

data report

PHYSICAL, CHEMICAL AND CURRENT METER DATA

CalCOFI CRUISE 7601
6-7 January 1976

CalCOFI CRUISE 7602
16-20 February 1976

CRUISE 7603 (TWATE III)
30 March-2 April 1976

CRUISE 7604
17 April-10 May 1976

CRUISE 7611
11 November 1976

SIO Reference 88-4
29 February 1988

UNIVERSITY OF CALIFORNIA
SCRIPPS INSTITUTION OF OCEANOGRAPHY

PHYSICAL, CHEMICAL AND CURRENT METER DATA

CalCOFI CRUISE 7601
6-7 January 1976

CalCOFI CRUISE 7602
16-20 February 1976

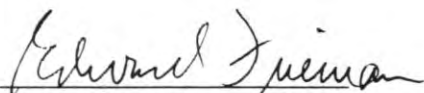
CRUISE 7603 (TWATE III)
30 March-2 April 1976

CRUISE 7604
16 April-10 May 1976

CRUISE 7611
11 November 1976

SIO Reference 88-4
29 February 1988

Approved for distribution:


Edward A. Frieman, Director

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INTRODUCTION

The data in this report were collected during CalCOFI Cruises 7601* and 7602, and Cruises 7603 and 7604 aboard the RV *Alexander Agassiz*, and Cruise 7611 aboard the RV *Ellen B. Scripps* of the Scripps Institution of Oceanography, University of California, San Diego. Although all these cruises were in the area of the California Cooperative Oceanic Fisheries Investigations (CalCOFI), only during 7601 and 7602 were planned CalCOFI station positions occupied. Cruise 7603 was a Two-Way Acoustic Transmission Experiment (TWATE III) on which the principle work accomplished was sound velocity analyses in the vicinity of locations 33°N, 118°W and 31°N, 120°W. The object of Cruise 7604 was to investigate eddies in the California Current, to determine their size, their movement in relationship to other currents, and the length of time they remain a distinguishable feature. A series of airborne expendable bathythermographs (AXBTs) used in a program to observe the thermal structure in the Central Pacific were calibrated by comparison with eight STD lowerings during Cruise 7611. This field program has been described in SIO Reference 76-19, Observation of Thermal Structure in the Central Pacific, T. P. Barnett, M. H. Sessions, and P. M. Marshall.

These data were collected and processed by personnel of the Data Collection and Processing Group, Marine Life Research Group (DCPG**, MLRG), Scripps Institution of Oceanography.

STANDARD PROCEDURES

The difference in purpose of the five cruises in this report results in a variation of the data collected. Hydrographic casts were made on all cruises but varied from only one cast of eight Nansen bottles on the STD wire for Cruise 7601 to 20 casts of 18 Nansen bottles on the hydrographic wire for Cruise 7604. Temperature and salinity were determined for all depths sampled. Oxygen and nutrients were determined for Cruise 7602 only. On Cruise 7601 the four free vehicle current meters which had been deployed during CalCOFI Cruise 7510 were recovered.

On STD lowerings during Cruises 7601, 7602, 7603, and 7611 where hydrographic casts were not made, a Nansen bottle was usually placed a few meters above the STD and another bottle was lowered to approximately 10 meters. During Cruise 7602, both down and up recordings from the STD were made on two separate DDL systems as well as analog traces for all lowerings.

Paired protected reversing thermometers were used on all Nansen bottle casts to determine temperatures which are recorded to hundredths of a degree Celsius. Sampling bottles used below a depth of 100 meters were equipped with unprotected thermometers for determination of depth of sampling.

Salinity samples were determined at sea using inductive-type salinometers. The salinity values are recorded to three decimal places.

Dissolved oxygen on Cruise 7602 was determined by the Winkler method as modified by Carpenter (1965), using the equipment and procedure outlined by Anderson (1971).

Silicate, nitrate and nitrite for Cruise 7602 were determined at sea using an automated analyzer. The procedures used are similar to those described in Atlas *et al.* (1971). Phosphate samples were determined using a Gilford modified DU spectrophotometer. Reactive phosphate was analyzed using the method of Murphy and Riley (1962), with the specific procedure outlined by Anderson (1971).

The observed data have been evaluated using the methodology described by Klein (1973). This involves consideration of their variation as functions of density or depth and their relations to each other, and comparisons with adjacent observations.

