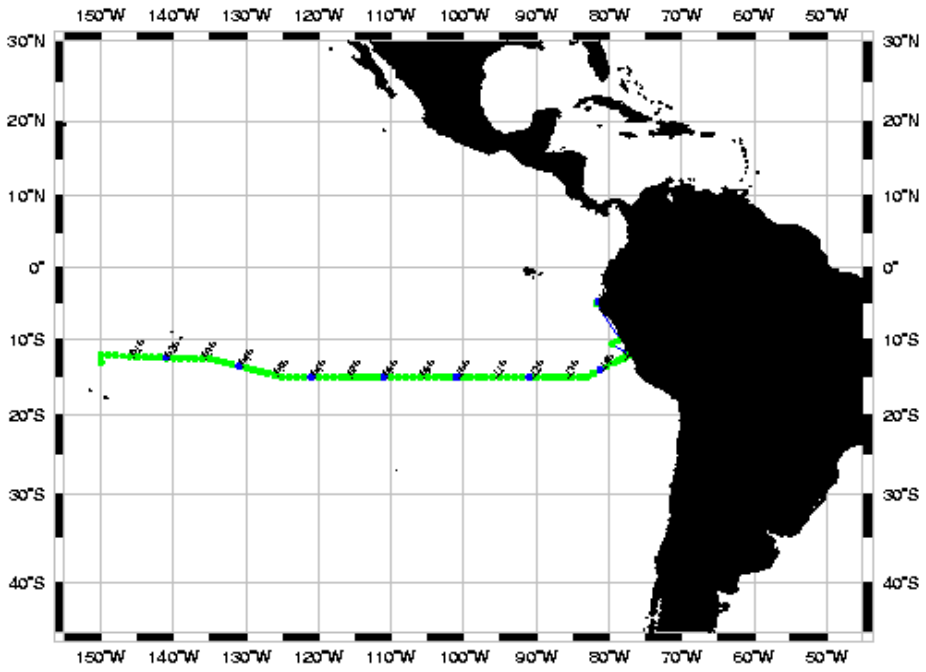
A. Cruise Narrative: P05H



A.1. Highlights

WHP Cruise Summary Information

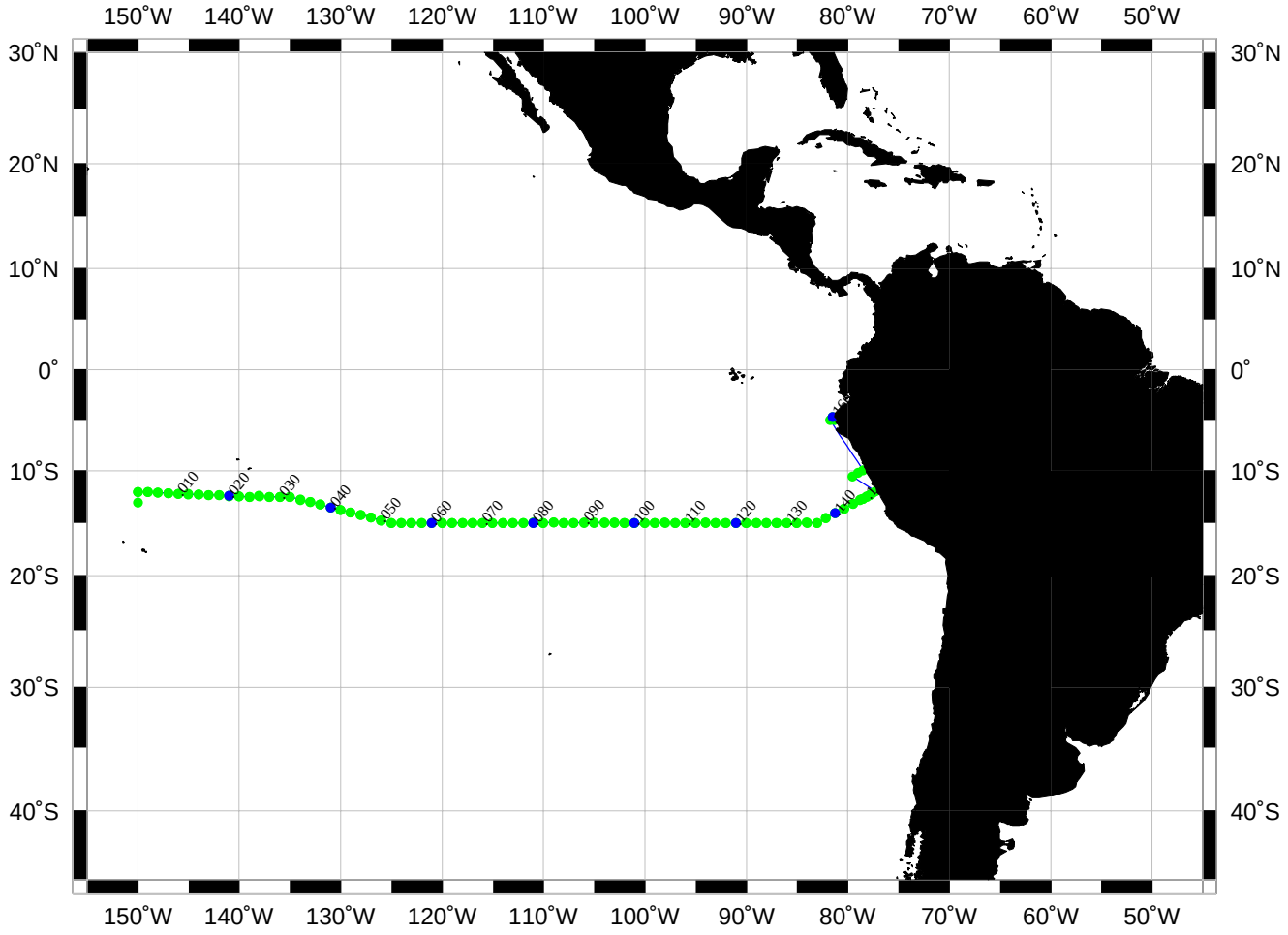
WOCE section designation	**P05H**
Expedition designation (EXPOCODE)	**3175TEW87_4**
Chief Scientist(s) and their affiliation	**D. W. Behringer**/NOAA/AOML
CTD Personnel	Doug Wilson, Mark Bushnell, Doug Anderson
Dates	1987.06.23 - 1987.07.28
Ship	R/V Researcher
Ports of call	Tahiti-Panama
Number of stations	161
Geographic boundaries of the stations	4° 38.9' S 150° 0.3' W 77° 15.3' W 15° 22' S
Floats and drifters deployed	none
Moorings deployed or recovered	none
Contributing authors	L. Mangum, J. Lynch, K. McTaggart, L. Stratton, S. Hayes

