 C) corrections were applied to temperature. Conductivity fit coefficients were determined using Matlab program CALCOP1:

number of points used	399
total number of points	565

```
% of points used in fit 70.62
fit standard deviation 0.001343
fit bias -0.00031362373
fit co pressure fudge 9.1652413e-008
min fit slope 0.99998194
max fit slope 1.0000325
```

GP200S.CAL of secondary (s/n 2026, 1536) sensor data (not including any duplicate salts) was at the lab in order to calibrate casts 19 and 20. Final pressure and temperature (s/n 2026) calibrations were pre-cruise. Drift (0.001214 C) and viscous (-0.0006 C) corrections were applied to temperature. Conductivity fit coefficients were determined using Matlab program CALCOPl:

```
number of points used 418
total number of points 554
% of points used in fit 75.45
fit standard deviation 0.001384
fit bias -0.010365362
fit co pressure fudge 1.134753e-006
min fit slope 1.0003656
max fit slope 1.0005231
```

Slope, bias, and pressure 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. (MARKSCAN creates a bottle file if a General Oceanics rosette was used.)

ROSSUM averages the bottle data specified in the DATCNV or MARKSCAN output and derives salinity, theta, sigma-t, and sigma-th. These bottle files are transferred to the PMEL VAX where post-cruise calibrations are computed.

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

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 9.0.

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.

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. These data are transferred to the PMEL VAX.

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. Station 28 sample 105 was flagged as bad.

Final CTD and bottle files were moved to DISK\$EPIC1:[HAYES.DATA.GP200.CTD] and included in the MySQL data management tables on June 9, 2000.

Header line 1, instrument type string, was corrected on July 18, 2000 in both CTD and bottle files. The new files were copied to DH and reloaded into the data management tables.