

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

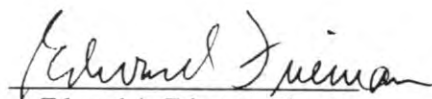
CRUISE 7603 (TWATE III)
30 March-2 April 1976

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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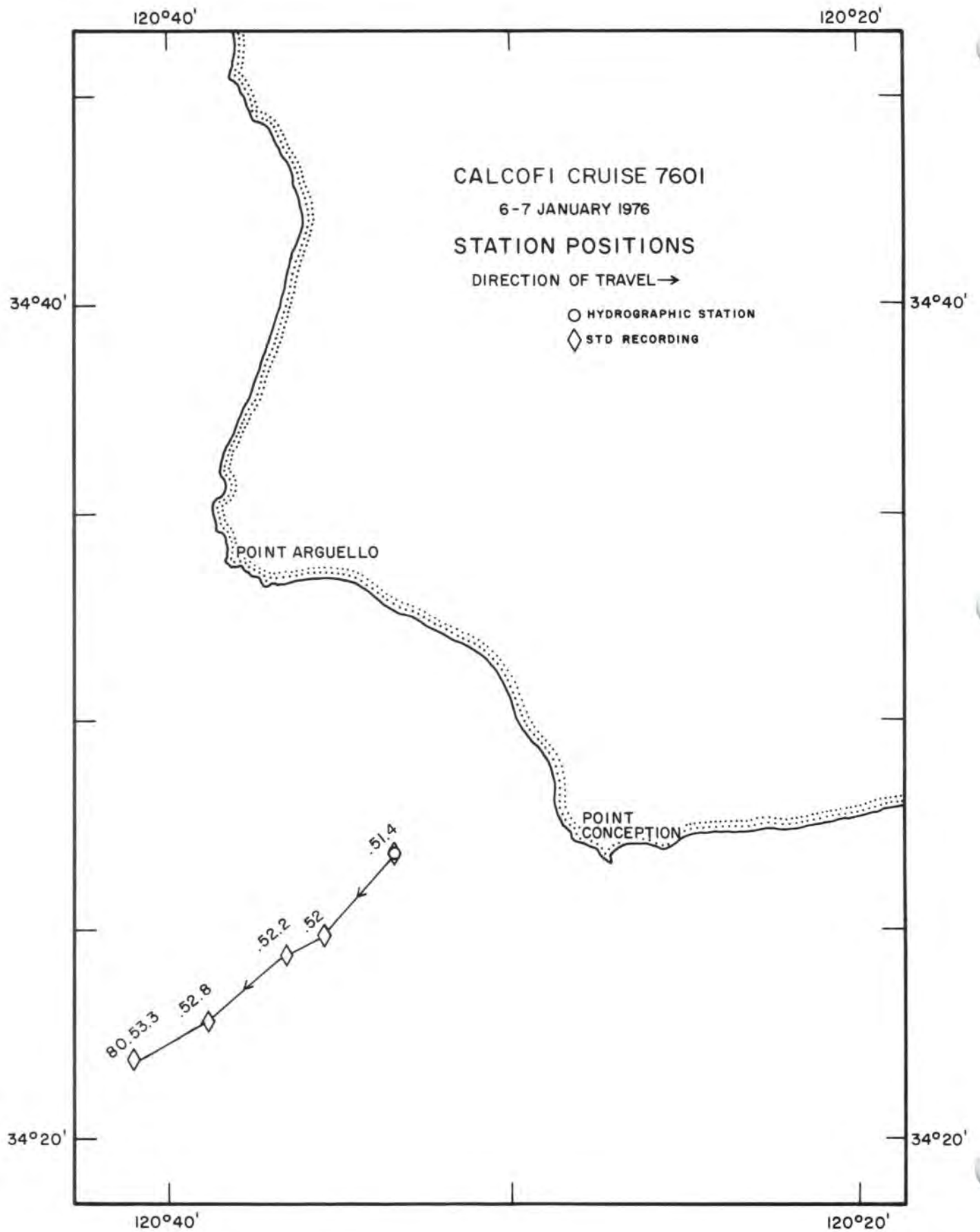


