

GP4-00-KA
NOAA Ship Ka'imimoana
Kwajalein, Marshall Islands - Honolulu, HI
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ACQUISITION:

Fifty CTD profiles were collected on this cruise. Twenty-three profiles were collected along 165E from 8N to 8S; and 27 were collected along 180 from 8S to 8N and along the ship's trackline to 12N. All but one CTD cast were to 1000m, cast 15 was aborted around 200 m owing to a bad termination. Winch cable and drum incompatibilities prevented any deep profiles from being collected. A new spool of cable will be installed while in Honolulu.

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 (PMC19.CON).

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.

Salinity samples were not collected on shallow cast 0151 as it was aborted after the termination went bad around 200 m. Profile data for casts 0281 and 0341 had to be replayed from VCR tape, and .BTL files created from .BL files. Cast 0481 was appended from two pieces, 0-500 m down and 500 m-surface.

Problems suspect of a poor termination persisted after the cable was reterminated. Also, hydraulic fluid leaked from the CTD A-frame and onto the underwater package on the recovery of cast 0221. In spite of clean up, interconnecting cables and connectors may have been damaged.

SALINITIES:

Seawater was collected at 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 23 degrees Celsius.

POST-CRUISE CONDUCTIVITY CALIBRATIONS:

GP400S.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 (0.000209 C) and viscous (-0.0006 C) corrections were applied to temperature. Conductivity fit coefficients were determined using Matlab program CALCOS2 since there were no deep bottles:

number of points used	395
total number of points	521
% of points used in fit	75.82
fit standard deviation	0.001569
fit bias	-0.0014178306
min fit slope	1.0000798
max fit slope	1.0001711

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 transfered 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 7 sample 111 and station 47 sample 106 were flagged as questionable. Station 28 sample 102, 33 sample 102, 34 sample 106, and 45 sample 102 were flagged as bad.

Final CTD and bottle files were moved to DISK\$EPIC1:[HAYES.DATA.GP400.CTD] and included in the MySQL data management tables on August 24, 2000.