WHP Cruise and Data Information

Instructions: Click on any item to locate primary reference(s) or use navigation tools above.

Cruise Summary Information	Hydrographic Measurements
Description of scientific program	CTD - general
	CTD - pressure
Geographic boundaries of the survey	CTD - temperature
Cruise track (figure)	CTD - conductivity/salinity
	CTD - dissolved oxygen
Floats and drifters deployed	
Moorings deployed or recovered	
Principal Investigators for all measurements	
	Data Status Notes

Station locations for P05H BEHRINGER: 1987



Produced from .sum file by WHPO-SIO

Extracted from:

NOAA Data Report ERL PMEL-33
CTD/0_2 Data Measurements Collected on TEW (Transport of Equatorial Waters)
June-August 1987

L. Mangum, J. Lynch, K. McTaggart, L. Stratton, and S. Hayes

ABSTRACT. Summaries of Neil Brown Instrument System (NBIS) CTD/0_2 measurements recorded on the TEW (Transports of Equatorial Waters) cruises during 1987, a description of the acquisition and processing systems, and a discussion of calibration techniques are presented. The major portion of these data was collected from 150°W to 150°E in the latitude range of 12°S-15°S. Additional casts collected across the Samoan Passage, in the Coral Sea Basin, across the Solomon Sea, and in the Pacific Basin along longitude 165°E between 5°S and 8°N are also presented. Station locations, meteorological conditions, and profiles of potential temperature, salinity, __ and oxygen are shown for each cast. In addition, potential temperature-salinity diagrams for each cast and section plots of oceanographic variables are given.

1. INTRODUCTION

The circulation of the equatorial Pacific has been principally determined by meridional sections across the zonal currents which dominate this region. Study of meridional flows into and out of the tropics has largely been limited to measurements of the boundary currents on the eastern and western sides of the basin and to inferences based upon property distributions from non-synoptic multi-cruise, multi-year measurements (e.g., Tsuchiya, 1968, 1981; Reid, 1986). In recent studies, emphasis on the boundary current regions has continued with the South East Tropical Pacific (SETP) component of the Equatorial Pacific Ocean Climate Study (EPOCS), the Western Equatorial Pacific Ocean Climate Study (WEPOCS), and the US-PRC TOGA study.