The STD data for Cruises 7601, 7604, and 7611 were processed by computer from the DDL recordings and appear to compare well with the hydrographic data. Although extra effort was made on Cruise 7603 to compare the STD recordings on two separate DDL instruments, the tabulated data were digitized from the analog traces and also

* The first two digits represent the year and the last digits the month of the cruise.

** Now the Oceanographic Data Facility (ODF).

appear to compare well with the hydrographic data.

TABULATED DATA

The reported hydrographic cast time is the Greenwich Mean Time (GMT) of the messenger release. Bottom depths, determined acoustically, have been corrected using Matthews (1939) tables and are reported in meters. Weather conditions have been coded using WMO code 4051.

Data tabulations are presented in the following forms:

1) Data from the sample bottle casts are tabulated with the observed levels of depth on the left of the page, and standard depth values of temperature, salinity and oxygen interpolated from these observations are on the right of the page. Additional computed values are also presented.

2) Data from the STD lowerings are presented with two stations printed side by side. Temperature and salinity are tabulated at closer standard intervals than the interpolated standard depth bottle data. Additional computed values are also presented.

3) Calibration of the AXBTs on Cruise 7611 required the data from the STD to be tabulated at approximately 10 meter intervals of depth. The additional computed values are tabulated for each depth.

4) Current meter speed and direction data were calculated over one-half-hour intervals. This report includes only the resultant speeds and directions for the entire record lengths.

The same parameters have been tabulated in this report as in previous reports. Cruises 7601 and 7602 have the CalCOFI station designations which have been in use for over thirty years. The first part specifies a line normal to the general trend of the coastline (CalCOFI line). The second part specifies a station position relative to the coast on the CalCOFI line. On some closely-spaced special inshore stations, an additional superscript number may appear after the line number or station number to indicate a finer resolution of the non-standard station location.

The column headings are to be interpreted as follows:

Z	Depth	Meters
T	Temperature	°C
S	Salinity	‰
O2	Dissolved Oxygen	ml/L
PO4	"Reactive" inorganic phosphate-phosphorous	µg at/L
SiO3	"Reactive" inorganic silicate-silicon	µg at/L
NO2	"Reactive" nitrite-nitrogen	µg at/L
NO3	"Reactive" nitrate-nitrogen	µg at/L
DT	δ_T Thermosteric anomaly	cl/ton
SIGT	$\sigma_t = (\rho_{s,t,0} - 1) 10^3$ where $\rho_{s,t,0}$ is the density the parcel of sea water would have if moved isothermally to the sea surface.	g/L
DD	Geopotential anomaly, referred to the sea surface.	dyn. meters

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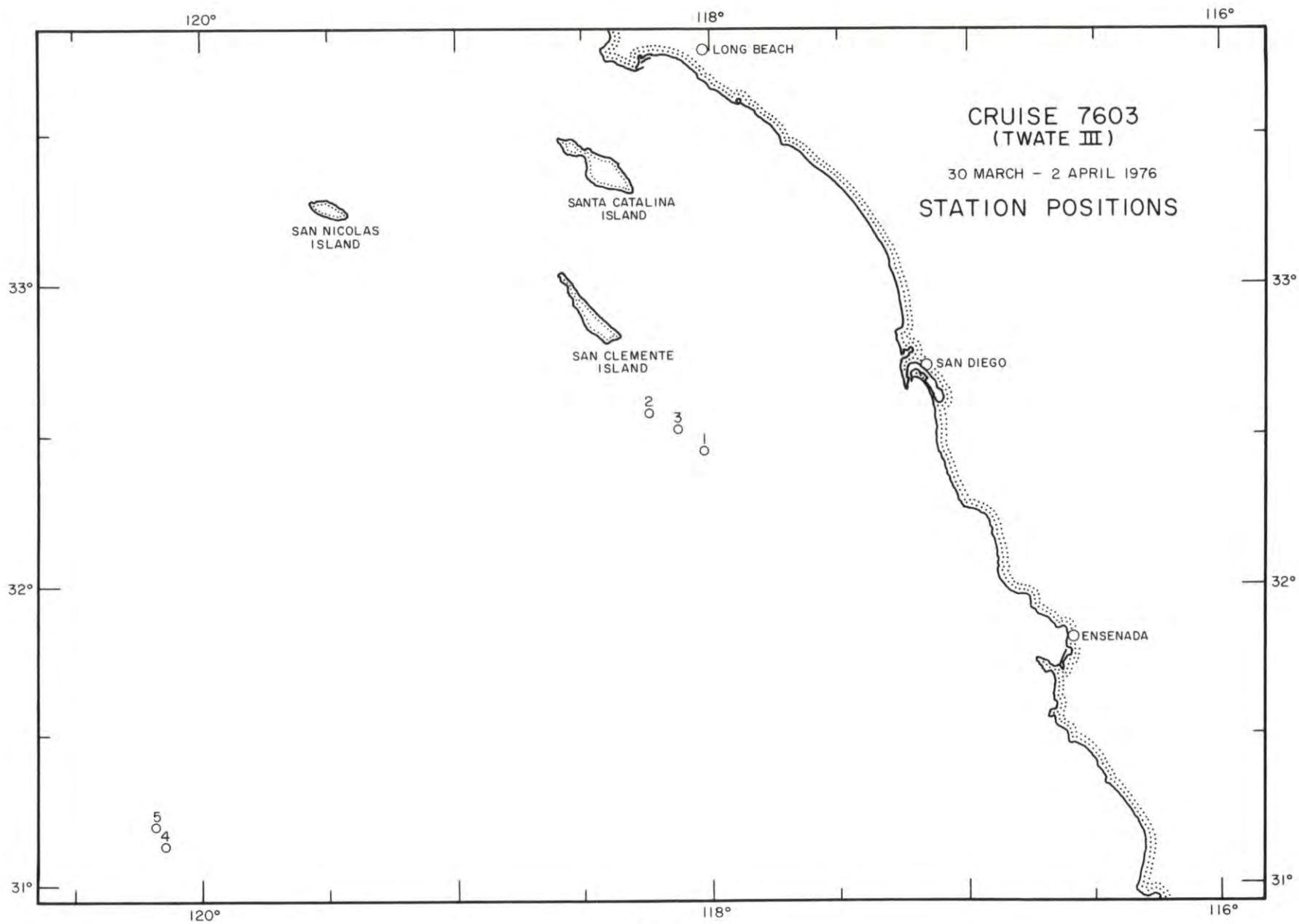


