GP1-96-MB
NOAA Ship Malcolm Baldrige
Rodman, Panama - Hilo, Hawaii
May 3 - 31, 1996

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ACQUISITION:

Thirty-six CTD profiles were collected during this cruise covering two meridionals from 8N to 8S. Nineteen profiles were collected along 95W, and 17 along 110W. The majority of casts were to 1000 m; 5 casts were deep (3000 db).

All casts used TAO's Sea-Bird 9plus CTD s/n 09P10881-0390 measuring pressure (s/n 58950), temperature (s/n 1708 or 1710), and conductivity (s/n 1467). The CTD was mounted in a 12-bottle frame with a Sea-Bird rosette sampler (s/n 54). The CTD data stream was passed through AOML's Sea-Bird 11plus deck unit. An analog signal was recorded onto the audio portion of VCR tape as a backup. Digitized data were sent to a personal computer equipped with Sea-Bird's SEASOFT acquisition software (version 4.209) where calibrated data were displayed in graphical form in real-time, as well as stored in raw form onto the hard disk. Backups of the raw data were made on Syquest 200 Mbyte tapes and returned to PMEL for post-cruise processing.

SALINITIES:

Salinity analysis was performed using Guildline Autosal salinometer s/n ??? (last calibrated ???) and IAPSO standard seawater batch #P129. Instrument calibrations were not applied to the bottle salinities used to calibrate this data set, only a drift-during-run linear interpolation correction. Standard operating temperature was 24 degrees Celsius.

POST-CRUISE CONDUCTIVITY CALIBRATIONS:

GP196A.CAL was created at PMEL using program SBECAL. Anomalous differences between CTD and bottle salinities were scrutinized. Bottle salinities were checked against their original log sheets for typos. Station 1 was aborted at 40 db so there were no bottle data for this cast.

Final pressure and temperature calibrations were pre-cruise. Conductivity calibration coefficients were best determined using a station-dependent second-order fitting routine, CALCOS2, written by Greg Johnson in MATLAB on the following groups.

Stations 2-14: number of points used 117
total number of points 130
% of points used in fit 90
fit standard deviation 0.00191
fit bias 0.0030983449 mS/cm
min fit slope 1.0000148
max fit slope 1.0000252

Stations 15-19: number of points used 44
total number of points 50
% of points used in fit 88
fit standard deviation 0.001934
fit bias 0.0061918306 mS/cm
min fit slope 0.99984193
max fit slope 0.99987277

Stations 20-27: number of points used 58
total number of points 70
% of points used in fit 82.86
fit standard deviation 0.001885
fit bias -0.0020791189 mS/cm
min fit slope 1.0002017
max fit slope 1.0002687

Stations 28-36: number of points used 80
total number of points 88
% of points used in fit 90.91
fit standard deviation 0.002486
fit bias 0.00063163251 mS/cm
min fit slope 1.0000853
max fit slope 1.0001812

Slope and bias values were applied to CTD data using PMEL Fortran program GP196_EPIC; and to bottle files using CALMSTR1.

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 seond 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.

SPLIT removes decreasing pressure records and keeps only the downcast data.

TRANS converts the data file from binary to ASCII format. These data are transfered to the PMEL VAX.

PMEL program GP196_EPIC applies post-cruise conductivity calibration coefficients, recomputes the derived variables in DERIVE, and converts the ASCII data files to EPIC format. Sea-Bird .CNV files are editted to remove bad records near the surface (typically the top 3 m) and any causing spikes in the deeper water column before running GP196_EPIC. GP196_EPIC extrapolates 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, GP196_EPIC 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 interpolated over greater than 2 db, the WOCE quality word is '666'.

PMEL program CALMSTR1 applies post-cruise conductivity calibration coefficients and recomputes the derived variables in ROSSUM. EPICBOMSTR converts the ASCII bottle data file into individual cast EPIC data files. Bad bottles that were not included in EPIC bottle files were station 21 bottle 5, station 24 bottle 6, station 30 bottle 5, and station 32 bottle 4.

Final CTD and bottle files were moved to DISK$EPIC1:[HAYES.DATA] and included in the RIM data management tables on September 30, 1996.