The vast mid-Pacific basin, covering more than a quarter of the earth's circumference has continued to be sampled with non-synoptic meridional sections at several longitudes and relatively short equatorial zonal sections. Recent estimates of the tropical Pacific heat budget and its variability have led to renewed interest in this mid-basin regime. On average the surface waters of the tropical Pacific collect heat from the sun and this heat is transported poleward. The magnitude and mechanisms of this mean heat flux out of the tropics is still poorly understood (Talley, 1984). In addition, several studies (Bryan, 1982; Pares-Sierra, 1985; Philander et al., 1986) emphasize the seasonal and interannual fluctuations in heat transport. Understanding the poleward heat transport and its variability is also crucial to the ENSO problem. In view of the ongoing studies of equatorial Pacific Ocean circulation, the planned studies of global ocean circulation (WOCE), and the importance of

meridional heat and freshwater transports by the Pacific, there was clearly a need for modern, high quality trans-Pacific hydrographic sections in the tropics. Such a section, chosen along approximately 15°S in order to pass near the center of the subtropical gyre of the South Pacific surface circulation, was the principal operation of the TEW expedition. The eastern section between Peru and 150°W was covered by the NOAA Ship ***Researcher*** in June-July, 1987 and the data were collected by the Atlantic Oceanographic and Meteorological laboratory (AOML) and are presented here. The western section from 150°W to Australia and additionally across the Samoan Passage, in the Coral Sea, across the Solomon Sea, and in the Pacific Basin along longitude 165°E was covered by the NOAA Ship Oceanographer.

Two CTD casts were done at each station; every degree from 150W to the coast of Peru (about 79W). One cast was to the bottom and the other some selected shallower depth. A total of 161 casts were completed. The first cast was a test cast. Lack of resources limited the number of salinity samples to 6 per cast. For good calibration coverage, all the salinity samples during the deep cast were taken at deep depths. 12 oxygen samples were taken per cast.

The conductivity calibration was broken down into three groups:

a*ctdcon + b = corrected ctd conductivity

1-33 CTD 2/2156 tem lag tau=10 scans con lag =.87

a= .9996983 b=.03778839

34-129 CTD 2/2156 tem lag tau=10 scans con lag =.87

a= 1.000317 b=.034629822

130-161 CTD 1/2769 tem lag tau=6 scans con lag =.87

Post cruise conductivity calibrations were used and no additional calibration was necessary.

Pressure=Pressure - 5 db.

The bottle salinities were converted to conductivites with SAL78 using a standard seawater conductivity of 42.914 mmho/cm. Standard seawater batch no. 103 was used with the AutoSal. The mean offset of this batch is 0. (Mantyla, correspondence), therefore no correction to bottle salinities was needed. CTD conductivity was linearly fitted to bottle conductivity. Approximately 25 percent of the data were thrown out before a fit that resulted in approximately a .002 std was achieved. There were a couple of special problems. Cast 5 has a gap in the data between 600 and 1000m. Cast 34 required an additional offset, most likely because it was the transition cast during the

jump in the offset, but it still contains a questionable feature at 400m that does not exist in the other cast at that station. Due to operator error, casts 91 and 125 do not begin at the surface. Dissolved oxygen was determined with two methods, Winkler and the new automated Carpenter box. I have not completed the CTD downcast oxygen calibration.

NOTES

(J. Lynch)

The casts that are now in dh:[data.tw487.ctd] contain final salinity calibrations. The oxygen calibrations have not yet computed. Carol will send a complete new set of data with the new oxygen cals when they are completed. These new casts will also have and expanded header (meteorological information), so I expect it will be easiest to reload everything from start to finish at that point. EPCTD or AOML_EPCTD (d2:[lynch.tew.aoml]) should be modified for the new format. The bottle files here do not contain calibrated CTD values. They also contain old style (no met info) headers.

CTD DATA
January 2, 1991
(K. MCTAGGART)

As far as I know, TW487 data was originally worked on by Jean Lynch in July of 1988. Her documentation is called TEW87.DOC and says that the CTD data received from Carol at AOML has their final conductivity/salinity calibrations applied but the oxygen data (OXC and OXT) were not calibrated because of complications at AOML and there was no meteorological data in the headers. A note from Carol mentions a .003 psu discrepancy between AOML's TW4 cast at 12S 150W and PMEL's TW2 cast at the same station. Jean put this preliminary data set into EPIC format living on disk hayes. We were waiting for an entirely new completed data package from Carol (who I don't think works there anymore) that never came.

Stan requested AOML's most recent CTD data files for TW487 from Dr. Behringer and these were received in September 1990. (We also sent Dr. Behringer our most recent TW287 CTD data files.) A modified version of Jean's AOML_EPCTD read the 2 meter averaged data files (which included meteorological header information and dissolved oxygen data) and put them in EPIC format. These replaced the first CTD files on disk hayes. (The working files used to convert AOML's latest data are archived on volume 1 of tape PO1006 saveset OCT3190.PO1006;4.) Deep theta-salinity plots showed the .003 psu discrepancy to still exist. We checked to see if AOML applied a conductivity cell factor, and they had.

