9400189 WR
TOWED CTD DATA
WECOMA TOGA COARE.
10/5/94

#DOCUMENTATION_FILE_NAME: Seasoar_W9211B_ddf
#NODC_ACCESSION_NUMBER: 9400189 *
#NODC_REFERENCE_NUMBER: *
#NODC_DOCUMENTATION_DATE: 19940801
#DOCUMENTOR: Robert O'Malley
#NODC_REVIEWER: Harry Iredale *
#DATE_RECEIVED: 19940815 *
#SUBMISSION_MEDIUM: DAT tape
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#COLLRCTION_INFORMATION:
Wecoma cruise W9211B
Guam to Guam, with brief stop in Pohnpei

SEASOAR LEG2

SEASOAR SAMPLING IN NINE TOWS AS FOLLOWS:

Tow	Start	End	Parameters measured
1	0825 UTC, 19 Dec	0232 UTC, 20 Dec	P, T, C
2	1241 UTC, 20 Dec	1602 UTC, 23 Dec	P, T, C
3	0238 UTC, 24 Dec	0307 UTC, 26 Dec	P, T, C
4	1915 UTC, 26 Dec	0535 UTC, 29 Dec	P, T, C
5	1333 UTC, 29 Dec	0342 UTC, 02 Jan	P, T, C
6	0808 UTC, 02 Jan	0541 UTC, 04 Jan	P, T, C
7	1003 UTC, 04 Jan	2316 UTC, 07 Jan	P, T, C
8	0251 UTC, 08 Jan	2300 UTC, 09 Jan	P, T, C
9	0712 UTC, 10 Jan	1948 UTC, 12 Jan	P, T, C

Most observations in the COARE intensive flux array, between 1 degree South and degrees S, and between 155 E and 157 E; tow 9 included observations from 1 S to along 156 E. Maximum sampling depth usually less than 300 m.
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#PROJECT: TOGA COARE
#FUNDING AGENCY: NSF and NOAA Global Programs
#GRANT/CONTRACT-NO: NSF OCE-9113510
#PLATFORM_TYPE: research vessel
#PLATFORM_NAME: Wecoma
#COLLECTION_METHODS:

SeaBird 9/11 plus CTD inside Seasoar vehicle; with dual ducted SBE-3 and SBE-4 temperature and conductivity sensors inside seasoar vehicle; flow through sensor duct pumped by SBE-5 pumps; duct intake and outlet on either side of lower nose; intake and outlet for each duct separated by about 5 cm; final

data came from the starboard-side pair of sensors for tows one and two (SN 1364 for T and SN 1018 for C) and from the port-side sensors for tow three (SN 1366 for T and SN 1021 for C) and also for tows four through nine (SN 1369 for T and SN 1041 for C).

#ANALYSIS_METHODS:

- used SBE calibration for temperature (tows 1-3) and pressure sensors (all to AND FOR PRELIMINARY CONDUCTIVITY ESTIMATES; DATES OF SBE CALIBRATIONS AS FOL

P	(SN 50506)	23 April	'92	(tows one - seven)
P	(SN 39017)	07 November	89	(tows eight and nine)
C	(SN 1018)	16 September	92	(tows one and two)
C	(SN 1021)	16 September	92	(tow three)
C	(SN 1041)	24 April	92	(tows four - nine)
T	(SN 1018)	16 September	92	(tows one and two)
T	(SN 1021)	16 September	92	(tow three)
T	(SN 1366)	27 March	92	(tows four - nine)

- temperature calibration (for tows 4-9) used available SBE post-cruise calibration data for the starboard-side temperature sensor; the port-side temperature sensor was adjusted to match the starboard processed data. Median temperature differences between the starboard- and port-side sensors were examined for the shallowest and deepest Seasoar data in tows four and nine. The following offset and multiplier were used TO OBTAIN PORT-SIDE TEMPERATURE DATA FOR TOWS FOUR THROUGH NINE:

  offset = 0.0034 multiplier = 1.000209

- in situ conductivity calibration determined from comparison of 3.0-5.5 m Seasoar values with salinity samples from ship's 5 m intake; additional in situ conductivity calibration available for the sensors used in tows one - three, as they were subsequently used in CTD casts taking water samples; Seasoar/CTD conductivity compared with the sample conductivity calculated from sample salinity and Seasoar/CTD temperature; corrections calculated separately for the duplicate sensors, and for the nine different tows; conductivity corrections (offset "a" and multiplier "k") applied as follows (also shown are the average and standard deviations of the salinity DIFFERENCES BETWEEN THE SAMPLE VALUES AND THE CORRECTED SEASOAR DATA):