FIGURE 3

PERSONNEL

Cruise 7603

SHIP'S CAPTAIN

Davis, Laurence E., RV *Alexander Agassiz*

PERSONNEL PARTICIPATING IN THE COLLECTION OF DATA

Worcester, Peter F. (chief scientist)	Graduate Student, SIO
Butler, Robert A.	Electronics Technician, SIO
Head, Michael J.	Graduate Student, SIO
Pezzoli, Karen L.	Lab Assistant, SIO
McComas, C. Henry	Post Grad. Research Oceanographer, SIO
Morgan, Frederick C.	Engineering Aid, SIO
Munk, Walter H.	Associate Director, SIO
Parks, Gerald J.	Development Technician, SIO
Pezzoli, Glenn S.	Lab Associate, SIO
Powell, William J.	Electronics Technician, SIO
Rowe, Raymond A.	Marine Technician, SIO
Watson, Kenneth M.	Visiting Researcher,
Weller, Robert A.	Graduate Student, SIO

RV ALEXANDER AGASSIZ CRUISE 7603 STATION 1

LATITUDE		LONGITUDE		MO/DAY/YR	MESSENGER	TIME	BOTTOM	WIND	SPEED	WEATHER	DOMINANT WAVES				
32 26.8 N		118 1.6 W		03/30/76	0400 GMT		1756 M	350	04 KT	I	290 06				
Z	T	S	O2	PO4	SI03	NO2	NO3	DT	Z	T	S	O2	SIGT	DT	DD
0	15.1							305.4	0	15.1	33.62		24.908	305.4	0.000
10	14.99	33.622						303.0	10	14.99	33.622		24.933	303.0	0.030
30	14.74	33.614						298.4	20	14.86	33.618		24.957	300.7	0.061
59	11.40	33.602						236.1	30	14.74	33.614		24.981	298.4	0.091
89	10.24	33.735						206.8	50	12.51	33.586		25.415	257.2	0.146
118	9.73	33.862						189.2	75	10.60	33.669		25.832	217.5	0.206
148	9.25	33.994						171.9	100	10.01	33.784		26.022	199.4	0.259
172	8.85	34.058						161.1	125	9.62	33.896		26.175	184.9	0.307
196	8.53	34.091						154.0	150	9.22	34.001		26.323	170.9	0.353
221	8.34	34.127						148.5	200	8.50	34.098		26.511	153.1	0.435
245	8.00	34.144						142.4	250	8.00	34.157		26.633	141.5	0.511
269	8.01	34.198						138.5	300	7.86	34.251		26.727	132.5	0.582
293	7.98	34.247						134.5	400	6.80	34.268		26.891	117.0	0.712
318	7.53	34.254						127.7	500	6.11	34.301		27.008	105.9	0.830
342	7.32	34.264						124.1							
390	6.89	34.268						118.1							
439	6.48	34.272						112.6							
488	6.18	34.298						106.9							
537	5.91	34.310						102.8							