In November 1990, I requested and received a tape of TW487 casts 1-18 raw CTD logger files and AOML's bottle data file containing uncalibrated CTD values from Mark

Bushnell. Programs used on the raw CTD data included a modified version of DPDN_DISK, a modified version of DLAGAV with a minimum fall rate of 0.8 and pressure interval of 1.5 db, and EPCTD. A .CAL file for the first 18 casts was generated from the bottle data file. A modified version of LINCAL and CALMSTR were used on the bottle data. The final calibrations applied to the CTD data were as follows:

P (upcast assumed linear) 0.0, 1.0
T (precruise) -.004607, .9999
C (from LINCAL, less casts 8,9,10) .026245797, .9998559
O_2 none

SPIKE was not called in EPCTD for gradient despiking. CTDPLT was used to check for spikes using full column TS plots. Cast 12 had 3 bad values removed using NOMIT in EPCTD; and cast 5 salinity data between approximately 600 and 1000 db were deleted and linearly interpolated with the other dependent variables being recalculated using CTDVAR.

Deep theta-salinity plots showed the TW2/TW4 difference in salinity to have decreased slightly. The newly calibrated casts 1-18 were not offset from the following group of AOML calibrated casts from cast 19 on. So it was decided to keep these newly calibrated 1 meter averaged casts replacing the previous casts 1-18 on disk hayes.

Deep theta-salinity plots of the first group of TW2 CTD casts with bottles calibrated by Jean revealed a cast break at about cast 10. The bottles of these first several casts of TW287 corresponded better with the TW487 CTD cast data. So supported, TW2 casts 1-10 were recalibrated and the resulting data decreased the TW2/TW4 difference in salinity even more. However, a discrepancy still exists of approximately .001 psu. Enough done.

All the working files used to recalibrate TW4 casts 1-18 and TW2 casts 1-10 are on my archive tape #P1062 with a saveset of FEB0191.

February 6, 1991

While making section plots for Stan, I noticed that cast 125 was missing the first 34 meters of data. The data was filled to the surface (every 2 db) with the same values as 35 db.

March 10, 1992

Oxygen data was received from Doug Wilson at AOML over Internet in an ASCII file containing cast #, bottle #, depth, CTD oxygen, "old" oxygen (done by ship personnel using Winkler titration), "new" oxygen (first cruise where oxygens were titrated using Carpenter method, automatic photometric endpoint determination), OXDUP,

temperature, CTD salinity (preliminary, don't use), bottle salinity, and SALDUP. Doug comments that neither old or new oxygen values look too good to him but the new oxygen values "get the nod". So the new oxygen values were added to

CTD Submitted; Reformatting needed
November 11, 2001
(Diggs)

Files were (finally) copied from PMEL website after prompting from P. Chapman and J Crease. Files are in p05/p05h/original and awaiting massive reformatting.

December 4, 2001
(McTaggart)

I show a D.W. Behringer of AOML as the Chief Scientist on TEW 4.

December 4, 2001
(Crease)

Hi, I could use some resolution on a couple of issues w/ P05H. Was it Oceanographer or Researcher (vessel)? Who was the PI and what is the official EXPOCODE? We're ready to use 3175TEW_4 as the expocode. Please advise. - sd

> > It was the Researcher so the expocode looks good. I'm checking on PI but
> > maybe Kristy knows. She mentions DR Behringer in one of the documents? -
> > J.Crease

Notes on P05 CTD reformatting
December 12, 2001
(D. Muus)

1. Data from /usr/export/html-public/data/onetime/pacific/p05/p05h/original/ tw487_ctd.lst formatted into p05hct.zip (CTD file) and p05hsu.txt (SUMMARY file)

2. Fourth line of each station header contains "DEPTH xxxx M". No indication if this is corrected or uncorrected. xxxx was used as UNC DEPTH in SUMMARY file except for the following stations:

STA	DEPTH	MAX PRES
001	9999	3358 (13S 150W)
156	60	998
157	60	166
158	60	130
159	60	996
160	60	996
161	60	78

3. Exchange file, p05h_ct1.zip, checked using Java Ocean Atlas.

CTD/SUM Data Reformatted/OnLine
(Diggs)
December 14, 2001

Made tables by re-running and forcing procedure to accept new line. Pre-WOCE line P05H (PMEL Transport of Equatorial Waters #4) data retrieved by S. Diggs from PMEL. Data pre-processed by Diggs, reformatted by Dave Muus. All maps and index files made. SUMfile, CTD zip archive, Exchange CTD archive and DOCfile placed on website.

Database needs to be changed to reflect new information. EXPOCODE is now 3175TEW87_4 and cruise dates are 6/23/87 to 7/28/87 (D. W. Behringer is the PI). No bottle data. DOC file is rough and needs reformatting as well.