EP1-90-MB
NOAA Ship Malcolm Baldrige
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ACQUISITION:

A total of 30 CTD casts were done by the ship's survey personnel (CST Hopkins, ST Dennis Sweeney, and ST Tom Lantry), the majority of which were to 1000 meters. AMC's CTD (S/N 2043) and 12-bottle rosette with 10-liter bottles were used for all casts. CTD 2043 did not have an oxygen sensor, however oxygen samples were drawn and titrated by CST Hopkins using a modified Winkler method. Data returned to the lab included a TK50 cartrige tape of the LOGGER disk files and salinity data, 3 small 9-track backup tapes containing LOGGER disk files, 5 large 9-track backup tapes of CTD data taken at the time of each cast, 6 VCR backup tapes of the audio signal during each cast, and printer listings with pre-cruise calibrations applied. The XYY' plotter used to monitor CTD data quality in real time, and strip chart which is helpful in determining rosette misfires were apparently not used. Documentation included the ship's form of the CTD cast logs, A-sheets on water sampling, salinity and oxygen analyses, weather logs, and the dead-reckoning abstracts.

Because PMEL's CTD cast logs were not filled out at sea, these were compiled back at the lab. The primary source of information were the ship's CTD cast logs. Deck unit P, T, C, and time of bottle stops were transcribed from these. The A-sheets provided Niskin bottle numbers and positions on the rosette, nominal firing depths, and salinity and oxygen sampling bottle numbers. Water sample salinity and oxygen data came from survey summary listings attached to their cast logs. CTD P, T, salinity (with precruise calibrations applied), and information on backup sequence came from the printer listings. Cast header information came from the bridge's weather logs. Depths of the water column were rarely noted at CTD stations. The nearest depth recorded on the DRAs was corrected and used where needed. Also created at the lab were the header and .CAL files using EDT and CALDSK.

Two autosals were contained aboard ship. Samples of P112 standard water were used throughout the cruise to standardize the salinometers before and after each run. The drift during each run was monitored and individual samples were corrected for this drift during each run by linear interpolation.

CONDUCTIVITY CALIBRATIONS:

A listing of the data with precruise calibrations applied was made using CALMSTR. Plots of P, T, C, salinity, and cast number verses the difference in CTD and bottle conductivity were generated, as well as deep TS plots of CTD and bottle data (in this case, deep meant the 500 and 1000 meter bottles). The differences in CTD and bottle salinities were noted and the .CAL was checked for typos, bad points, and misfires. There were 4 missing bottle salts from survey and no evidence of any misfires.

CTD pressure and temperature values were corrected using precruise calibration coefficients determined by NWRCC in December 1989.

2043 6 380

-0.7603	.9987171	0.348780E-6	-0.3157158E-10	P DN	S/N 2043	DEC 89
-2.2141	.9935210	0.248593E-5	-0.2361966E-09	P UP	S/N 2043	DEC 89
-0.0024	1.0000330	0.000000E-6	0.0000000E-10	T	S/N 2043	DEC 89
-0.0124	.9988607	0.000000E-6	0.0000000E-10	C	S/N 2043	DEC 89

Final calibrations for pressure and temperature remained the same as the pre-cruise. The new International Temperature Scale of 1990 (ITS-90) was NOT applied to the temperature values of this data set. A new conductivity calibration was determined in the lab using LINCAL which calculates a linear fit of bottle conductivity verses CTD conductivity, applies this fit, and throws out pairs of data whose difference is 2.8 times the standard deviation. It then recalculates the fit and iterates through the data until no values are thrown out. In this case, 68 values were discarded from a total of 306 values in 10 repetitions. The maximum residual was 0.0143 and the standard deviation was 0.0051. The new conductivity coefficients were A0:-.0219 and A1:0.9987329. A new listing with this first-order correction applied was made using CALMSTR, and the same types of plots were generated. No trends or offsets were evidenced in these plots. Keep in mind that these are only 1000 meter casts and that high variability in the surface layer is expected.

After processing the data (see the following section) and deep CTD data was compared with historical data (fall EPOCS 1989), only one outstanding bottle salinity value was thrown out (1000 meter bottle from cast 25). Bottle files were generated into PMEL's EPIC format using EPICBOMSTR.

PROCESSING:

CTD cast data was restored from the TK50 cartrige tape. Casts 16 and 21 however were empty files, and had to be restored from the small 9-track magnetic tapes. As has been the lab's experience in the past with AOML tapes, these were unreadable by our VAX system. Fortunately, a computer specialist, Tiffany Vance, was able to read the tapes on a microVAX system (node Huey).

DPDNZ read the raw data files and calculated the fall rate every 60 scans. This output was input into DLAGAVZ which creates a file of 1-meter averages. DLAGAVZ lags and despikes the data, performs fall rate editing, and applies pre-cruise calibrations, writing uncalibrated conductivity to the file which is then used by EPCTD. The minimum fall rate allowable was 0.5 with a pressure interval of 1.2 meters. EPCTD despikes the data, fills the data to one value every decibar, and applies final calibrations as specified in it's command file. The new conductivity calibration coefficients calculated in the lab were applied here. EPCTD also computes salinity, sigma-theta etc., adds meteorological header information to the data file, and puts the data in PMEL's EPIC format.

The EPIC formatted bottle and CTD data files were used to produce various plots for the final data report. Among these, TS plots of the entire water column were made for each cast. These showed that casts 1, 4, 9, 14, 20, 25, 26, and 27 had surface spikes and needed to be despiked manually. A majority of the TS curves were jagged. Cast 29 was the most obvious. This was investigated by running REDDIC on the raw dpdn data (before editing) and plotting the problem area with no points thrown out. Then another plot was made of the problem area with bad points thrown out but the data still unaveraged. A third plot was made of the good 1-meter averaged data, then a fourth after running EPCTD which by default checks the gradient on either side of a point and if it is less than that allowable (in this case 0.025 for 0-200m), then that point is thrown out and a linearly interpolated value is put in its place. 3 major features in the problem area of cast 29 were editted out here. Stan decided this

gradient editting was necessary only in special cases and the default should be false in EPCTD.COM. So EPCTD was reran on all of the casts, and the data report reflects these final versions in all its plots. (The lack of editting retained two spikes which had to be taken out manually. These were cast 18 574 db and cast 23 198 db points.) The
original point in question of cast 29 was not discarded by EPCTD because the higher values of salinity existed over several meters. This was seen by plotting the output of REDDIC; temperature and conductivity vs. depth. The jagged TS curves are due to the water properties varying so greatly with incremental changes in depth.

The TS plots were also compared to historical data from the fall of 1989 data report. This comparison showed excellent correlation for depths greater than 200 meters.

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