Tow	N	a	k	Ave S Diff	Std Dev S. Diff
1-2	100	-0.00192	1.000513	+0.000	0.004
3	130	-0.00225	1.000617	+0.000	0.004
4	21	0.00000	1.000530	+0.000	0.002
5	25	0.00000	1.000530	+0.001	0.005
6	9	0.00000	1.000530	+0.000	0.006
7	1	0.00000	1.000530	0.000	-----
8	5	0.00000	1.000530	-0.001	0.004
9	19	0.00000	1.000530	0.000	0.003

DATA PROCESSING:

The first step in reprocessing is to incorporate the temperature and conductivity correction factors determined from in-situ calibration as given above.

The next step is to compute lagged correlations between temperature and conductivity for each sensor pair, separately for ascending and DESCENDING PROFILES, AND SEPARATELY FOR THREE DEPTH RANGES: 50 to 120 dbar, 120 to 180 dbar, and 180 to 240 dbar, provided the segment contains at least 72 scans. Cross-correlations are calculated after detrending both temperature and conductivity by first-differencing the 24-Hz data. Correlations are calculated for +/- 12 lags; the maximum correlation is almost always > 0.85. The fractional value of the optimum

lag is determined by fitting a parabola to the cross-correlation values. The edited values of the alignment offset were applied sequentially in reprocessing the 24-Hz T/C data. To reprocess data from depths shallower than 50 m, we used the offset value determined from the preceding 120 to 50 dbar layer; for data deeper than 240 m, we used the offset value determined from the preceding 180 to 240 dbar layer.

To correct the 24 Hz conductivity data for the thermal mass of the conductivity cell, we used the standard algorithm with a fixed value for the thermal anomaly time constant (tau = 10 sec), and variable values for the thermal anomaly amplitude depending on the ALIGNMENT OFFSET:

```
  alpha = 0.03                                  if offset < 1.75 or = 1.75
  alpha = 0.03 + 0.03 ((offset-1.75)/2.75) if offset > 1.75,
```

The corrected and realigned 24 Hz temperature and conductivity data are used to calculate 24-Hz salinity, and these are averaged to yield one-second averages stored in hourly files.

Successive hourly files of the reprocessed one-second average data were joined and clipped to yield a single data file for each section of the Standard Butterfly Pattern, and for each one-degree segment of the long cross-equatorial section (1 S to 5 N) at the end of the cruise. Final PROCESSED DATA FILES CONTAIN: unfiltered GPS latitude and longitude; pressure; temperature, salinity, and sigma-t from the better sensor pair; date and time; and an integer representing flags (to indicate collection of a water sample from 5-m intake (thousands digit set to 1), missing GPS data filled by linear interpolation (tens digit set to 1), and to indicate port or starboard intake for the T/C sensor pair (ones digit set to 1 or 0, respectively)).

Comparison between reprocessed data from ascending and descending portions of the Seasoar trajectory sometimes showed very little difference. For this cruise, salinity data from both descending and ascending profiles appear to be of high quality, but the ascending salinity data are sometimes of better quality than the descending data.

#INSTRUMENTS: SBE 9/11 plus CTD SN 0258 with pressure sensor SN 50506 (calibrated at SBE 23 April 92) for tows one through seven, and SBE 9/11 plus CTD SN 2843 with pressure sensor SN 39017 (calibrated at SBE 07 November 89) for tows eight and nine; temperature sensor SN 1018 (calibrated at SBE 16 September 92, with scale correction dated 2 Dec 92) and conductivty sensor SN 1018 (calibrated at SBE 16 September 92 both for tows one and two; temperature sensor SN 1021 (calibrated at SBE 16 September 92, with scale correction dated 2 Dec 92) and conductivty sensor SN 1021 (calibrated at SBE 16 September 92) both for tow three; and temperature sensor SN 1366 (calibrated at SBE 27 March 92, with scale correction dated 2 Dec 92) and conductivty sensor SN 1041 (calibrated at SBE 24 April 92) both for tows four through nine.

#PUBLICATIONS: O'Malley, R, P. M. Kosro, R. Lukas, and A. Huyer. 1994. SEASOAR Observations During a COARE Surveys Cruise, W9211B, 12 December 1992 to 16 January 1993. COAS, Oregon State University, Data Report 156, Ref 94-2. 426 pp.