RV ALEXANDER AGASSIZ CRUISE 7603 STATION 2

LATITUDE		LONGITUDE		MO/DAY/YR	MESSENGER	TIME	BOTTOM	WIND	SPEED	WEATHER	DOMINANT WAVES				
32 34.1 N		118 14.6 W		03/31/76	1700 GMT		1664 M	320	18 KT	0	320 01 03				
Z	T	S	O2	PO4	SI03	NO2	NO3	DT	Z	T	S	O2	SIGT	DT	DD
0	15.1							305.4	0	15.1	33.62		24.908	305.4	0.000
10	15.03	33.620						304.0	10	15.03	33.620		24.923	304.0	0.030
30	14.37	33.584						293.1	20	14.81	33.607		24.961	300.4	0.061
59	11.59	33.534						244.4	30	14.37	33.584		25.037	293.1	0.090
89	10.31	33.711						209.7	50	12.49	33.531		25.377	260.8	0.146
118	9.79	33.848						191.2	75	10.76	33.619		25.765	223.9	0.207
148	9.30	33.977						174.0	100	10.07	33.767		25.999	201.7	0.261
172	8.94	34.044						163.5	125	9.67	33.881		26.155	186.9	0.310
196	8.71	34.116						154.7	150	9.27	33.983		26.301	173.0	0.356
221	8.46	34.132						149.9	200	8.67	34.120		26.502	153.9	0.439
245	8.23	34.184						142.7	250	8.15	34.186		26.634	141.4	0.515
269	7.85	34.188						137.0	300	7.57	34.204		26.733	132.0	0.585
294	7.66	34.206						133.0	400	6.64	34.232		26.885	117.6	0.716
318	7.32	34.201						128.8	500	6.05	34.294		27.011	105.6	0.834
342	7.20	34.229						125.1							
391	6.704	34.226						118.9							
440	6.399	34.265						112.1							
488	6.108	34.288						106.8							
537	5.854	34.313						101.9							

RV ALEXANDER AGASSIZ CRUISE 7603 STATION 3

LATITUDE		LONGITUDE		MO/DAY/YR	MESSENGER	TIME	BOTTOM	WIND	SPEED	WEATHER	DOMINANT WAVES				
32 31.1 N		118 7.5 W		03/31/76	2006 GMT		1867 M	310	18 KT	0	320 01 03				
Z	T	S	O2	PO4	SI03	NO2	NO3	DT	Z	T	S	O2	SIGT	DT	DD
0	15.1							305.4	0	15.1	33.62		24.908	305.4	0.000
35	13.05	33.578						267.8	10	15.03	33.620		24.923	304.0	0.030
84	10.32	33.720						209.2	20	14.81	33.607		24.961	300.4	0.061
133	9.21	33.991						171.6	30	14.37	33.584		25.037	293.1	0.090
230	8.31	34.208						142.1	50	12.49	33.531		25.377	260.8	0.146
328	7.45	34.263						125.9	75	10.76	33.619		25.765	223.9	0.207
425	6.55	34.264						114.1	100	9.81	33.841		26.100	192.1	0.259
523	5.93	34.307						103.3	125	9.30	33.968		26.283	174.7	0.306
621	5.40	34.356						93.4	150	8.99	34.051		26.398	163.8	0.349
719	5.00	34.392						86.2	200	8.49	34.174		26.572	147.3	0.428
816	4.66	34.420						80.5	250	8.13	34.228		26.669	138.1	0.502
914	4.37	34.446						75.5	300	7.70	34.259		26.758	129.6	0.571
1011	4.14	34.469						71.5	400	6.77	34.264		26.892	116.9	0.700
1109	3.82	34.494						66.4	500	6.06	34.295		27.010	105.7	0.817
1206	3.58	34.513						62.7	600	5.50	34.346		27.119	95.4	0.925
1304	3.36	34.532						59.3	700	5.07	34.386		27.203	87.5	1.024
1401	3.13	34.551						55.8	800	4.71	34.416		27.267	81.4	1.117
1498	2.92	34.565						52.9	1000	4.17	34.466		27.367	71.9	1.288
1643	2.70	34.584						49.6	1200	3.59	34.512		27.461	62.9	1.442
1783	2.620	34.592						48.3	1500	2.92	34.565		27.568	52.8	1.645
1788	2.617	34.594						48.2							

RV ALEXANDER AGASSIZ										CRUISE 7603				STATION 4		
LATITUDE		LONGITUDE		MO/DAY/YR		MESSENGER		TIME	BOTTOM	WIND	SPEED	WEATHER	DOMINANT WAVES			
31 7.7 N		120 9.0 W		04/01/76		2150 GMT			3832 M	340	19 KT	1	340 10 08			
Z	T	S	O2	PO4	SI03	NO2	NO3	DT	Z	T	S	O2	SIGT	DT	DD	
411	6.47	34.264						113.1	500	5.85	34.310		27.049	102.1	0.000	
455	6.15	34.294						106.9	600	5.24	34.339		27.146	92.8	0.104	
498	5.86	34.309						102.3	700	4.85	34.391		27.232	84.6	0.200	
542	5.60	34.326						97.9	800	4.55	34.431		27.298	78.4	0.289	
586	5.31	34.331						94.3	1000	3.91	34.491		27.412	67.6	0.453	
630	5.11	34.360						89.8	1200	3.40	34.529		27.494	59.8	0.598	
674	4.95	34.380						86.6	1500	2.80	34.574		27.584	51.3	0.793	
718	4.78	34.399						83.3	2000	2.07	34.630		27.691	41.2	1.071	
761	4.66	34.418						80.6	2250	1.88	34.646		27.718	38.6	1.194	
849	4.39	34.446						75.7	2500	1.78	34.654		27.733	37.2	1.312	
937	4.07	34.476						70.2	2750	1.69	34.665		27.749	35.7	1.428	
1024	3.86	34.495						66.7	3000	1.64	34.675		27.761	34.6	1.542	
1112	3.68	34.509						64.0	3250	1.60	34.679		27.767	34.0	1.654	
1199	3.40	34.529						59.9	3500	1.56	34.680		27.771	33.6	1.765	
1418	2.96	34.562						53.5								
1637	2.56	34.589						48.1								
2076	2.00	34.636						40.1								
2521	1.77	34.654						37.1								
2970	1.642	34.674						34.7								
3427	1.572	34.680						33.7								

RV ALEXANDER AGASSIZ										CRUISE 7603				STATION 5		
LATITUDE		LONGITUDE		MO/DAY/YR		MESSENGER		TIME	BOTTOM	WIND	SPEED	WEATHER	DOMINANT WAVES			
31 12.0 N		120 11.2 W		04/02/76		0217 GMT			3832 M	330	19 KT	1	340 08 08			
Z	T	S	O2	PO4	SI03	NO2	NO3	DT	Z	T	S	O2	SIGT	DT	DD	
0	14.0							285.3	0	14.0	33.59		25.119	285.3	0.000	
10	13.96	33.592						284.4	10	13.96	33.59		25.129	284.4	0.028	
30	13.95	33.593						284.1	20	13.95	33.59		25.130	284.2	0.057	
54	13.54	33.581						277.0	30	13.95	33.59		25.132	284.1	0.085	
68	11.94	33.544						249.9	50	13.61	33.58		25.194	278.2	0.142	
83	10.97	33.612						228.0	75	11.43	33.57		25.606	239.0	0.207	
97	10.25 A	33.692						210.1	100	10.14	33.71		25.943	207.0	0.263	
122	9.56	33.832						188.7	125	9.49	33.84		26.157	186.7	0.313	
146	9.07	33.92						174.7	150	9.01	33.93		26.301	173.0	0.359	
170	8.76	33.98						165.6	200	8.35	34.04		26.491	155.0	0.442	
204	8.30	34.05						153.7	250	7.80	34.12		26.633	141.5	0.518	
268	7.64	34.14						137.7	300	7.44	34.17		26.724	132.8	0.589	
361	7.04	34.21						124.4	400	6.62	34.24		26.896	116.6	0.719	
410	6.51	34.25						114.6	500	5.96	34.30		27.025	104.3	0.836	
459	6.20	34.28						108.5	600	5.29	34.34		27.139	93.5	0.941	
508	5.91	34.30						103.5	700	4.88	34.39		27.226	85.2	1.038	
557	5.63	34.32						98.7								
605	5.25	34.34						92.9								
654	5.02	34.35						89.6								
702	4.876	34.39						85.0								
751	4.70	34.41						81.6								

A) ALTERNATE TEMPERATURE VALUE, 10.57 DEGREES CELSIUS.

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