FIGURE 1

PERSONNEL

CalCOFI Cruise 7601

SHIP'S CAPTAIN

Davis, Laurence E., RV *Alexander Agassiz*

PERSONNEL PARTICIPATING IN THE COLLECTION OF DATA

Muus, David A. Staff Research Associate, SIO
 (in charge)
 Singleton, James R. Electronics Technician, SIO

CURRENT METER DATA

No.	Latitude °N	Longitude °W	Between Stations	Corrected Sounding (m)	Meters off Bottom	Start Date	Total Hours	Mean Vector Direction (°T)	Speed (cm/s)
1-E	34°25.5	120°34.5	80 51.4-80 52.0	150	50	15 Nov. '75	366	334	2.4
2-D	34°24.6	120°35.8	80 52.0-80 52.2	239	50	15 Nov. '75	518	353	1.3
3-C	34°23.6	120°37.2	80 52.2-80 52.8	347	50	15 Nov. '75	551	110	0.6
4-B	34°22.9	120°39.2	80 52.8-80 53.3	465	50	15 Nov. '75	528	107	5.3

LATITUDE		LONGITUDE		MO/DAY/YR		MESSENGER TIME		BOTTOM		WIND SPEED		WEATHER		DOMINANT WAVES	
34 26.8 N		120 33.5 W		01/06/76		1534 GMT		104 M		340 23 KT		1		340 05 06	
Z	T	S	O2	PO4	SI03	NO2	NO3	DT	Z	T	S	O2	SIGT	DT	DD
0	12.12	33.607						248.5	0	12.12	33.607		25.506	248.5	0.000
5	12.12	33.604						248.7	10	12.12	33.604		25.504	248.8	0.025
15	12.12	33.603						248.8	20	12.11	33.605		25.506	248.5	0.050
25	12.10	33.606						248.2	30	11.91	33.608		25.546	244.7	0.074
36	11.66	33.610						240.1	50	11.56	33.622		25.621	237.6	0.123
58	11.51	33.628						236.1	75	10.65	33.686		25.836	217.2	0.180
69	10.78	33.670						220.5							
80	10.54	33.699						214.4							

STATION 80 51.4

RV ALEXANDER AGASSIZ

CALCOFI CRUISE 7601

STATION 80 51.4

LATITUDE		LONGITUDE		MO/DAY/YR		START TIME		BOTTOM		LATITUDE		LONGITUDE		MO/DAY/YR		START TIME		BOTTOM	
34 26.8 N		120 33.5 W		01/06/76		1520 GMT		104 M		34 26.8 N		120 33.5 W		01/06/76		1545 GMT		104 M	
WIND	SPEED	WAVES		WEA	BAROMETER		DRY	WET	CLOUDS	WIND	SPEED	WAVES		WEA	BAROMETER		DRY	WET	CLOUDS
340	23 KT	340 05 06		1	1026	MB	12.1 C	9.5 C	1/8 CI										
Z	T	S	SIGT		DT	DD	Z	T	S	SIGT		DT	DD						
0	12.11	33.61	25.511		248.1	0.000	0	12.11	33.61	25.511		248.1	0.000						
10	12.11	33.61	25.511		248.1	0.025	10	12.10	33.61	25.512		247.9	0.025						
20	12.11	33.61	25.511		248.1	0.050	20	12.11	33.61	25.511		248.1	0.050						
30	12.05	33.60	25.514		247.7	0.075	30	12.01	33.61	25.529		246.3	0.074						
40	11.65	33.61	25.597		239.9	0.099	40	11.69	33.61	25.589		240.6	0.099						
50	11.58	33.62	25.617		237.9	0.123	50	11.65	33.62	25.605		239.2	0.123						
75	10.60	33.70	25.856		215.3	0.180	75	10.66	33.69	25.838		217.0	0.180						
81	10.49	33.71	25.883		212.7	0.193	83	10.52	33.71	25.878		213.2	0.198						

STATION 80 52

RV ALEXANDER AGASSIZ

CALCOFI CRUISE 7601

STATION 80 52

LATITUDE		LONGITUDE		MO/DAY/YR		START TIME		BOTTOM		LATITUDE		LONGITUDE		MO/DAY/YR		START TIME		BOTTOM	
34 24.8 N		120 35.5 W		01/06/76		1705 GMT		209 M		34 24.8 N		120 35.5 W		01/06/76		1735 GMT		209 M	
WIND	SPEED	WAVES		WEA	BAROMETER		DRY	WET	CLOUDS	WIND	SPEED	WAVES		WEA	BAROMETER		DRY	WET	CLOUDS
340	23 KT	340 06 06		1	1027	MB	11.9 C	9.4 C	2/8 CI										
Z	T	S	SIGT		DT	DD	Z	T	S	SIGT		DT	DD						
0	12.14	33.61	25.505		248.6	0.000	0	12.16	33.61	25.501		249.0	0.000						
10	12.14	33.61	25.505		248.6	0.025	10	12.15	33.61	25.503		248.8	0.025						
20	12.15	33.62	25.511		248.1	0.050	20	12.15	33.61	25.503		248.8	0.050						
30	12.14	33.61	25.505		248.6	0.075	30	12.14	33.61	25.505		248.6	0.075						
40	12.12	33.61	25.509		248.3	0.100	40	12.04	33.61	25.524		246.8	0.100						
50	12.07	33.61	25.518		247.4	0.124	50	11.25	33.63	25.686		231.4	0.124						
75	10.51	33.70	25.872		213.8	0.182	75	10.33	33.72	25.918		209.4	0.179						
100	10.02	33.78	26.018		199.9	0.235	100	9.97	33.79	26.034		198.4	0.230						
125	9.54	33.87	26.168		185.6	0.283	125	9.60	33.87	26.158		186.6	0.279						
150	9.06	33.94	26.300		173.1	0.329	150	9.27	33.92	26.251		177.7	0.325						
175	7.89	34.11	26.613		143.4	0.369	175	8.17	34.07	26.540		150.3	0.367						
179	7.86	34.12	26.625		142.2	0.375	179	8.15	34.08	26.551		149.3	0.373						

STATION 80 52.2

RV ALEXANDER AGASSIZ

CALCOFI CRUISE 7601

STATION 80 52.8

LATITUDE		LONGITUDE		MO/DAY/YR		START TIME		BOTTOM		LATITUDE		LONGITUDE		MO/DAY/YR		START TIME		BOTTOM	
34 24.4 N		120 36.5 W		01/06/76		1853 GMT		306 M		34 22.8 N		120 38.7 W		01/06/76		2127 GMT		417 M	
WIND	SPEED	WAVES		WEA	BAROMETER		DRY	WET	CLOUDS	WIND	SPEED	WAVES		WEA	BAROMETER		DRY	WET	CLOUDS
330	22 KT	340 07 06		1	1028	MB	11.7 C	9.5 C	2/8 CI	330	25 KT	340 07 06		0	1026	MB	10.8 C	9.8 C	0/8
Z	T	S	SIGT		DT	DD	Z	T	S	SIGT		DT	DD						
0	12.10	33.61	25.512		247.9	0.000	0	12.20	33.62	25.501		249.0	0.000						
10	12.10	33.61	25.512		247.9	0.025	10	12.19	33.62	25.503		248.8	0.025						
20	12.10	33.61	25.512		247.9	0.050	20	12.18	33.61	25.497		249.4	0.050						
30	12.08	33.61	25.516		247.5	0.074	30	12.15	33.62	25.511		248.1	0.075						
40	12.08	33.61	25.516		247.5	0.099	40	11.56	33.62	25.621		237.6	0.099						
50	12.04	33.61	25.524		246.8	0.124	50	10.99	33.64	25.740		226.3	0.122						
75	10.60	33.68	25.840		216.7	0.182	75	10.54	33.68	25.851		215.8	0.178						
100	10.22	33.74	25.953		206.1	0.236	100	10.11	33.76	25.987		202.8	0.231						
125	9.42	33.92	26.227		180.1	0.285	125	9.40	33.90	26.214		181.2	0.279						
150	9.08	33.95	26.305		172.6	0.329	150	9.10	33.97	26.317		171.4	0.324						
175	8.55	34.03	26.451		158.8	0.371	175	8.56	33.98	26.410		162.6	0.367						
200	8.00	34.08	26.573		147.2	0.411	200	8.38	34.06	26.500		154.1	0.407						
225	7.96	34.10	26.595		145.1	0.448	225	8.02	34.10	26.586		145.9	0.446						
250	7.77	34.13	26.646		140.2	0.485	250	7.92	34.12	26.616		143.1	0.483						
273	7.53	34.16	26.705		134.7	0.517	275	7.58	34.15	26.690		136.1	0.519						
							300	7.36	34.16	26.729		132.4	0.553						
							325	7.25	34.17	26.752		130.2	0.587						
							350	7.16	34.18	26.773		128.2	0.621						
							371	7.14	34.18	26.775		128.0	0.649						

STATION 80 52.8

RV ALEXANDER AGASSIZ

CALCOFI CRUISE 7601

STATION 80 53.3

LATITUDE LONGITUDE MO/DAY/YR START TIME BOTTOM
 34 22.8 N 120 38.7 W 01/06/76 2155 GMT 417 M

LATITUDE LONGITUDE MO/DAY/YR START TIME BOTTOM
 34 22.0 N 120 40.8 W 01/07/76 0215 GMT 507 M

WIND SPEED WAVES WEA BAROMETER DRY WET CLOUDS

WIND SPEED WAVES WEA BAROMETER DRY WET CLOUDS
 330 27 KT 330 08 06 0 1026 MB 11.2 C 10.0 C 0/8

Z	T	S	SIGT	DT	DD
0	12.17	33.60	25.491	249.9	0.000
10	12.17	33.61	25.499	249.2	0.025
20	12.17	33.61	25.499	249.2	0.050
30	12.18	33.61	25.497	249.4	0.075
40	12.12	33.61	25.509	248.3	0.100
50	11.03	33.64	25.733	226.9	0.124
75	10.72	33.65	25.796	221.0	0.180
100	10.10	33.76	25.989	202.7	0.233
125	9.51	33.89	26.188	183.7	0.282
150	9.11	33.96	26.308	172.3	0.328
175	8.43	34.03	26.469	157.0	0.369
200	8.19	34.08	26.545	149.9	0.409
225	7.99	34.10	26.590	145.5	0.446
250	7.67	34.14	26.669	138.1	0.483
275	7.46	34.16	26.715	133.7	0.518
300	7.31	34.16	26.736	131.7	0.552
325	7.24	34.17	26.754	130.0	0.586
350	7.14	34.18	26.775	128.0	0.620
375	7.04	34.18	26.789	126.7	0.653
381	7.04	34.19	26.797	125.9	0.661

Z	T	S	SIGT	DT	DD
0	12.15	33.62	25.511	248.1	0.000
10	12.15	33.62	25.511	248.1	0.025
20	12.15	33.62	25.511	248.1	0.050
30	12.15	33.62	25.511	248.1	0.075
40	12.15	33.62	25.511	248.1	0.099
50	11.78	33.64	25.596	240.0	0.124
75	10.87	33.71	25.816	219.1	0.182
100	10.39	33.74	25.923	208.9	0.236
125	9.56	33.88	26.172	185.2	0.285
150	8.94	33.97	26.343	169.0	0.330
175	8.45	34.05	26.482	155.8	0.372
200	8.34	34.07	26.514	152.8	0.411
225	7.92	34.13	26.624	142.3	0.449
250	7.77	34.14	26.654	139.5	0.485
275	7.56	34.14	26.685	136.6	0.521
300	7.39	34.16	26.725	132.8	0.556
325	7.24	34.17	26.754	130.0	0.590
350	7.06	34.19	26.794	126.2	0.623
375	6.84	34.20	26.832	122.6	0.656
400	6.54	34.22	26.889	117.2	0.687
425	6.53	34.22	26.890	117.1	0.718
450	6.37	34.23	26.919	114.4	0.748
469	6.04	34.26	26.985	108.1	0.771