#ASSOCIATED_DATASETS: Seasoar and CTD data from W9211A, and from W9211C (COARE Legs 1 and 3); also CTD data from W9211B (COARE Leg 2) submitted by JIMAR, University of Hawaii.

#ASSOCIATED_VERSIONS: *

#DATA_FILES:

182448 deploy02jan.data

```
 343140     deploy04jan.data
 142968     deploy08jan.data
 183456     deploy10jan.data
 212772     deploy19dec.data
 195636     deploy20dec.data
 341376     deploy24dec.data
 311472     deploy26dec.data
 210336     deploy29dec.data
 720720     e2n02jana.data
1527036     e2n02janb.data
2101680     e2n05jan.data
2016000     e2n06jan.data
2101680     e2n08jan.data
2131920     e2n09jan.data
1940400     e2n20dec.data
2262960     e2n21dec.data
1703520     e2n23dec.data
2031120     e2n25dec.data
2177280     e2n27dec.data
2212560     e2n28dec.data
2222640     e2n30dec.data
2031120     e2n31dec.data
2857680     n2s02jan.data
3422160     n2s03jan.data
1310400     n2s04jan.data
2898000     n2s05jan.data
3049200     n2s06jan.data
3024000     n2s08jan.data
1043280     n2s09jan.data
1411200     n2s10jan.data
1446480     n2s19dec.data
2877840     n2s20dec.data
3326400     n2s22dec.data
2907996     n2s24dec.data
2933280     n2s25dec.data
2958480     n2s27dec.data
1900080     n2s28dec.data
 937440     n2s29dec.data
2807280     n2s30dec.data
2842560     n2s31dec.data
 364560     recover02jan.data
 347760     recover04jan.data
 216300     recover07jan.data
 258720     recover09jan.data
 226800     recover12jan.data
  29400     recover20dec.data
 589680     recover23dec.data
 266280     recover26dec.data
 346920     recover29dec.data
1461600     s2n03jan.data
2016000     s2w01jan.data
2222640     s2w02jan.data
2106720     s2w04jan.data
2076480     s2w05jan.data
1945440     s2w07jan.data
1980720     s2w08jan.data
1935360     s2w19dec.data
2121840     s2w21dec.data
2152080     s2w22dec.data
2131920     s2w24dec.data
```

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   1486800     s2w25dec.data
   2152080     s2w27dec.data
   2101680     s2w29dec.data
   2126880     s2w31dec.data
   2973600     transita.data
   2555280     transitb.data
   2444400     transitc.data
   2353680     transitd.data
   2252880     transite.data
   2273040     transitf.data
   2444400     w2e01jan.data
   2464560     w2e04jan.data
   2620800     w2e06jan.data
   2620800     w2e07jan.data
   2666160     w2e09jan.data
   1647996     w2e10jan.data
   1854720     w2e19dec.data
   2575440     w2e21dec.data
   2555280     w2e23dec.data
   2565360     w2e24dec.data
   2766960     w2e26dec.data
   2812320     w2e28dec.data
   2560320     w2e30dec.data
   2666160     w2e31dec.data
   1748880     w2n03jan.data

  86 files
DATA_SET_VOLUME: 157346338 bytyes
DOCUMENTATION_FILES:  16361     w9211b.csr.txt
#DATA_SET_NAME  Wecoma Seasoar Leg 2 *
#SOURCE_COMPUTER:  Sun Sparc IPC
#SOURCE_COMPUTER_OPERATING_SYSTEM: Sun OS 4.1.2
#SOURCE_LANGUAGE: Fortran and C
#COMPUTER_CODE: ASCII
#ORIGINATOR_DATASET_IDENTIFIER: W9211B
#DATA_DATES: 19921219-19930112
#LEFT_GEOGRAPHIC_UPPER_BOUND:    10N    140E
#RIGHT_GEOGRAPHIC_LOWER_BOUND:   10S    180
#GEOGRAPHIC_REGION:
 Equatorial Pacific, north of Australia
 TOGA COARE Large Scale Domain
 Western Pacific Warm Pool
#DATA_TYPE: SEASOAR  data
#SPHERE:   ocean                          *
#PARAMETERS: latitude (decimal degrees), longitude (decimal degrees), pressure
 (dbars), temperature (C), salinity (psu), Sigma-theta (kg/cubic meter), time
 (decimal day of 1993), date (integral year, month, day), time (integral hour,
 minute, second), flag
#FORMAT_DESCRIPTION:
 NO HEADER; EACH LINE CONTAINS 1 HZ VALUES OF:
  unfiltered GPS latitude
  unfiltered GPS longitude
  pressure (dbars), accurate to better than plus/minus 2 db
  temperature (C), accurate to plus/minus 0.01 C
  salinity (psu), accurate to plus/minus 0.01 psu
  sigma-t (kg/cubic meter),
  decimal date,
  integral year, month, day, hour, minute, second
  flag word (see format comments below for interpretation)
#FORMAT_PUBLICATION:
```

#FORMAT_COMMENTS:

These *.data files contain 1-sec-averaged Seasoar data for each section of the standard COARE Surveys Butterfly pattern from W9211B in ASCII format.

File names include the name of each section, and the date (UTC) at the BEGINNING OF THE PARTICULAR OCCUPATION:

N2S: meridional section along 156 deg, 6 min East
W2E: zonal section along 1 deg, 50 min South
S2W: diagonal joining southern end of N2S line with western end of W2E li
E2N: diagonal joining eastern end of W2E line with northern end of N2S li

A few files have names slightly different from the standard. In one case, the traverse went from W2N (instead of W2E or E2N) and it is named accordingly. In another case a section was interrupted for the end of the tow, and then restarted again on the same day; in that case an "a" and a "b are appended to the name to distinguish them. In one other case we went from north to south and back again along the N2S section on the same day; in this case the first followed the normal naming convention, but the second was called S2N. Finaly the transit from the study area to 5 degrees North latitude was broken up essentially into one degree segments, with the first file going from the northern end of the N2S section to the equator, the second going from the equator to one degree north latitude, and so on. These sections are named "transit" and the letters "a", "b", "c", etc. give their sequence. Also supplied are the data from the Seasoar deployments and recoveries, separate from the sections; they are named "deploy" or "recover beginning of the deployment or recovery.

In each file, short data gaps within a section have been filled by setting variables except time to 1.0E35.

As for another COARE Seasoar data set, W9211C (submitted in Dec 93), two files are presented for each section. Files named *.up.data contain data from ascending profiles only (each with a descending trailer of < 5 m); succeeding profiles are separated by an extra <Return>. Files named *.data contain the continuous time-series, both ascending and descending, without interruption.

[NODC ONLY RECEIVED .data FILES]

THE FOLLOWING SAMPLE SHOWS THE FIRST TEN LINES OF N2S20DEC.DATA:

```
-1.23489 156.09906 317.8 12.2329 34.8680 26.4424 355.82291 92 12 20 19 45  0
-1.23489 156.09906 318.0 12.2076 34.8699 26.4488 355.82294 92 12 20 19 45  1
-1.23489 156.09906 318.2 12.2150 34.8696 26.4471 355.82294 92 12 20 19 45  2
-1.23489 156.09906 318.5 12.1975 34.8654 26.4472 355.82294 92 12 20 19 45  3
-1.23489 156.09906 318.7 12.1558 34.8624 26.4529 355.82297 92 12 20 19 45  4
-1.23489 156.09906 318.8 12.1140 34.8606 26.4595 355.82297 92 12 20 19 45  5
-1.23489 156.09906 319.1 12.0854 34.8605 26.4650 355.82300 92 12 20 19 45  6
-1.23500 156.09895 319.5 12.0643 34.8586 26.4674 355.82300 92 12 20 19 45  7
-1.23500 156.09895 319.8 12.0476 34.8570 26.4695 355.82300 92 12 20 19 45  8
-1.23500 156.09895 319.9 12.0395 34.8573 26.4712 355.82303 92 12 20 19 45  9
```

THE VARIABLES ARE:

latitude (decimal degrees, negative for southern hemisphere),
longitude (decimal degrees, positive for eastern hemisphere),
pressure (decibars) temperature from preferred sensor pair (degrees Celsius)
salinity (psu) from same sensor pair
sigma-t
decimal year-day (of 1993)

153,698 x 1024 =

LRECL=80

1,967,334 Records

integer year, month, day, hour, minute, second
a 4-digit integral number (with values of 1,10,11,1000,1001,1010, or 1011)
REPRESENTING FOUR SEPARATE FLAGS:
flag 1 (thousands digit) is usually 0; a value of 1 marks the time of a salinity sample from ship's thruflow system (intake at 5 m).
flag 2 (hundreds digit) is always zero;
flag 3 (tens digit) is usually 0; a value of 1 marks missing GPS data; position was interpolated from available data;
flag 4 is 1 for the T/C sensor pair whose intake is on the port side of Seasoar

#MISC_DOCUMENTATION: *
#SUBMITTOR_DOCUMENTATION: