UNIVERSITY OF CALIFORNIA

SCRIPPS INSTITUTION OF OCEANOGRAPHY

PHYSICAL AND CHEMICAL DATA

CalCOFI Cruise 7712
29 November - 20 December 1977

CalCOFI Cruise 7801
5 January - 1 February 1978

CalCOFI Cruise 7803
17 February - 15 March 1978

CalCOFI Cruise 7804
29 March - 26 April 1978

CRUCERO AH-7712, JD-7712
29 de noviembre-20 de diciembre 1977

CRUCERO AH-7801, JD-7801
5 de enero-1 de febrero 1978

CRUCERO AH-7803, JD-7803
17 de febrero-15 de marzo 1978

CRUCERO AH-7804, JD-7804
29 de marzo-26 de abril 1978

Sponsored by

Marine Research Committee

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W. A. Nierenberg, Director

CONTENTS

INTRODUCTION

The data in this report were collected during Cruises 7712*, 7801, 7803, and 7804 of the California Cooperative Oceanic Fisheries and Investigations (CalCOFI) program aboard the RV David Starr Jordan, National Marine Fisheries Service, and the RV Alejandro de Humboldt Instituto Nacional de Pesca of the Mexican Federal Government. The report preceding this one in the series was SIO Ref. 80-21 which included data for 1972.

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, the Southwest Fisheries Center, National Marine Fisheries Service (NMFS), and the Instituto Nacional de Pesca (INP), various branches.

STANDARD PROCEDURES

Hydrographic Cast Data

Most of the hydrographic casts consisted of 18 Nansen bottles. At most stations the maximum sampling depth was 500 meters, bottom depth permitting. Temperature, salinity, oxygen, and nutrients were determined for all depths on each station.

At selected stations 10 meter bottles were cast with samples being taken for temperature, salinity, oxygen, and nutrients.

In general, paired protected reversing thermometers were used to determine temperatures which were recorded in hundredths of a Celsius degree. Unless otherwise noted, temperatures determined using unprotected (pressure) thermometers or surface "bucket" thermometers were recorded to tenths of a degree. Sample bottles used below 100 meters were equipped with unprotected thermometers for depth determination.

Salinity values on both ships for all cruises included, were determined using models 6220 and 6230 Hytech (now Grundy Environmental Systems, Inc.) inductive salinometers. A very few samples collected on the Humboldt during 7804 were analyzed on an

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

** Now the Physical and Chemical Oceanographic Data Facility (PACODF).

INTRODUCCION

Los datos de este informe fueron obtenidos durante los cruceros 7712*, 7801, 7803, y 7804 realizados dentro del programa de cooperación científico-técnico entre CalCOFI (California Cooperative Oceanic Fisheries Investigations) y el Instituto Nacional de Pesca del Departamento de Pesca** de México, a bordo del B/I David Starr Jordan, del National Marine Fisheries Service de los Estados Unidos y el B/I Alejandro de Humboldt, del Departamento de Pesca, México. El informe precedente a éste en la serie era el SIO Ref. 80-21, que incluye datos para 1972.

Estos datos fueron colectados y procesados por el personal del Data Collection and Processing Group del Marine Life Research Group (DCPG***, MLRG) del Scripps Institution of Oceanography, y por el personal del Southwest Fisheries Center del National Marine Fisheries Service (NMFS), y del Instituto Nacional de la Pesca (INP) del Departamento de Pesca.

METODOS

Obtención de Datos Hidrográficos

El mayor número de lances realizados se efectuaron con 18 botellas, muestreándose la mayoría de las estaciones hasta una profundidad máxima de 500 metros, cuando la profundidad lo permitía. Se determinó en todas las profundidades de cada estación temperatura, salinidad, oxígeno, y nutrientes. Se seleccionaron también estaciones para el muestreo a 10 metros de profundidad, para la toma de estos datos.

Para determinar temperatura se utilizaron por lo general termómetros de inversión dobles, registrándose ésta en grados centígrados, con aproximación centesímos. La temperatura superficial se determinó empleando termómetros de cubeta no protegidos, registrándola en décimas de grados. Para profundidades mayores de 100 metros se equiparon con termómetros no protegidos.

La salinidad fue determinada utilizando salinómetros de inducción modelos 6220 y 6230 Hytech (ahora Grundy Environmental Systems, Inc.). Algunas pocas muestras colectadas en el Humboldt durante 7804

* Los primeros dos dígitos representan el año y los dos que siguen, el mes en que se efectuó el crucero.

** Ahora llamado la Secretaría de Pesca.

*** Ahora llamado Physical and Chemical Oceanographic Data Facility (PACODF).

Autolab inductive salinometer. Except for a few major malfunctions when salinometers could no longer be used, problems consisted of bubbles in the cells, excessive drift (samples were rerun) and stirring motor breakdowns. With the exception of a few 10 meter samples, all samples were analyzed at sea.

The salinity values were recorded and reported to three decimal places, provided accepted standards were met. If only one determination per sample was obtained, or there was doubt concerning the accuracy of the analytical results, the salinities were reported to two decimal places.

Dissolved oxygen was determined by the Winkler method as modified by Carpenter (1965), using the equipment and procedure outlined by Anderson (1971). On Cruise 7804-J, problems associated with equipment malfunctions and at times poor pickling procedures resulted in unreliable data. Data for these stations have been omitted.

Phosphate, silicate, nitrite, and nitrate were determined using an automated analyzer consisting of the following components:

Sampler: A.H. Thomas Model 253 Little with a 20 position sampling rack.

Proportioning Pump: Technicon^{R} AutoAnalyzer^{R} II Proportioning Pump with air bar.

Detectors: Hitachi Model 100-10 spectophotometers with flow through cell adaptors.

Recorders: Hitachi Model 056 two-pen recorders with felt tip pens.

The procedures used are basically those described in Atlas et al. (1971). There were very few problems associated with the silicate and nitrate analyses. In general, these data were processed in a routine manner. Nitrite tend to vary between poor and very poor after the first week of each cruise depending on whether or not contamination occurred when the sample bottles were not routinely cleaned with hydrochloric acid. When contamination was evident, the typically "high" nitrite values were omitted for the station and the tabulated nitrate value is nitrate plus nitrite. This tabulated value is probably closer to the correct value than had a correction with the "high" nitrite been made.

se analizaron con un salinómetro de inducción Autolab. Excepto por algunos malos funcionamientos en que ya se podían utilizar los salinómetros, problemas consistían de la formación de burbujas en las celdas, excesivas partículas y mal funcionamiento del motor (estos mustreos se hicieron de nuevo). Con la excepción de algunas muestras de 10 metros, todas fueron analizadas a bordo.

Los valores de salinidad se registraron y se reportaron en milésimas de aproximación, de acuerdo con el procedimiento estándar aceptado. Cuando sólo se realizó una determinación por muestra ó había una duda respecto a la confiabilidad de los datos, la salinidad se reportó en centésimos.

El oxígeno disuelto fue determinado por el método Winkler modificado por Carpenter (1965) usando el equipo y procedimientos descritos por Anderson (1971). En el crucero 7804-J, problemas asociados con malos funcionamientos de equipo y malos métodos de fijación resultaron en datos desconfiables. Los datos para estas estaciones han sido suprimidos.

Fosfato, silicato, nitrito, y nitrato, se determinaron con la ayuda del analizador automático con las siguientes especificaciones:

Muestredor: A.H. Thomas Modelo 253 Little Dipper con una roseta muestreadora con 20 posiciones.

Bomba abastecedora: Technicon^{R} AutoAnalyzer^{R} II Bomba Abastecedora con barra de aire.

Sensores: Hitachi Modelo 100-10 espectrofotómetros con adaptadores que permiten el flujo libre por las celdas.

Registradores: Hitachi Modelo 056 dos registradores que consisten de plumas con puntas de fieltro.

Los procedimientos usados son básicamente los descritos en Atlas et al. (1971). Los silicatos y nitratos fueron procesados con poca dificultad y de manera rutinaria. Las muestras para determinar nitritos fueron contaminados en varios de los cruceros. Los nitritos tendían a variarse, siendo entre malos y muy malos, después de las primeras semanas de cada crucero,

Phosphate data are less reliable than the other measurements due to a number of problems including: poor sensitivity, poorly defined peaks, a serious memory effect and a very slow response time. Temperature control at the elevated temperature required for the analysis were also a problem at times. The initially calculated phosphate values were often unreasonable. Adjustments were made based on two factors: one expedition phosphate data show that there is very little phosphate variation at a depth of 500 meters (approx. 2.8 to 3.1 μg-at/L) and two, a plot of phospate vs. nitrate is essentially linear and constant, and the cruise nitrates are believed to be acceptable. The phosphate factors and baselines were adjusted to bring the phosphate results into reasonable agreement with the historical 500 m phosphate range and the phosphate-nitrate relationship.

The observed data have been evaluated using standard DCPG techniques (Klein, 1973). This involves consideration of their variation as functions of density or depth and their relations to each other, and comparison with concurrent bathythermogram (BT or XBT) or CTDO observations and with previous or adjacent observations.

In general, chlorophyll samples were collected from the first 12 levels of 18 bottle casts or all levels of shallow casts. However, during cruises 7712-J and 7801-J, samples were typically taken from only 7 of the top 12 levels.

Chlorophyll samples were analyzed on all cruises by fluorometer using one of two techniques: 7712-H, the technique of Yentsch and Menzel (1963); on all other cruises, the technique of Owen (1974). On 7801-H, both fluorometers became inoperable shortly after the cruise was started. As a result, data for about five stations have been lost. The remainder of the samples were filtered; the filters were frozen and returned to the lab for subsequent analysis. A comparison of frozen versus non-frozen samples (Owen, 1978, verbal communications) would suggest that samples from frozen filters could be low by as much as 25%.

Secchi disk observations were made on most stations occurring between 0900 and 1600 Pacific Standard Time (PST, +8) for all cruises except 7712-H. These data are tabulated following the chlorophyll data.

Tritium samples were collected on the Jordan during Cruises 7801 and 7804 at selected stations. Additional samples were taken on subsequent cruises. All tritium results may appear in a later report.

Data collected with an in situ Conductivity/Temperature/Depth/Oxygen recorder (CTDO) during the cruises in this report will appear in a separate report.

dependiendo de si la contaminación ocurrío cuando las botellas muestreadoras no fueron limpiadas rutinamente con ácido hidroclórico. Cuando la contaminación era muy evidente, los valores típicamente "altos" de nitrito eran suprimidos para aquella estación y el valor tabulado de nitrato es probablemente más cercano al valor correcto que si le hubiera hecho una corrección con el valor "alto" del nitrito.

Los datos de fosfatos son menos confiables que las otras medidas debido a una serie de problemas que incluyen lo siguiente: mala sensibilidad, picos mal definidos, un serio efecto de memoria, y un lento tiempo de respuesta. El mantenimiento de la temperatura a la temperatura elevada requerida por el análisis también resultó problemático a veces. Los valores de fosfatos que se calculaban inicialmente eran a menudo irrazonables. Se hicieron ajustes, basándose en dos factores: datos de fosfato de expedición muestran que hay muy poca variación de fosfato a una profundidad de 500 metros (approx. 2.8 a 3.1μg-at/L) y, un diagrama de fosfato contra nitrato es escencialmente linear y constante, y se cree que los nitratos de los cruceros son aceptables. Los factores de fosfato y las líneas de base fueron ajustados para que estuvieran los resultados de fosfato de acuerdo con el rango fosfático histórico de 500 metros y la relación fosfato-nitrato.

Los datos observados fueron evaluados usando las técnicas estándares del Data Collection and Processing Group (DCPG) (Klein, 1973). Estas técnicas consideran sus variaciones en función de la densidad ó profundidad y las relaciones de una con otra y en comparación con batitermogramas simultáneos (BT ó XBT) ó con CTDO, así como con observaciones previas.

En general las muestras fueron colectadas de los primeros 12 niveles de un lance de 18 botellas ó de todos los niveles en los muestreos realizados a poca profundidad, excepto durante los cruceros 7712-J y 7801-J donde las muestras fueron tomadas de los 7 primeros niveles.

Las muestras de clorofila en todos los cruceros se analizaron por fluorometría utilizando una u otra de las siguientes técnicas: Para el crucero 7712-H se utilizó la técnica de Yentsch y Menzel (1963) y para todos los demás la técnica de Owen (1974), excepto el crucero 7801-H en el cual ambos fluorómetros estuvieron fuera de operación poco después de iniciado el crucero. Como resultado se perdieron datos de 5 estaciones. Las muestras restantes fueron filtradas; los filtros se congelaron y fueron enviados al laboratorio para el análisis subsecuente. Una comparación entre las muestras congeladas y las no congeladas (Owen, comunicación personal, 1978), sugeriría que las

Starting with Cruise 7712, the standard CalCOFI oblique tow, 300 meters of wire out, depth permitting, was made with an open Bongo frame with a 505 μ net on the starboard side and a 333 μ net on the port side. Starboard samples were preserved in formalin; port samples were preserved in an alcohol solution for otolith studies.

Periodically a heretofore standard 1 m CalCOFI tow was taken in order to extend the comparisons between the Bongo and 1-m net tows made during the 1975 CalCOFI cruises.

Manta (neuston) surface tows were made on all net-tow stations, weather conditions permitting, and on selected stations vertical phytoplankton tows were made to a depth of 100 m (depth permitting).

TABULATED DATA

The time for bottle casts is reported in Greenwich Mean Time. It is the time of messenger releases. Secchi disk observations are reported in local time (PST).

When more than one cast was lowered on a station, the messenger times for the first and last casts are given. Multiple casts, excluding the surface casts, are indicated by a footnote letter following the observed depth.

Bottom depths, determined acoustically, have been corrected using Mathews (1939) tables and are reported in meters. On the Humboldt, the echo sounding units had a rated maximum sounding range of 1000 meters. Depths greater than this are from the navigational charts, and after conversion to meters have been listed to the nearest five meters. The weather and dominant waves are coded using the National Oceanographic Data Center (NODC) method.

Data for all cruises presented in this report were obtained by bottle casts or from separate lowerings to obtain the Secchi disk data. The data appear in two forms:

1. Data from the sample bottle casts are tabulated with the observed levels of depth on the left of a page, and standard depth values of temperature, salinity, and oxygen interpolated from these observations on the right. Computed values of thermosteric anomaly (DT) are included with the observed levels and computed values of sigma-t (SIGT), thermosteric anomaly (DT), and geopotential anomaly (DD) are included with the interpolated levels.

muestras de filtros congelados podían resultar con una desviación del 25%.

Las observaciones con disco Secchi se efectuaron en todas las estaciones realizadas entre las 0900 y las 1600 horas tiempo del Pacífico (PST) para todos los cruceros, excepto para el 7712-H. Estos datos son tabulados por separado y siguen a los datos de clorofila.

Durante 7801-J y 7804-J se tomaron muestras de tritio en estaciones selectas. Adicionalmente se tomaron muestras en cruceros subsecuentes. Los resultados de estos datos serán reportados posteriormente en un informe por separado.

Iniciándose con el crucero 7712 se hizo un arrastre oblicuo estándar de CalCOFI, cuando ésto fuera permitido por una profundidad equivalente a un filar de 300 metros de cable. Se hizo con un marco abierto Bongo con una red de 505μ en el lado estribor y una red de 333μ en el lado babor. Las muestras del lado babor fueron preservados en una solución de alcohol para estudios de otolitos.

Periódicamente los arrastres CalCOFI de 1 metro que eran estándares hasta la fecha se hicieron para poder extender las comparaciones que se hicieron durante los cruceros CalCOFI de 1975.

También se hicieron arrastres superficiales Manta (neuston) y en estaciones selectas se hicieron arrastres verticales de fitoplancton hasta una profundidad de 100 metros (si la profundidad lo permitía).

DATOS TABULADOS

El tiempo registrado para los lances de botella fue el tiempo del meridiano de Greenwich. Es la hora del envío del mensajero. Las observaciones del disco de Secchi son registradas en tiempo local (hora del Pacífico).

Cuando se realizó más de un lance por estación se anota la hora del envío del primer mensajero y del último. Multiples lances, excluyendo a lances superficiales, se señalan con una letra al calce después de la profundidad observada.

Cuando la profundidad del fondo se determinó acústicamente, fue corregida utilizando las tablas de Matthews (1939), registrándola en metros. En el B/I Humboldt, las profundidades mayores de 1000 metros no fueron registradas por la ecosonda, así que éstas se obtuvieron de cartas de navegación y después de ser convertidas a metros, fueron listadas con aproximación a cinco metros. El tiempo y oleaje dominante se codificaron usando el método del National Oceanographic Data Center (NODC).

2. Chlorophyll, phaeophytin and Secchi disk data appear as separate sections.

With the addition of chlorophyll-a, phaeophytin and Secchi disk observations, the same parameters have been tabulated in this report as in previous reports. The decimal has been omitted from the CalCOFI station number so station 90.65 appears in the tabulated data as 90065. [The CalCOFI station designations have been in use for over twenty years. Th first part specifies a line normal to the general trend of the coast line (CalCOFI line). The second part specifies a station position relative to the coast on the CalCOFI line.] The column headings are to be interpreted as follows:

Z	Depth	Meters
T	Temperature	^{o}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" nitrate-nitrogen	μg-at/L
NO3	"Reactive" nitrate-nitrogen	μg-at/L
DT	δ_T = Thermosteric anomaly	cl/ton
SIGT	$\sigma_T = (\rho_{s,t,o} - 1)10^3$ where $\rho_{s,t,o}$ is is the density the parcel would have if moved isothermally to the sea surface.	g/L
DD	Geopotential anomaly, referred to the sea surface.	dyn. meters
CHL.A	Chlorophyll-a	mg/m^3
PHAEO	Phaeophytin	mg/m^3

Durante el crucero 7801-H, la parte que registra velocidad en el anemómetro del barco se descompuso después de la estación 103.45. Por ésto, se empezó con la estación 103.40, y se estimó la velocidad del viento basada en el oleaje causado por el viento. Estos datos deben ser considerados menos fiables que lo normal.

Los datos de todos los cruceros presentados en este informe se obtuvieron de lances con botellas ó de bajadas separadas para obtener los datos del disco Secchi. Estos datos se registran en dos formas:

1. Los datos provenientes de lances con botellas y tabulados en niveles de profundidad se ubicaron al margen izquierdo de la página y los valores de profundidades estándares correspondientes a temperatura, salinidad, oxígeno, interpolados de estas observaciones, al lado derecho. Valores computados de la anomalía termostérica (DT) se incluyen con los niveles observados, y los valores computados de sigma-t (SIGT), anomalía termostérica (DT), y anomalía geopotencial (DD) se incluyen con los niveles interpolados.

2. Clorofila, feofitina, y datos del disco Secchi aparecen en una sección separada.

Con la adición de clorofila-a, feofitina, y observaciones del disco Secchi, los mismos parámetros son tabulados en este informe como en reportes previos. El punto decimal de las estaciones de CalCOFI se omitió, así que los datos de la estación número 90.65 se registran como 90065. [Las designaciones de estaciones CalCOFI han estado en uso durante más de veinte años. La primera parte especifica una línea normal a la tendencia general de la costa (Línea CalCOFI). La segunda parte especifica la posición de una estación relativo a la costa en la línea CalCOFI.] Los símbolos del encabezado de las columnas se deben interpretar de la siguiente manera:

Z	Profundidad	Metros
T	Temperatura	^{o}C
S	Salinidad	‰
O2	Oxígeno	ml/L
PO4	Fosfato-fósforo inorgánico "reactivo"	μg-at/L
SIO3	Silicato-Silicio inorgánico "reactivo"	μg-at/L
NO2	Nitrito-nitrógeno "reactivo"	μg-at/L
NO3	Nitrito-nitrógeno "reactivo"	μg-at/L
DT	δ_T = Anomalía termostérica	cl/ton.
SIGT	σ_T $(\rho_{s,t,0} - 1)10^3$ donde $\rho_{s,t,0}$ es la densidad que tendría la parcela si ésta se moviera isotérmicamente hasta la superficie del mar.	g/L
DD	Anomalía geopotencial, referida a la superficie del mar.	metros din.
CHL.A	Clorofila-a	mg/m^3
PHAEO	Feofitina	mg/m^3

FOOTNOTES

Data which appear to be in error without obvious reason are reported, but flagged uncertain with a U. Such data were not used in the determination of data at standard depths. Footnotes are used to indicate data which have required special processing.

NOTAS AL CALCE

Los datos que aparecen con errores sin explicación obvia son reportados, pero se les señala con una U. Estos datos no fueron utilizados en la determinación de datos a profundidades estándares. Se utilizan las notas al calce para indicar los datos que han requerido un procesamiento especial.

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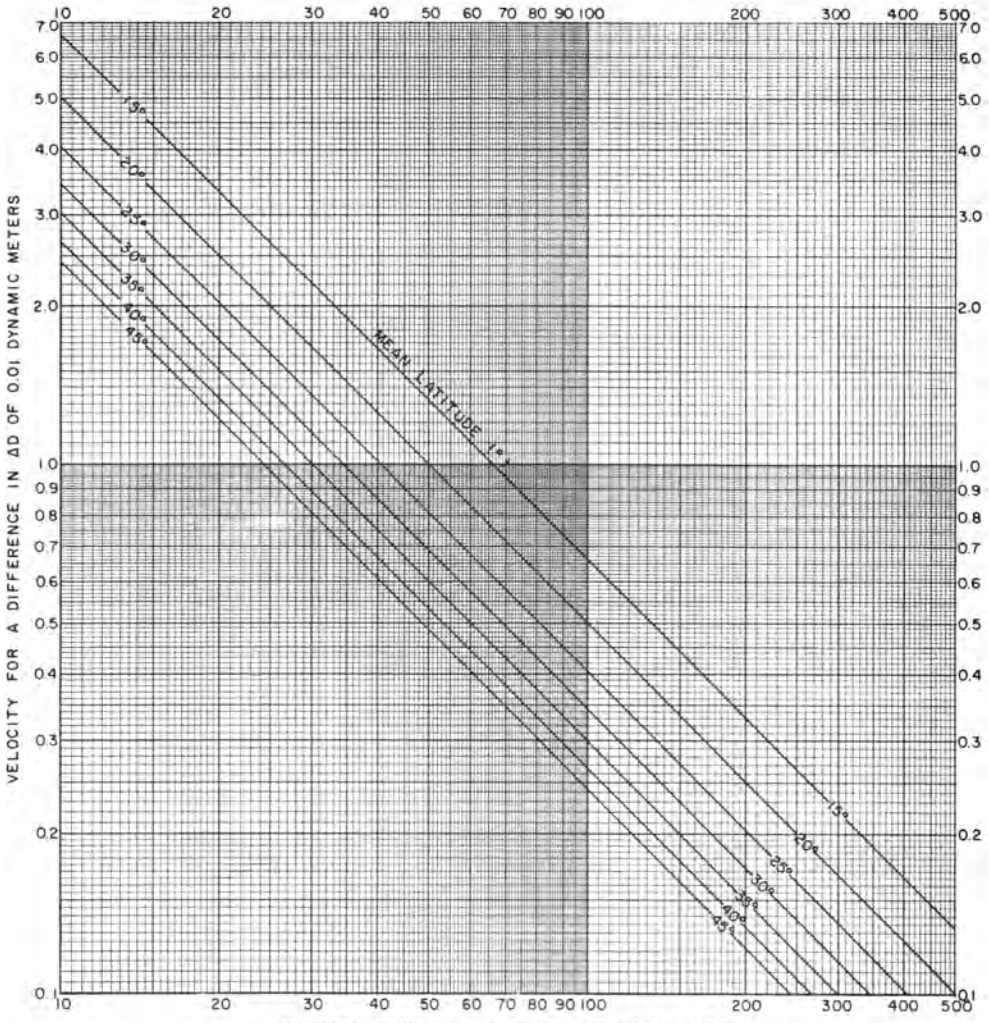

VELOCITY OF GEOSTROPHIC FLOW
(NAUTICAL MILES PER DAY)

cm/sec	0	1	2	3	4	5	6	7	8	9
0	KNOTS / N.M/DAY	0.02 / 0.47	0.04 / 0.93	0.06 / 1.40	0.08 / 1.86	0.10 / 2.33	0.12 / 2.80	0.14 / 3.26	0.16 / 3.73	0.17 / 4.20
10	0.19 / 4.66	0.21 / 5.13	0.23 / 5.59	0.25 / 6.06	0.27 / 6.53	0.29 / 6.99	0.31 / 7.46	0.33 / 7.93	0.35 / 8.39	0.37 / 8.86
20	0.39 / 9.32	0.41 / 9.79	0.43 / 10.26	0.45 / 10.72	0.47 / 11.19	0.49 / 11.66	0.51 / 12.12	0.52 / 12.59	0.54 / 13.05	0.56 / 13.52
30	0.58 / 13.99	0.60 / 14.45	0.62 / 14.92	0.64 / 15.38	0.66 / 15.85	0.68 / 16.32	0.70 / 16.78	0.72 / 17.25	0.74 / 17.72	0.76 / 18.18
40	0.78 / 18.65	0.80 / 19.11	0.82 / 19.58	0.84 / 20.05	0.85 / 20.51	0.87 / 20.98	0.89 / 21.45	0.91 / 21.91	0.93 / 22.38	0.95 / 22.84
50	0.97 / 23.31	0.99 / 23.78	1.01 / 24.24	1.03 / 24.71	1.05 / 25.17	1.07 / 25.64	1.09 / 26.11	1.11 / 26.57	1.13 / 27.04	1.15 / 27.51
60	1.17 / 27.98	1.18 / 28.44	1.20 / 28.90	1.22 / 29.37	1.24 / 29.84	1.26 / 30.30	1.28 / 30.77	1.30 / 31.24	1.32 / 31.70	1.34 / 32.17
70	1.36 / 32.63	1.38 / 33.10	1.40 / 33.57	1.42 / 34.03	1.44 / 34.50	1.46 / 34.96	1.48 / 35.43	1.50 / 35.90	1.52 / 36.36	1.53 / 36.83
80	1.55 / 37.30	1.57 / 37.76	1.59 / 38.23	1.61 / 38.69	1.63 / 39.16	1.65 / 39.63	1.67 / 40.09	1.69 / 40.56	1.71 / 41.03	1.73 / 41.49
90	1.75 / 41.96	1.77 / 42.42	1.79 / 42.89	1.81 / 43.36	1.83 / 43.82	1.85 / 44.29	1.86 / 44.76	1.88 / 45.22	1.90 / 45.69	1.92 / 46.15
100	1.94 / 46.62	1.96 / 47.09	1.98 / 47.55	2.00 / 48.02	2.02 / 48.48	2.04 / 48.95	2.06 / 49.42	2.08 / 49.88	2.10 / 50.35	2.12 / 50.82

CONVERSION TABLE
(CENTIMETERS / SECOND – KNOTS – NAUTICAL MILES / DAY)

1 cm/sec = 0.019 kts = 0.466 NAUTICAL MILES / DAY
1 kt = 24 NAUTICAL MILES / DAY = 51.48 cm/sec
1 NAUTICAL MILE / DAY = 0.042 kts = 2.14 cm/sec

FIGURES

Cruise 7712

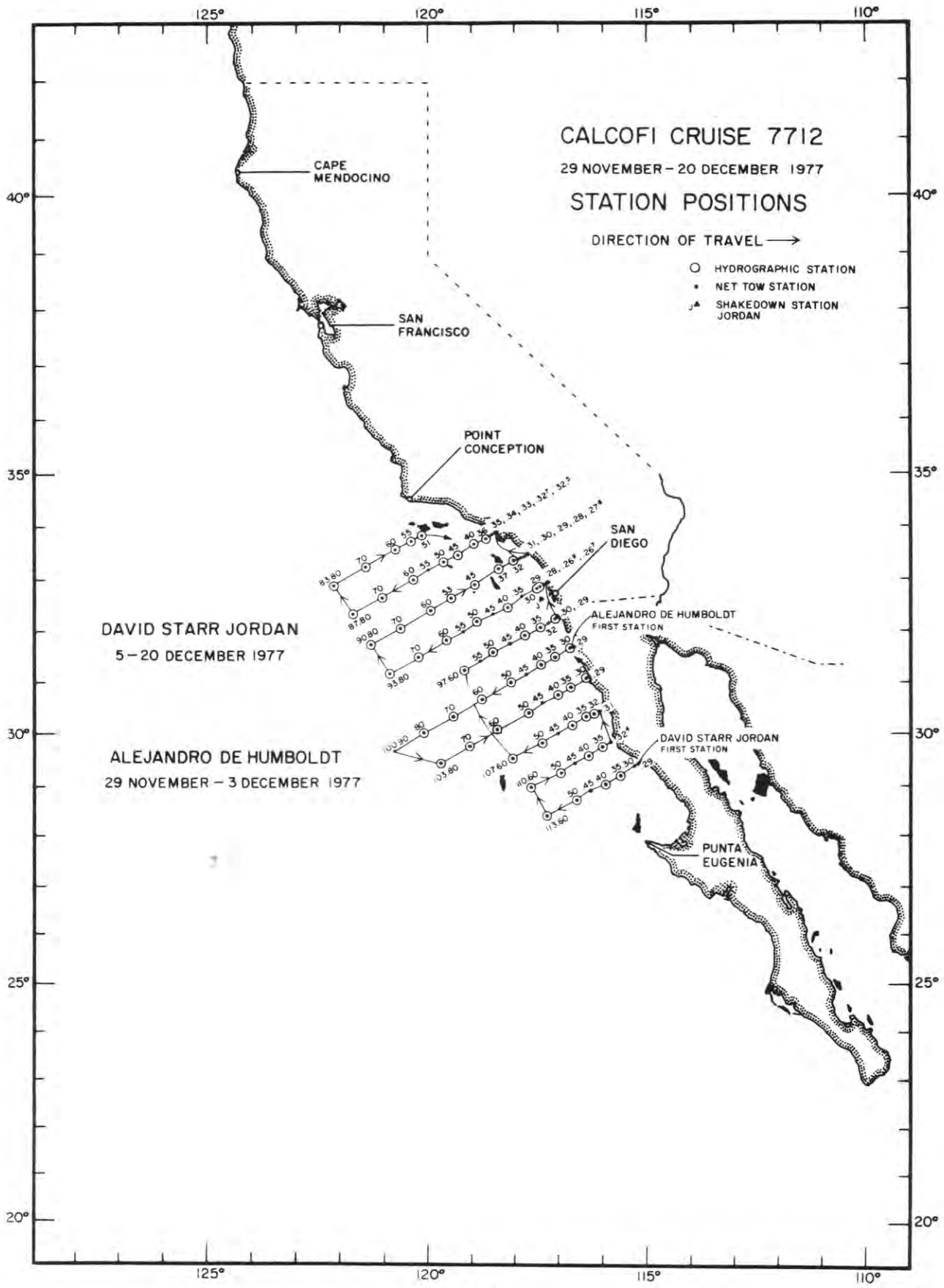
CALCOFI CRUISE 7712
29 NOVEMBER – 20 DECEMBER 1977
STATION POSITIONS
DIRECTION OF TRAVEL
HYDROGRAPHIC STATION
NET TOW STATION
SHAKEDOWN STATION
JORDAN
CAPE MENDOCINO
SAN FRANCISCO
POINT CONCEPTION
SAN DIEGO
ALEJANDRO DE HUMBOLDT
FIRST STATION
DAVID STARR JORDAN
FIRST STATION
PUNTA EUGENIA
DAVID STARR JORDAN
5 – 20 DECEMBER 1977
ALEJANDRO DE HUMBOLDT
29 NOVEMBER – 3 DECEMBER 1977
125°
120°
115°
110°
40°
35°
30°
25°
20°

FIGURE 1

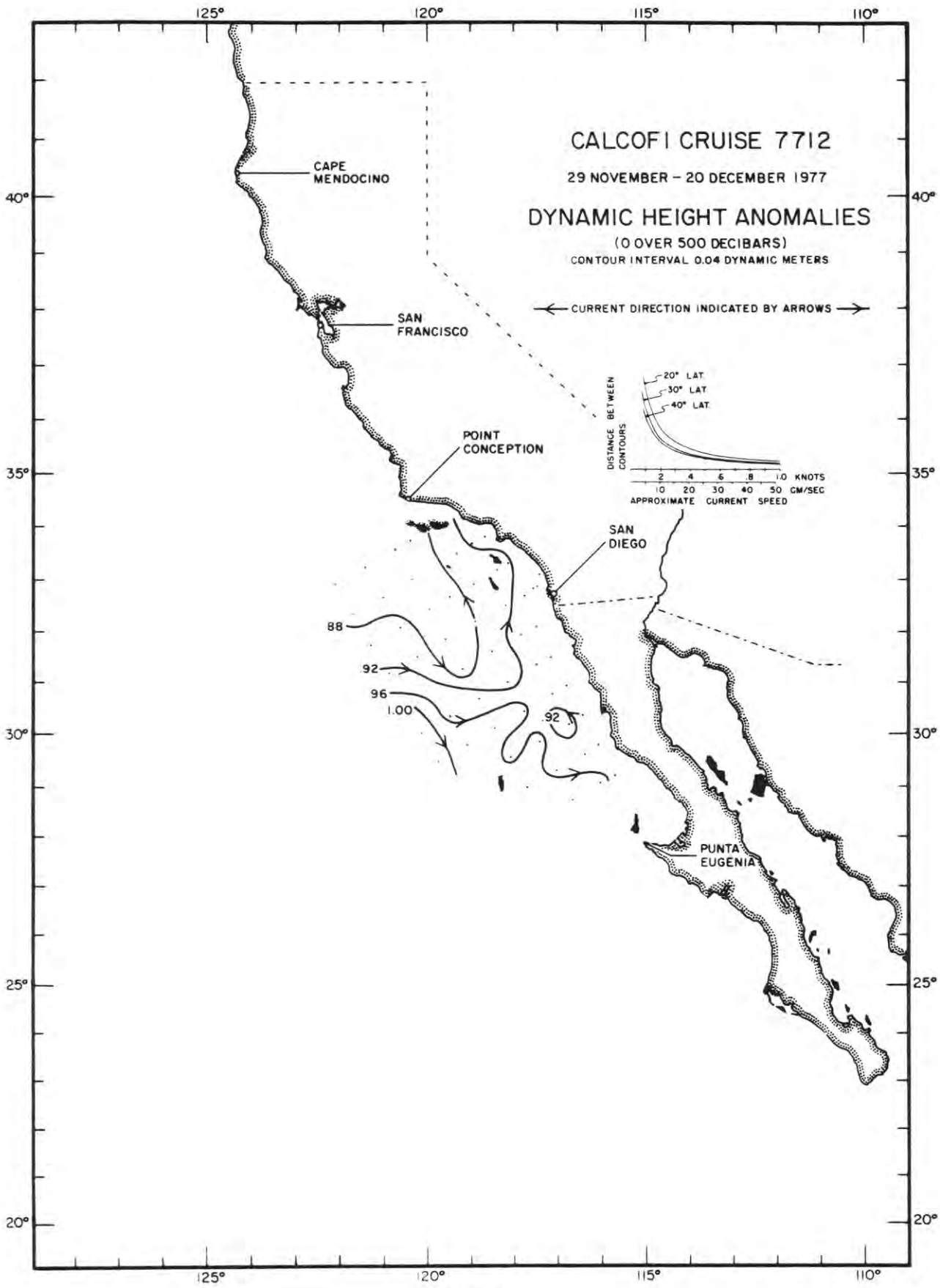
CALCOFI CRUISE 7712
29 NOVEMBER – 20 DECEMBER 1977
DYNAMIC HEIGHT ANOMALIES
(0 OVER 500 DECIBARS)
CONTOUR INTERVAL 0.04 DYNAMIC METERS
CURRENT DIRECTION INDICATED BY ARROWS
DISTANCE BETWEEN CONTOURS
20° LAT.
30° LAT.
40° LAT.
2 4 6 8 1.0 KNOTS
10 20 30 40 50 CM/SEC
APPROXIMATE CURRENT SPEED
CAPE MENDOCINO
SAN FRANCISCO
POINT CONCEPTION
SAN DIEGO
PUNTA EUGENIA
88
92
96
1.00
.92
125°
120°
115°
110°
40°
35°
30°
25°
20°

FIGURE 2

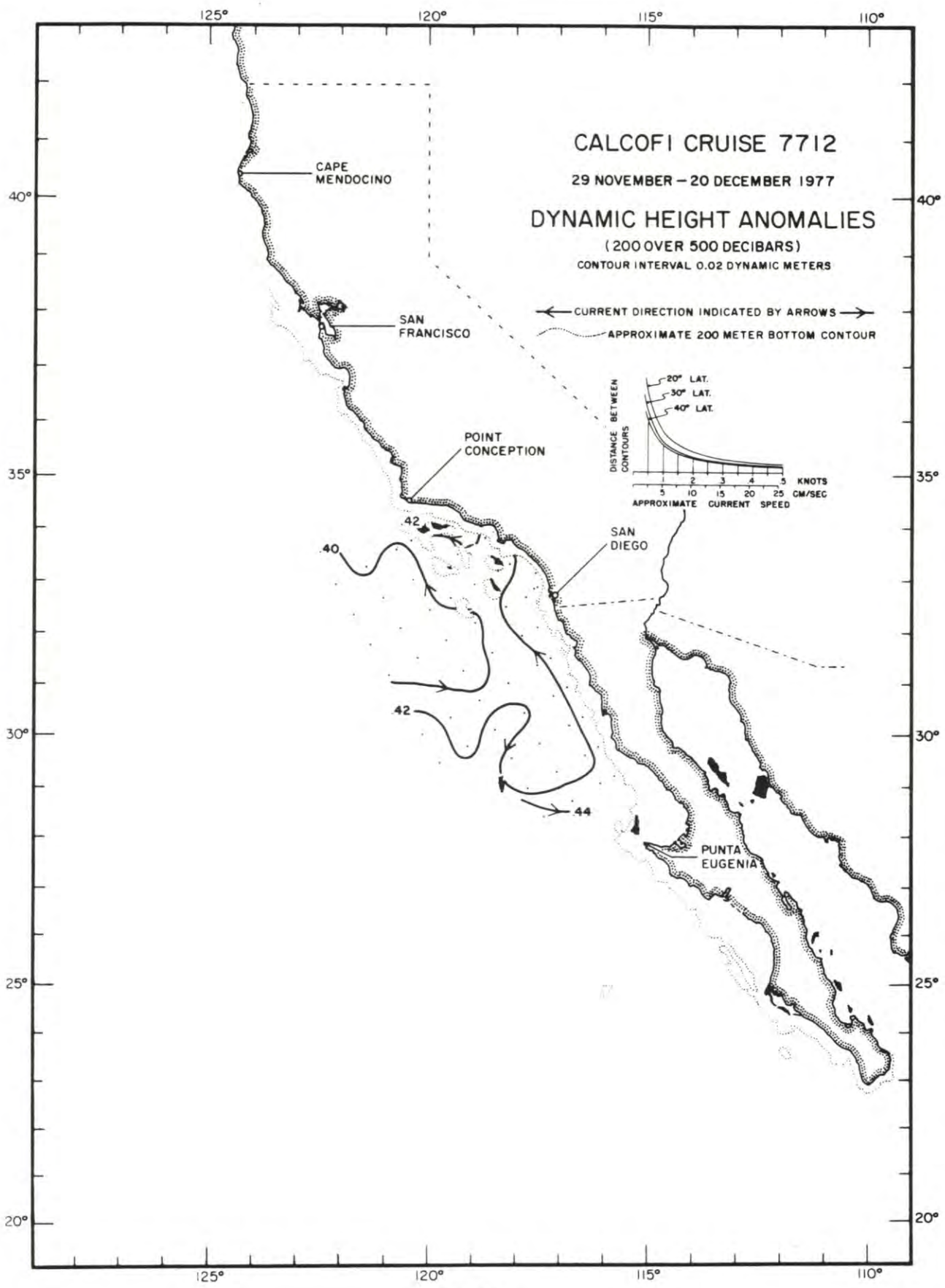
CALCOFI CRUISE 7712
29 NOVEMBER – 20 DECEMBER 1977
DYNAMIC HEIGHT ANOMALIES
(200 OVER 500 DECIBARS)
CONTOUR INTERVAL 0.02 DYNAMIC METERS
CURRENT DIRECTION INDICATED BY ARROWS
APPROXIMATE 200 METER BOTTOM CONTOUR
DISTANCE BETWEEN CONTOURS
20° LAT.
30° LAT.
40° LAT.
1 2 3 4 5 KNOTS
5 10 15 20 25 CM/SEC
APPROXIMATE CURRENT SPEED
CAPE MENDOCINO
SAN FRANCISCO
POINT CONCEPTION
SAN DIEGO
PUNTA EUGENIA
42
40
42
44
125°
120°
115°
110°
40°
35°
30°
25°
20°

FIGURE 3

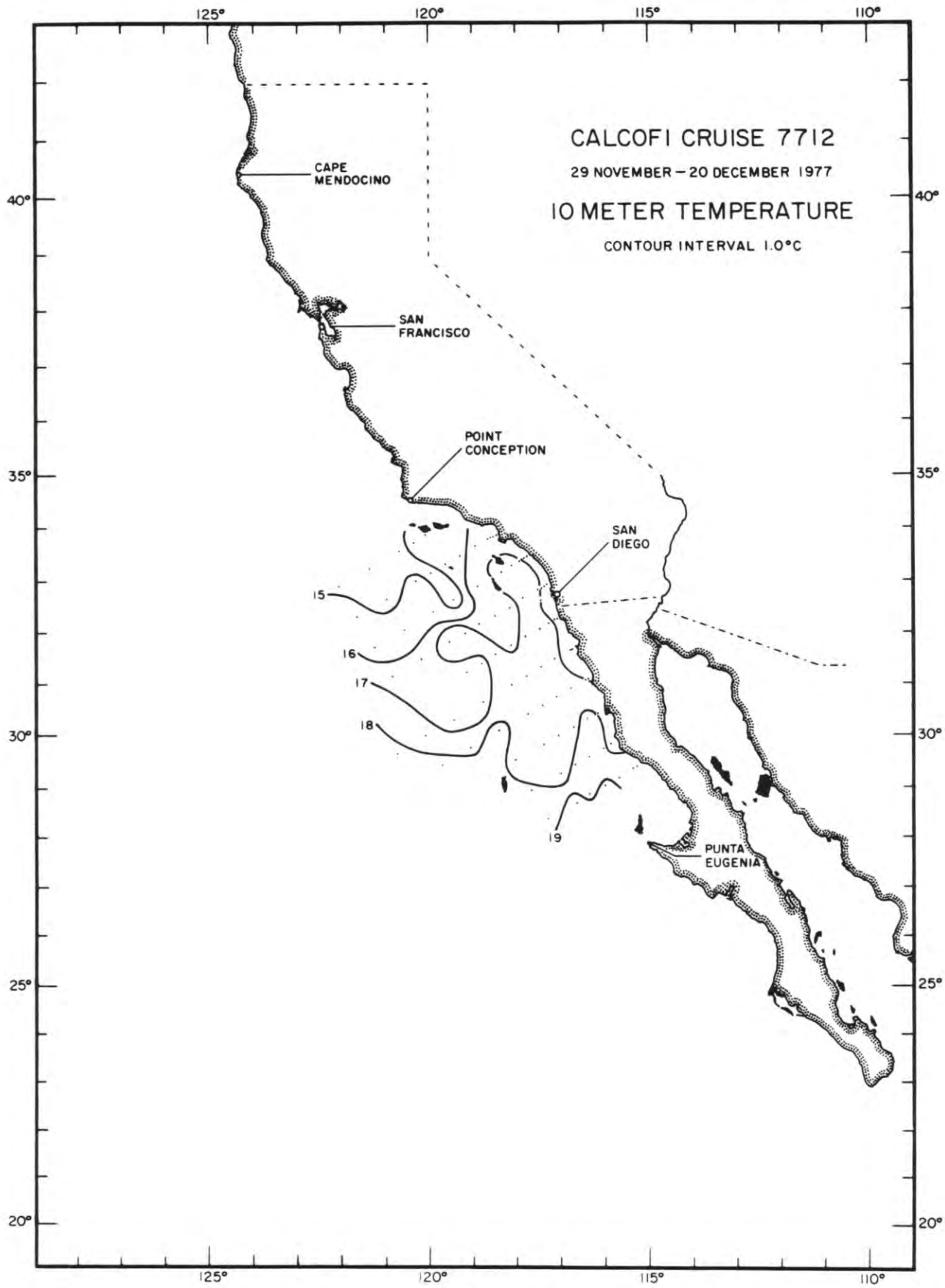
CALCOFI CRUISE 7712
29 NOVEMBER – 20 DECEMBER 1977
10 METER TEMPERATURE
CONTOUR INTERVAL 1.0°C
CAPE MENDOCINO
SAN FRANCISCO
POINT CONCEPTION
SAN DIEGO
PUNTA EUGENIA
15
16
17
18
19
125°
120°
115°
110°
40°
35°
30°
25°
20°

FIGURE 4

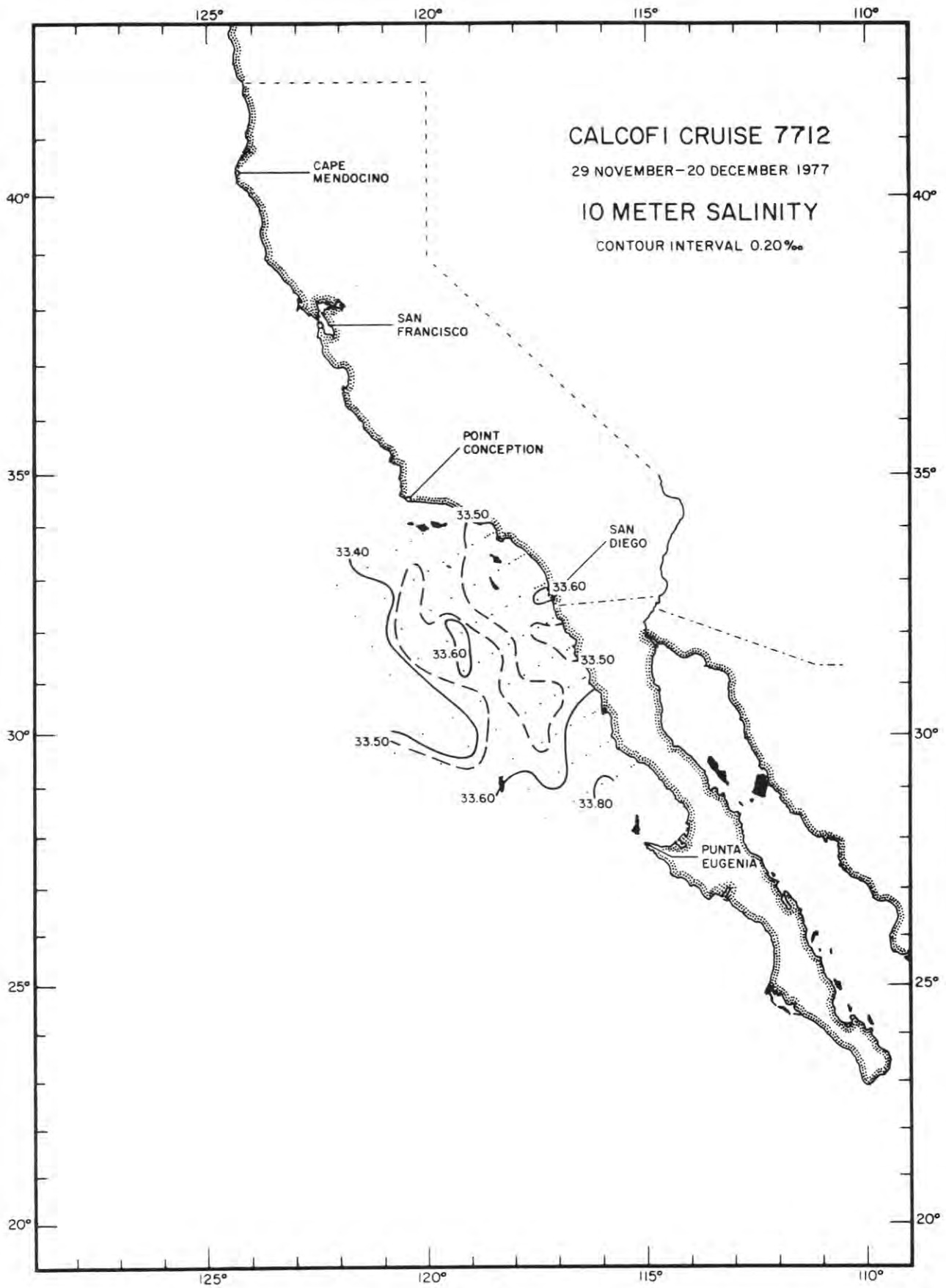
CALCOFI CRUISE 7712
29 NOVEMBER–20 DECEMBER 1977
10 METER SALINITY
CONTOUR INTERVAL 0.20‰
CAPE MENDOCINO
SAN FRANCISCO
POINT CONCEPTION
SAN DIEGO
PUNTA EUGENIA
33.40
33.50
33.60
33.50
33.60
33.50
33.60
33.80
125°
120°
115°
110°
40°
35°
30°
25°
20°

FIGURE 5

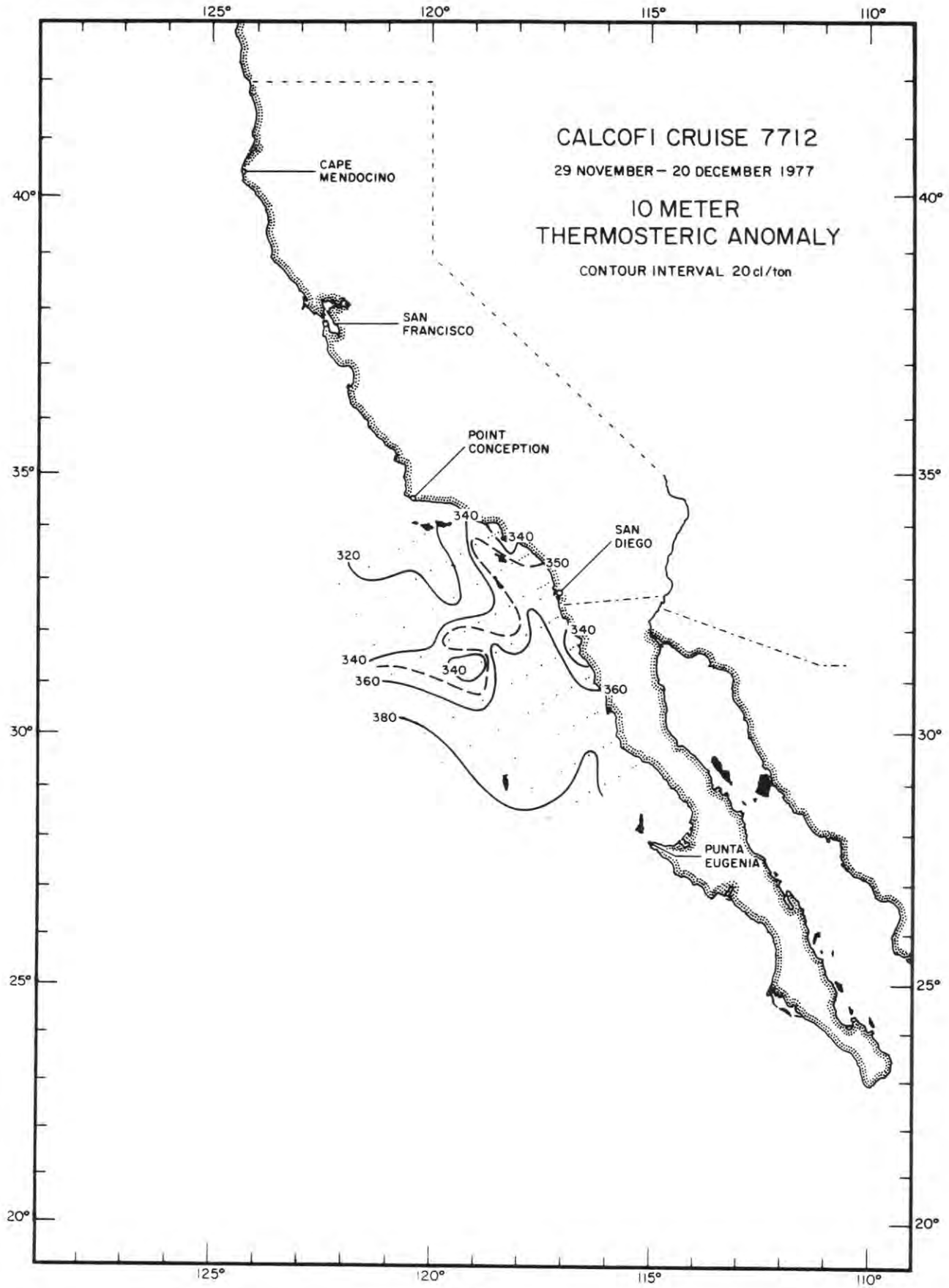
CALCOFI CRUISE 7712
29 NOVEMBER – 20 DECEMBER 1977
10 METER
THERMOSTERIC ANOMALY
CONTOUR INTERVAL 20 cl/ton
CAPE MENDOCINO
SAN FRANCISCO
POINT CONCEPTION
SAN DIEGO
PUNTA EUGENIA
320
340
340
350
340
340
340
360
360
380
125°
120°
115°
110°
40°
35°
30°
25°
20°

FIGURE 6

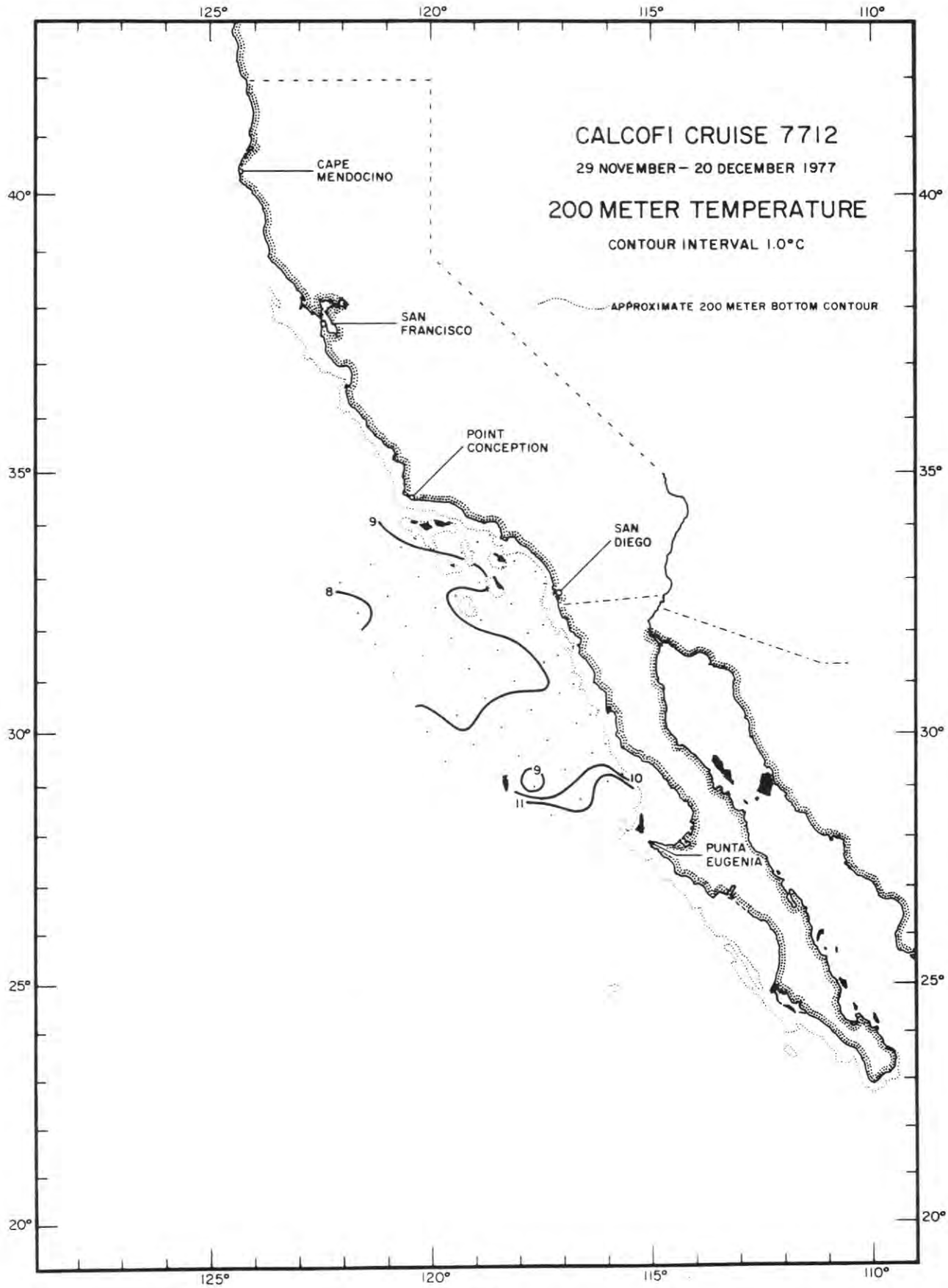
CALCOFI CRUISE 7712
29 NOVEMBER – 20 DECEMBER 1977
200 METER TEMPERATURE
CONTOUR INTERVAL 1.0°C
APPROXIMATE 200 METER BOTTOM CONTOUR
CAPE MENDOCINO
SAN FRANCISCO
POINT CONCEPTION
SAN DIEGO
PUNTA EUGENIA
125°
120°
115°
110°
40°
35°
30°
25°
20°
8
9
9
10
11

FIGURE 7

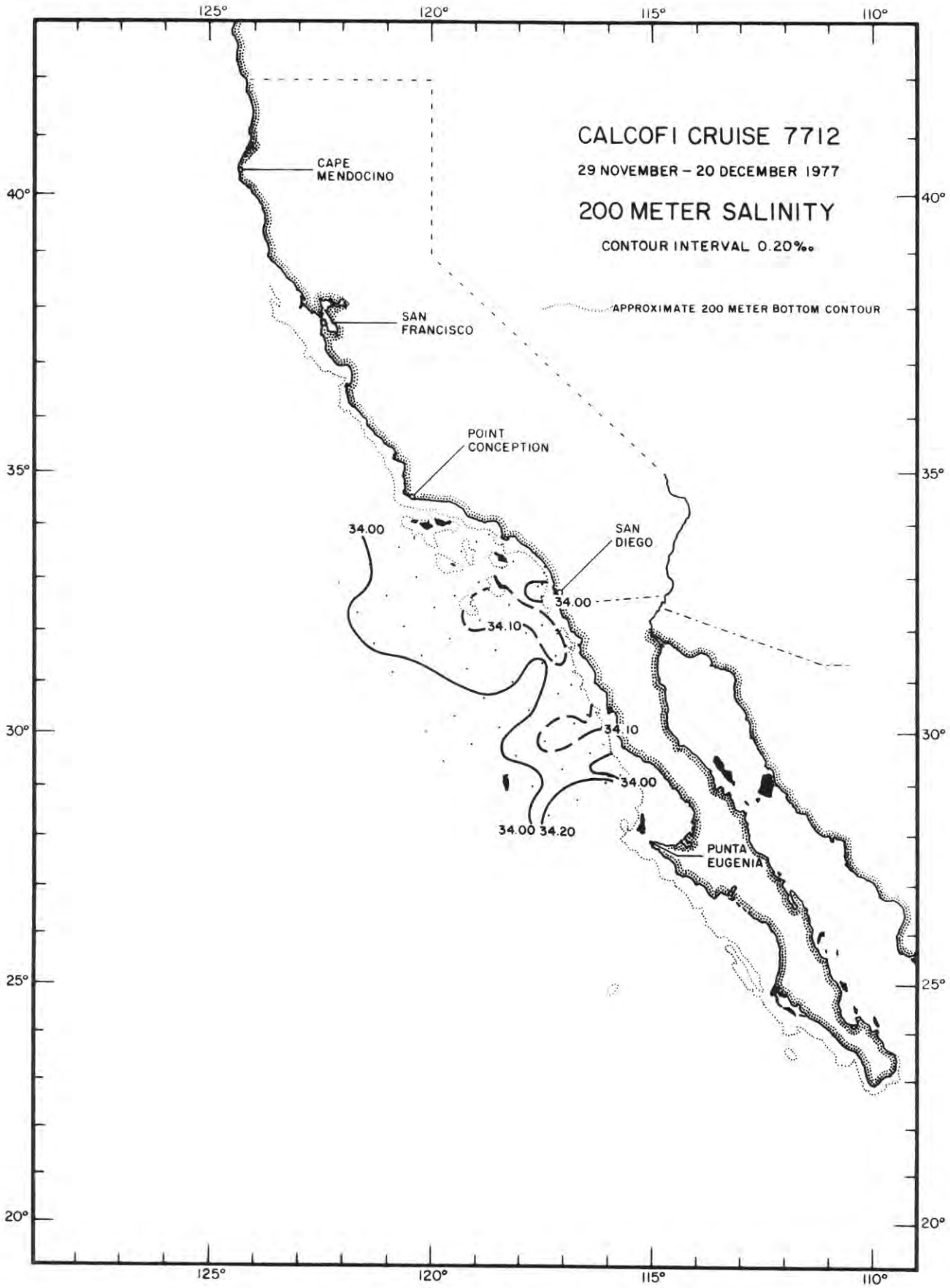
CALCOFI CRUISE 7712
29 NOVEMBER – 20 DECEMBER 1977
200 METER SALINITY
CONTOUR INTERVAL 0.20‰
APPROXIMATE 200 METER BOTTOM CONTOUR
CAPE MENDOCINO
SAN FRANCISCO
POINT CONCEPTION
SAN DIEGO
PUNTA EUGENIA
34.00
34.10
34.00
34.10
34.00
34.00 34.20
125°
120°
115°
110°
40°
35°
30°
25°
20°

FIGURE 8

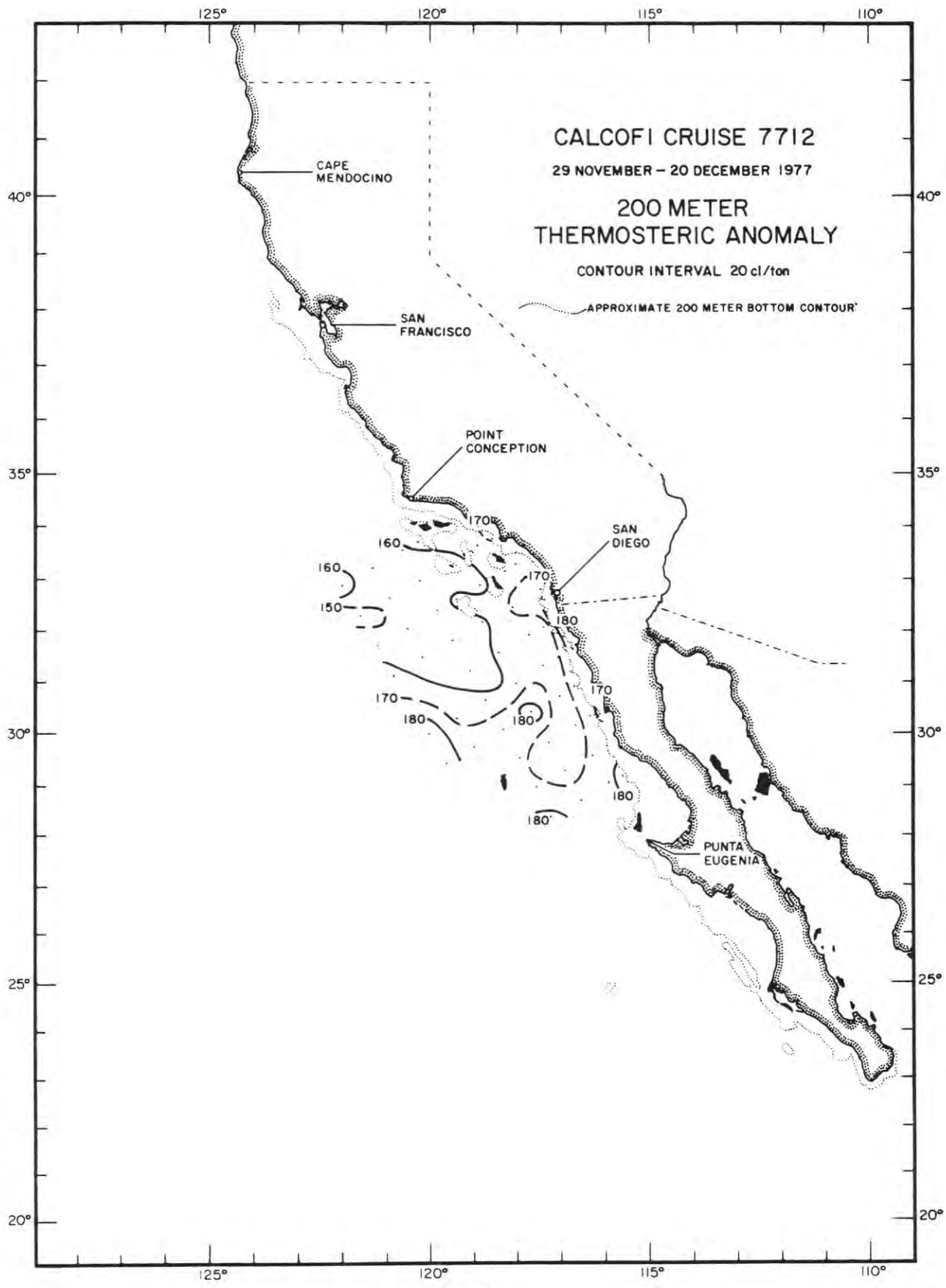
CALCOFI CRUISE 7712
29 NOVEMBER – 20 DECEMBER 1977
200 METER
THERMOSTERIC ANOMALY
CONTOUR INTERVAL 20 cl/ton
APPROXIMATE 200 METER BOTTOM CONTOUR
CAPE MENDOCINO
SAN FRANCISCO
POINT CONCEPTION
SAN DIEGO
PUNTA EUGENIA
125°
120°
115°
110°
40°
35°
30°
25°
20°
150
160
170
180

FIGURE 9

PERSONNEL

Cruise 7712

SHIP'S CAPTAINS

Roll, Milton RV David Starr Jordan
Zatarain, José M. RV Alejandro de Humboldt

PERSONNEL PARTICIPATING IN THE COLLECTION OF DATA

RV David Starr Jordan:

Counts, Robert C. (in charge)	Fishery Biologist NMFS
Cota V., Alfredo	Fishery Biologist INP
Flerx, William C.	Biological Technician NMFS
Johnson, Mary	Marine Technician DCPG*
Johnson, Treve L.	Marine Technician DCPG
Kaye, H. Ross	Electronics Technician DCPG
Mead, Richard V.	Marine Technician DCPG
Metoyer, Jack D.	Biological Technician NMFS
Muus, David	Staff Research Associate DCPG
Patla, Susan M.	Marine Technician DCPG
Patrick, Ronald G.	Marine Technician DCPG
Roberts, Stephen M.	Staff Research Associate DCPG
Stallard, Martha O.	Staff Research Associate DCPG
Stevens, Elizabeth G.	Biological Technician NMFS
Sweet, Paul R.	Marine Technician DCPG

RV Alejandro de Humboldt:

Bryan, Walter R. (in charge)	Marine Technician DCPG
Alvarez Mendoza, Manuel	Oceanologist INP
Arizpe Uribe, Tomás T.	Physicist INP
Butler, John L.	Fishery Biologist NMFS
Hemingway, George T.	Staff Research Associate MLRG
Johnson, Treve L.	Marine Technician DCPG
Mauck, William W.	Marine Technician DCPG
Navarrete Gutierrez, Mario	Plankton Sorter INP
Rowe, Raymond A.	Marine Technician DCPG
Sweet, Paul R.	Marine Technician DCPG

* DCPG: Now Physical & Chemical Oceanographic Data Facility (PACODF)

RV DAVID STARR JORDAN — CALCOFI CRUISE 7712 — 83051

LATITUDE	LONGITUDE	MO/DAY/YR	MESSENGER TIME	BOTTOM	WIND	SPEED	WEATHER	DOMINANT WAVES
33 52.0N	120 08.5W	12/20/77	0301 GMT	159M	080	18KT		

Z	T	S	O2	PO4	SIO3	NO2	NO3	DT	Z	T	S	O2	SIGT	DT	DD
1	15.34	33.492	5.86	0.25	2.	0.00	0.1	319.9	0	15.34	33.492	5.86	24.757	319.9	0.000
11	15.32	33.490	5.86	0.28	2.	0.00	0.1	319.6	10	15.32	33.492	5.86	24.760	319.7	0.032
30	15.23	33.490	5.85	0.31	3.	0.01	0.7	317.7	20	15.28	33.492	5.86	24.769	318.7	0.064
39	14.17	33.473	5.51	0.50	5.	0.06	3.3	297.4	30	15.23	33.490	5.85	24.780	317.7	0.096
53	12.71	33.473	5.11	0.76	8.	0.12	7.2	269.2	50	12.98	33.470	5.19	25.232	274.6	0.155
66	12.07	33.542	4.64	0.93	12.	0.06	10.3	252.5	75	11.69	33.576	4.41	25.562	243.3	0.220
80	11.50	33.588	4.31	1.05	14.	0.11	12.7	239.0	100	11.02	33.641	3.99	25.735	226.9	0.280
99	11.04	33.636	4.01	1.15	16.	0.04	14.3	227.5	125	10.56	33.740	3.58	25.894	211.7	0.335
118	10.66	33.709	3.67	1.36	20.	0.01	17.7	215.7							

RV DAVID STARR JORDAN — CALCOFI CRUISE 7712 — 83055

LATITUDE	LONGITUDE	MO/DAY/YR	MESSENGER TIME	BOTTOM	WIND	SPEED	WEATHER	DOMINANT WAVES
33 44.0N	120 24.5W	12/20/77	0018 GMT	1701M	110	19KT	1	090 7 6

Z	T	S	O2	PO4	SIO3	NO2	NO3	DT	Z	T	S	O2	SIGT	DT	DD
0	15.03	33.475	5.88	0.29	2.		0.5	314.7	0	15.03	33.475	5.88	24.812	314.7	0.000
11	15.00	33.476	5.85	0.27	2.		0.1	314.0	10	15.00	33.478	5.85	24.819	314.0	0.031
29	15.01	33.473	5.93	0.31	2.		0.4	314.4	20	15.01	33.476	5.90	24.817	314.2	0.063
39	14.79	33.460	5.87	0.28	2.		0.6	310.8	30	14.99	33.474	5.92	24.819	314.0	0.094
48	12.58	33.389	5.34	0.57	7.		5.6	273.0	50	12.27	33.393	5.24	25.311	267.2	0.153
62	11.15	33.453	4.72	1.09	11.		12.2	242.9	75	10.76	33.545	4.35	25.706	229.6	0.215
76	10.75	33.551	4.33	1.07	15.		14.7	228.9	100	10.19	33.773	3.57	25.983	203.3	0.270
95	10.28	33.733	3.73	1.31	19.		18.3	207.7	125	9.92	33.881	3.05	26.112	191.0	0.320
118	9.95	33.867	3.11	1.59	25.		21.7	192.4	150	9.72	33.932	2.87	26.186	183.9	0.367
137	9.88	33.893	3.00	1.59	26.		22.3	189.4	200	9.08	34.064	2.27	26.393	164.4	0.456
165	9.49	33.980	2.69	1.68	30.		23.5	176.8	250	8.62	34.163	1.76	26.544	150.0	0.537
194	9.15	34.047	2.34	1.86	35.		26.2	166.5	300	8.13	34.198	1.38	26.645	140.4	0.612
221	8.87	34.116	2.03	2.07	43.		29.1	157.2	400	7.26	34.234	0.92	26.800	125.7	0.751
258	8.55	34.171	1.69	2.13	44.		29.5	148.4	500	6.32	34.268	0.55	26.954	111.1	0.876
315	7.98	34.201	1.29	2.29	51.		30.7	137.9							
385	7.43	34.231	0.98	2.49	59.		33.1	128.1							
457	6.65	34.245	0.70	2.73	70.		36.4	116.8							
532	6.15	34.289	0.45	2.78	79.		37.1	107.3							

RV DAVID STARR JORDAN — CALCOFI CRUISE 7712 — 83060

LATITUDE	LONGITUDE	MO/DAY/YR	MESSENGER TIME	BOTTOM	WIND	SPEED	WEATHER	DOMINANT WAVES
33 34.0N	120 45.0W	12/19/77	1952 GMT	1479M	090	17KT	1	310 8 8

Z	T	S	O2	PO4	SIO3	NO2	NO3	DT	Z	T	S	O2	SIGT	DT	DD
2	14.36	33.467	5.96	0.30	2.	0.04	0.6	301.6	0	14.36	33.467	5.96	24.949	301.6	0.000
11	14.33	33.463	6.01	0.30	3.	0.04	0.5	301.3	10	14.33	33.465	6.01	24.952	301.3	0.030
30	14.23	33.466	6.02	0.31	3.	0.07	0.8	299.1	20	14.28	33.466	6.01	24.964	300.2	0.060
39	13.72	33.454	5.81	0.42	4.	0.19	2.9	289.9	30	14.23	33.466	6.02	24.976	299.1	0.090
48	12.62	33.408	5.31	0.64	7.	0.19	7.4	272.4	50	12.34	33.396	5.23	25.299	268.4	0.147
62	10.93	33.368	4.81	0.94	12.	0.01	12.7	245.4	75	10.34	33.518	4.33	25.760	224.5	0.209
75	10.34	33.518	4.33	1.06	16.	0.13	16.3	224.5	100	9.98	33.667	3.89	25.935	207.8	0.264
93	10.09	33.630	3.99	1.17	19.	0.02	18.0	212.2	125	9.57	33.787	3.51	26.097	192.5	0.314
116	9.72	33.741	3.67	1.34	22.	0.00	20.9	198.1	150	9.13	33.900	3.14	26.257	177.3	0.361
134	9.42	33.828	3.35	1.47	26.	0.00	22.8	186.9	200	8.38	34.047	2.42	26.489	155.2	0.446
161	8.93	33.941	3.01	1.67	31.	0.00	25.1	171.1	250	7.73	34.099	1.91	26.627	142.1	0.522
188	8.45	34.014	2.62	1.84	35.	0.00	27.7	158.6	300	7.27	34.140	1.43	26.725	132.9	0.593
216	8.30	34.080	2.17	1.97	42.	0.00	29.2	151.5	400	6.62	34.227	0.76	26.883	117.8	0.724
252	7.69	34.098	1.90	2.19	48.	0.00	31.5	141.5	500	6.00	34.290	0.45	27.013	105.4	0.842
307	7.23	34.145	1.36	2.37	57.	0.00	33.9	131.8							
377	6.75	34.212	0.85	2.67	66.	0.01	35.5	120.6							
448	6.34	34.253	0.61	2.83	75.	0.00	38.0	112.3							
524	5.83	34.308	0.38	2.93	85.	0.00	39.5	102.0							

RV DAVID STARR JORDAN — CALCOFI CRUISE 7712 — 83070

LATITUDE	LONGITUDE	MO/DAY/YR	MESSENGER TIME	BOTTOM	WIND	SPEED	WEATHER	DOMINANT WAVES
33 14.4N	121 26.1W	12/19/77	1424 GMT	3546M	010	18KT		

Z	T	S	O2	PO4	SIO3	NO2	NO3	DT	Z	T	S	O2	SIGT	DT	DD
1	14.47	33.433	5.97	0.25	2.		0.0	306.3	0	14.47	33.433	5.97	24.900	306.3	0.000
11	14.46	33.435	5.96	0.24	2.		0.0	306.0	10	14.46	33.437	5.96	24.903	306.0	0.031
29	14.47	33.434	6.04	0.24	2.		0.0	306.2	20	14.46	33.436	6.01	24.902	306.1	0.061
38	14.47	33.438	5.97	0.25	2.		0.0	305.9	30	14.47	33.436	6.04	24.901	306.2	0.092
47	14.24	33.431	5.84	0.23	2.		0.0	301.8	50	14.20	33.431	5.82	24.954	301.2	0.153
60	13.77	33.392	5.75	0.37	3.		1.9	295.4	75	11.62	33.238	5.41	25.312	267.1	0.224
74	11.73	33.237	5.44	0.64	7.		6.8	268.9	100	10.01	33.404	4.68	25.726	227.8	0.287
92	10.33	33.315	4.94	1.00	13.		13.0	239.4	125	9.46	33.674	3.89	26.027	199.1	0.341
115	9.66	33.581	4.19	1.25	20.		17.8	209.0	150	9.16	33.858	3.15	26.219	180.9	0.389
134	9.32	33.744	3.63	1.36	25.		19.7	191.6	200	8.41	34.001	2.77	26.449	159.0	0.475
162	9.05	33.920	2.88	1.60	31.		23.8	174.5	250	7.88	34.064	2.34	26.577	146.9	0.554
190	8.55	33.982	2.84	1.78	35.		26.0	162.4	300	7.31	34.091	1.88	26.681	137.0	0.627
218	8.19	34.027	2.62	1.87	39.		27.5	153.9	400	6.47	34.174	0.97	26.861	119.9	0.761
256	7.83	34.068	2.29	2.07	45.		29.3	145.7	500	5.96	34.251	0.54	26.987	107.9	0.881
313	7.16	34.096	1.75	2.29	55.		31.1	134.5							
384	6.56	34.160	1.07	2.62	67.		35.2	122.0							
457	6.20	34.218	0.70	2.82	75.		37.4	113.2							
533	5.77	34.274	0.45	2.77	85.		37.4	103.9							

RV DAVID STARR JORDAN — CALCOFI CRUISE 7712 — 83080

LATITUDE	LONGITUDE	MO/DAY/YR	MESSENGER TIME	BOTTOM	WIND	SPEED	WEATHER	DOMINANT WAVES
32 54.0N	122 08.0W	12/19/77	0837 GMT	4117M	350	20KT		

Z	T	S	O2	PO4	SIO3	NO2	NO3	DT	Z	T	S	O2	SIGT	DT	DD
2	14.68	33.212	5.96	0.43	3.	0.00	0.0	326.7	0	14.68	33.212	5.96	24.685	326.7	0.000
12	14.68	33.214	5.97	0.45	3.	0.00	0.0	326.6	10	14.68	33.216	5.97	24.687	326.6	0.033
31	14.78	33.341	5.92	0.46	3.	0.00	0.0	319.3	20	14.72	33.270	5.95	24.719	323.5	0.065
40	14.29	33.351	5.94	0.46	4.	0.04	0.7	308.7	30	14.77	33.336	5.92	24.759	319.7	0.097
50	14.19	33.396	5.91	0.49	4.	0.08	1.0	303.4	50	14.19	33.396	5.91	24.930	303.4	0.160
64	13.00	33.251	5.78	0.61	5.	0.20	2.5	291.0	75	11.63	33.194	5.45	25.277	270.4	0.232
78	11.25	33.191	5.34	0.82	10.	0.00	7.1	263.9	100	9.72	33.438	4.49	25.800	220.7	0.294
97	9.74	33.391	4.61	1.28	19.	0.00	15.4	224.3	125	9.49	33.651	3.89	26.004	201.3	0.347
120	9.59	33.626	3.91	1.60	24.		20.5	204.6	150	9.02	33.752	3.74	26.159	186.6	0.396
138	9.21	33.693	3.85	2.07U	27.		21.4	193.7	200	8.37	33.969	2.93	26.430	160.8	0.485
166	8.81	33.830	3.52	1.79	31.		23.3	177.5	250	7.62	34.048	2.29	26.603	144.4	0.563
194	8.47	33.950	3.04	1.96	37.		26.2	163.6	300	6.86	34.067	1.73	26.725	132.8	0.635
221	8.00	34.015	2.57	1.93	40.		28.3	152.1	400	6.06	34.153	0.88	26.898	116.4	0.764
259	7.51	34.051	2.22	2.23	47.		31.4	142.6	500	5.55	34.251	0.47	27.038	103.1	0.880
315	6.64	34.072	1.55	2.53	60.		35.1	129.6							
386	6.14	34.147	0.98	3.01	72.		38.0	118.5							
457	5.77	34.213	0.56	2.91	81.		41.5	108.4							
532	5.39	34.273	0.41	3.21	91.		41.0	99.6							

RV DAVID STARR JORDAN — CALCOFI CRUISE 7712 — 87036

LATITUDE	LONGITUDE	MO/DAY/YR	MESSENGER TIME	BOTTOM	WIND	SPEED	WEATHER	DOMINANT WAVES
33 48.9N	118 40.0W	12/17/77	2141 GMT	815M	180	14KT	5	250 10 10

Z	T	S	O2	PO4	SIO3	NO2	NO3	DT	Z	T	S	O2	SIGT	DT	DD
0	16.75	33.542	5.78		1.	0.00	0.0	346.7	0	16.75	33.542	5.78	24.476	346.7	0.000
10	16.73	33.546	5.85		2.	0.00	0.0	345.9	10	16.73	33.546	5.85	24.484	345.9	0.035
29	14.88	33.416	6.11		3.	0.04	0.0	315.9	20	15.94	33.481	5.99	24.614	333.5	0.069
39	13.68	33.397	5.61		5.	0.60	0.0	293.3	30	14.74	33.414	6.07	24.825	313.4	0.101
48	13.34	33.411	5.30		6.	0.06	4.3	285.7	50	13.30	33.415	5.30	25.127	284.7	0.161
62	13.08	33.426	5.27		6.	0.04	4.1	279.6	75	12.77	33.446	5.10	25.256	272.4	0.231
76	12.74	33.446	5.08		8.	0.02	6.2	271.8	100	12.19	33.504	4.74	25.412	257.5	0.298
94	12.31	33.486	4.82		9.	0.01	8.4	260.9	125	11.35	33.613	4.11	25.652	234.7	0.360
116	11.76	33.560	4.43		12.	0.00	11.9	245.6	150	10.36	33.795	3.35	25.970	204.5	0.416
134	10.93	33.671	3.78		18.	0.01	17.0	223.0	200	9.35	34.039	2.54	26.329	170.4	0.511
160	10.08	33.866	3.15		25.	0.01	21.7	194.6	250	8.68	34.167	1.90	26.536	150.7	0.594
186	9.60	33.978	2.89		29.	0.01	25.1	178.6	300	8.29	34.218	1.45	26.637	141.2	0.669
213	9.14	34.086	2.26		35.	0.01	27.2	163.5	400	7.15	34.277	0.69	26.849	121.0	0.806
249	8.69	34.164	1.91		41.	0.00	29.2	151.0	500	6.26	34.315	0.37	26.999	106.8	0.927
303	8.27	34.219	1.42		48.	0.03	31.3	140.7							
373	7.43	34.264	0.85		60.	0.01	34.9	125.6							
442	6.75	34.291	0.50		71.	0.00	37.3	114.7							
515	6.15	34.320	0.36		80.	0.00	37.4	105.0							

RV DAVID STARR JORDAN — CALCOFI CRUISE 7712 — 87040

LATITUDE	LONGITUDE	MO/DAY/YR	MESSENGER TIME	BOTTOM	WIND	SPEED	WEATHER	DOMINANT WAVES
33 40.0N	118 58.0W	12/18/77	0144 GMT	888M	240	12KT	5	240

Z	T	S	O2	PO4	SIO3	NO2	NO3	DT	Z	T	S	O2	SIGT	DT	DD
1	16.99	33.557	5.74	0.22	2.	0.00	0.0	350.9	0	16.99	33.557	5.74	24.431	350.9	0.000
11	16.98	33.557	5.77	0.22	2.	0.00	0.0	350.7	10	16.98	33.559	5.77	24.433	350.7	0.035
30	16.83	33.536	5.83	0.21	2.	0.00	0.0	348.9	20	16.91	33.549	5.80	24.443	349.8	0.070
39	14.70	33.395	6.10	0.29	4.	0.01	0.0	313.7	30	16.83	33.536	5.83	24.453	348.9	0.105
49	14.02	33.378	6.03	0.32	4.	0.01	0.0	301.3	50	13.94	33.378	6.00	24.968	299.8	0.170
63	12.92	33.372	5.56	0.52	6.	0.01	3.6	280.6	75	12.35	33.401	5.21	25.301	268.1	0.242
77	12.27	33.408	5.15	0.68	8.	0.09	6.9	265.9	100	10.99	33.611	4.16	25.717	228.6	0.304
96	11.12	33.587	4.27	1.00	14.	0.01	13.1	232.5	125	10.46	33.732	3.64	25.904	210.8	0.360
119	10.59	33.696	3.78	1.22	19.	0.00	17.2	215.5	150	10.02	33.857	3.16	26.076	194.4	0.411
138	10.21	33.805	3.36	1.44	23.		18.4	201.2	200	9.19	34.067	2.34	26.379	165.7	0.503
166	9.78	33.916	2.91	1.57	26.		22.1	186.1	250	8.71	34.155	1.86	26.523	152.0	0.584
195	9.24	34.052	2.40	1.84	34.		25.7	167.6	300	8.23	34.202	1.46	26.634	141.4	0.660
222	8.99	34.110	2.14	1.94	37.		27.2	159.5	400	7.32	34.262	0.77	26.813	124.4	0.799
260	8.61	34.166	1.77	2.11	42.		29.1	149.6	500	6.47	34.302	0.46	26.961	110.4	0.923
318	8.06	34.213	1.34	2.26	49.		30.4	138.2							
388	7.44	34.256	0.83	2.55	59.		32.2	126.4							
459	6.78	34.283	0.56	2.71	69.		36.1	115.6							
535	6.25	34.316	0.40	2.70	78.		36.5	106.5							

RV DAVID STARR JORDAN — CALCOFI CRUISE 7712 — 87045

LATITUDE	LONGITUDE	MO/DAY/YR	MESSENGER TIME	BOTTOM	WIND	SPEED	WEATHER	DOMINANT WAVES
33 29.8N	119 19.0W	12/18/77	0554 GMT	1607M	230	24KT	6	

Z	T	S	O2	PO4	SIO3	NO2	NO3	DT
1	15.49	33.483	6.01	0.25	2.	0.00	0.0	323.7
11	15.48	33.484	5.98	0.22	2.	0.00	0.0	323.4
29	15.44	33.484	6.04	0.25	2.	0.00	0.0	322.6
39	15.32	33.476	6.00	0.26	2.	0.02	0.1	320.6
48	12.92	33.382	5.49	0.62	6.	0.25	4.7	279.9
62	11.66	33.417	5.01	0.81	10.	0.62	8.8	254.4
76	11.01	33.528	4.49	1.01	14.	0.02	13.8	234.9
95	10.69	33.579	4.31	1.03	15.	0.10	14.9	225.8
118	10.13	33.814	3.48	1.46	22.	0.04	19.9	199.2
137	9.79	33.899	3.12	1.58	26.	0.02	22.1	187.5
165	9.40	34.014	2.65	1.84	31.	0.01	25.0	172.8
194	9.06	34.087	2.26	1.96	36.	0.02	26.0	162.2
222	8.90	34.118	2.10	1.96	38.	0.00	27.6	157.5
260	8.49	34.181	1.63	2.27	44.	0.00	30.0	146.7
317	8.02	34.215	1.26	2.41	51.	0.00	31.8	137.5
388	7.39	34.252	0.82	2.66	61.	0.00	34.4	126.0
460	6.87	34.274	0.60	3.04	69.	0.00	36.6	117.5
535	6.20	34.31	0.42	3.00	80.	0.00	37.4	106.3

Z	T	S	O2	SIGT	DT	DD
0	15.49	33.483	6.01	24.717	323.7	0.000
10	15.48	33.486	5.98	24.720	323.4	0.032
20	15.46	33.486	6.01	24.725	323.0	0.065
30	15.43	33.485	6.04	24.731	322.4	0.097
50	12.63	33.381	5.41	25.233	274.6	0.157
75	11.04	33.522	4.52	25.638	236.1	0.221
100	10.57	33.630	4.14	25.805	220.2	0.279
125	9.99	33.853	3.33	26.078	194.3	0.331
150	9.60	33.957	2.89	26.226	180.2	0.379
200	9.02	34.096	2.22	26.427	161.1	0.466
250	8.60	34.166	1.76	26.548	149.6	0.545
300	8.15	34.210	1.35	26.651	139.8	0.620
400	7.30	34.257	0.77	26.812	124.5	0.758
500	6.53	34.292	0.50	26.946	111.8	0.883

RV DAVID STARR JORDAN — CALCOFI CRUISE 7712 — 87050

LATITUDE	LONGITUDE	MO/DAY/YR	MESSENGER TIME	BOTTOM	WIND	SPEED	WEATHER	DOMINANT WAVES
33 20.0N	119 39.5W	12/18/77	0927 GMT	71M	280	23KT	6	

Z	T	S	O2	PO4	SIO3	NO2	NO3	DT
1	15.40	33.477	5.95	0.25	2.	0.00	0.0	322.2
12	15.16	33.474	5.97	0.30	3.	0.01	0.5	317.4
21	14.15	33.445	5.80	0.39	4.	0.05	2.9	299.0
29	12.92	33.417	5.61	0.65	7.	0.09	6.0	277.3
48	11.19	33.458	4.82	1.04	12.	0.05	12.4	243.2

Z	T	S	O2	SIGT	DT	DD
0	15.40	33.477	5.95	24.733	322.2	0.000
10	15.20	33.476	5.97	24.774	318.3	0.032
20	14.29	33.451	5.82	24.950	301.5	0.063
30	12.79	33.420	5.57	25.231	274.8	0.092
50	11.10	33.460	4.75	25.581	241.5	0.144

RV DAVID STARR JORDAN — CALCOFI CRUISE 7712 — 87060

LATITUDE	LONGITUDE	MO/DAY/YR	MESSENGER TIME	BOTTOM	WIND	SPEED	WEATHER	DOMINANT WAVES
33 00.1N	120 21.5W	12/18/77	1558 GMT	669M	310	22KT	1	290 9 9

Z	T	S	O2	PO4	SIO3	NO2	NO3	DT
2	15.92	33.525	5.72	0.23	2.		0.0	329.8
12	15.91	33.525	5.71	0.27	2.		0.0	329.6
30	15.92	33.527	5.80	0.27	2.		0.0	329.6
40	15.89	33.525	5.76	0.27	2.		0.0	329.1
49	12.29	33.390	5.14	0.52	8.		8.5	267.6
63	11.02	33.424	4.68	1.08	12.		13.2	242.8
78	10.75	33.467	4.47	1.15	14.		14.6	235.1
96	10.21	33.600	4.02	1.40	18.		18.0	216.3
120	9.58	33.768	3.44	1.59	24.		21.5	193.9
139	9.21	33.843	3.21	1.75	27.		22.9	182.6
167	8.51	33.977	2.83	1.84	34.		26.0	162.2
195	8.38	34.005	2.69	1.96	36.		27.0	158.2
223	7.95	34.068	2.24	2.03	42.		29.2	147.4
261	7.80	34.085	2.09	2.20	45.		30.2	144.0
317	7.24	34.146	1.45	2.55	55.		32.5	131.9
387	6.69	34.210	0.90	2.78	65.		35.0	119.9
459	6.25	34.261	0.55	2.99	73.		37.6	110.6
535	5.88	34.308	0.40	3.19	81.		38.4	102.6

Z	T	S	O2	SIGT	DT	DD
0	15.92	33.525	5.72	24.653	329.8	0.000
10	15.91	33.527	5.71	24.655	329.6	0.033
20	15.91	33.528	5.75	24.655	329.6	0.066
30	15.92	33.527	5.80	24.655	329.6	0.099
50	12.20	33.394	5.09	25.325	265.9	0.159
75	10.77	33.458	4.51	25.638	236.1	0.222
100	10.10	33.633	3.91	25.889	212.2	0.278
125	9.48	33.791	3.37	26.115	190.7	0.329
150	8.91	33.901	3.05	26.293	173.9	0.376
200	8.30	34.018	2.61	26.478	156.3	0.460
250	7.83	34.085	2.12	26.601	144.5	0.537
300	7.43	34.126	1.66	26.692	135.9	0.609
400	6.60	34.221	0.82	26.880	118.1	0.741
500	6.04	34.288	0.44	27.007	106.1	0.860

RV DAVID STARR JORDAN — CALCOFI CRUISE 7712 — 87070

LATITUDE	LONGITUDE	MO/DAY/YR	MESSENGER TIME	BOTTOM	WIND	SPEED	WEATHER	DOMINANT WAVES
32 39.5N	121 02.1W	12/18/77	2214 GMT	3738M	330	11KT	1	290 8 8

Z	T	S	O2	PO4	SIO3	NO2	NO3	DT
2	15.00	33.361	5.92	0.29	2.		0.0	322.4
12	14.98	33.364	5.95	0.29	2.		0.0	321.8
31	14.94	33.364	6.04	0.29	2.		0.0	320.9
40	14.89	33.389	5.90	0.29	2.		0.1	318.1
49	14.54	33.341	5.90	0.32	2.		0.5	314.5
63	11.59	33.398	5.96	0.51	5.		3.3	254.5
77	10.25	33.172	5.26	0.93	11.		11.1	248.7
96	9.77	33.362	4.74	1.18	15.		15.5	226.9
119	9.97	33.683	3.70	1.52	21.		19.9	206.3
138	9.61	33.852	3.13	1.69	26.		23.0	188.1
166	8.96	33.949	2.84	1.83	30.		25.5	170.9
193	8.56	33.987	2.74	1.95	34.		27.0	162.2
221	7.92	34.046	2.40	2.12	41.		29.5	148.6
259	7.52	34.078	2.01	2.36	47.		31.7	140.7
316	7.04	34.117	1.50	2.58	56.		34.7	131.4
388	6.43	34.178	0.95	2.89	67.		37.4	119.0
459	5.95	34.224	0.60	3.04	76.		39.2	109.7
536	5.57	34.281	0.39	3.22	84.		40.6	101.0

Z	T	S	O2	SIGT	DT	DD
0	15.00	33.361	5.92	24.731	322.4	0.000
10	14.98	33.366	5.94	24.736	321.9	0.032
20	14.97	33.368	5.99	24.741	321.4	0.064
30	14.94	33.366	6.04	24.746	321.0	0.097
50	14.35	33.347	5.90	24.857	310.4	0.160
75	10.37	33.188	5.38	25.497	249.5	0.230
100	9.80	33.421	4.56	25.774	223.2	0.290
125	9.89	33.747	3.49	26.014	200.4	0.343
150	9.33	33.909	2.95	26.233	179.5	0.392
200	8.40	34.003	2.66	26.453	158.7	0.478
250	7.59	34.075	2.10	26.629	142.0	0.555
300	7.17	34.107	1.64	26.714	133.9	0.626
400	6.34	34.187	0.88	26.888	117.3	0.757
500	5.73	34.255	0.47	27.019	104.9	0.874

RV DAVID STARR JORDAN — CALCOFI CRUISE 7712 — 87080

LATITUDE	LONGITUDE	MO/DAY/YR	MESSENGER TIME	BOTTOM	WIND	SPEED	WEATHER	DOMINANT WAVES
32 19.5N	121 43.0W	12/19/77	0340 GMT	4117M	010	17KT		

Z	T	S	O2	PO4	SIO3	NO2	NO3	DT
1	15.04	33.376	5.88	0.50	5.	0.01	0.5	322.1
10	15.04	33.375	5.89	0.41	5.	0.00	0.2	322.2
29	14.92	33.351	6.00	0.41	4.	0.01	0.2	321.5
38	14.82	33.353 U	5.95	0.39	4.	0.01	0.1	
47	14.86	33.359	5.91	0.39	4.	0.01	0.1	319.7
61	14.31	33.273	5.95	0.39	3.	0.01	0.0	314.8
75	11.30	33.321	4.95	0.89	18.	0.12	11.1	255.2
93	9.98	33.627	3.87	1.31	27.	0.01	19.2	210.6
115	9.16	33.800	3.37	1.58	33.	0.00	23.3	185.0
133	8.77	33.904	3.11	1.85	37.	0.01	25.2	171.4
160	8.39	34.001	2.74	1.96	42.	0.00	27.1	158.7
186	7.99	34.017	2.66	1.90	45.	0.00	28.2	151.8
213	7.64	34.029	2.42	2.12	49.	0.00	29.8	146.0
250	7.21	34.050	2.09	2.23	55.	0.01	31.6	138.6
306	6.78	34.108	1.33	2.46	64.	0.01	34.7	128.7
378	6.11	34.125	0.94	2.90	76.	0.00	38.0	119.1
451	5.79	34.212	0.60	3.08	84.	0.01	39.3	108.7
529	5.46	34.273	0.39	3.04	92.	0.02	40.2	100.3

Z	T	S	O2	SIGT	DT	DD
0	15.04	33.376	5.88	24.734	322.1	0.000
10	15.04	33.375	5.89	24.733	322.2	0.032
20	15.00	33.370	5.95	24.737	321.8	0.064
30	14.91	33.350	6.00	24.742	321.3	0.097
50	14.74	33.342	5.92	24.771	318.6	0.161
75	11.30	33.321	4.95	25.437	255.2	0.233
100	9.65	33.699	3.65	26.015	200.2	0.290
125	8.92	33.863	3.22	26.262	176.8	0.338
150	8.52	33.975	2.86	26.412	162.5	0.381
200	7.80	34.025	2.55	26.558	148.7	0.460
250	7.21	34.050	2.09	26.664	138.6	0.534
300	6.82	34.103	1.41	26.758	129.7	0.603
400	5.99	34.150	0.83	26.904	115.9	0.731
500	5.58	34.255	0.45	27.038	103.1	0.846

RV DAVID STARR JORDAN — CALCOFI CRUISE 7712 — 90033

LATITUDE	LONGITUDE	MO/DAY/YR	MESSENGER TIME	BOTTOM	WIND	SPEED	WEATHER	DOMINANT WAVES
33 18.5N	118 07.0W	12/16/77	2312 GMT	796M	230	11KT	0	250 4 4

Z	T	S	O2	PO4	SIO3	NO2	NO3	DT
1	17.14	33.564	5.79	0.09	1.	0.00	0.0	353.8
11	16.94	33.558	5.78	0.10	1.	0.00	0.0	349.7
30	15.68	33.440	6.15	0.16	2.	0.00	0.0	330.9
39	14.21	33.379	6.10	0.25	2.	0.03	0.0	305.0
48	13.60	33.383	5.84	0.34	3.	0.13	1.1	292.8
62	12.50	33.444	5.13	0.62	6.	0.07	6.6	267.5
76	11.83	33.473	4.83	0.77	9.	0.02	9.5	253.3
95	10.93	33.607	4.19	1.06	14.	0.00	14.6	227.8
119	10.41	33.755	3.59	1.31	19.	0.00	18.4	208.2
138	10.08	33.841	3.29	1.43	22.	0.00	20.5	196.4
166	9.49	33.948	2.83	1.65	26.	0.00	23.8	179.1
195	9.12	34.044	2.57	1.81	32.	0.00	25.9	166.3
223	8.83	34.125	2.07	1.88	37.	0.00	27.8	155.9
262	8.53	34.177	1.71	2.13	42.	0.00	29.6	147.6
317	7.98	34.213	1.32	2.32	49.	0.01	31.9	137.0
390	7.39	34.262	0.84	2.52	59.	0.00	34.9	125.3
459	6.87	34.283	0.58	2.70	67.	0.00	36.8	116.8
537	6.22	34.317	0.36	2.83	78.	0.00	39.1	106.1

Z	T	S	O2	SIGT	DT	DD
0	17.14	33.564	5.79	24.401	353.8	0.000
10	16.97	33.562	5.78	24.438	350.3	0.035
20	16.57	33.516	5.96	24.497	344.7	0.070
30	15.68	33.440	6.15	24.642	330.9	0.104
50	13.44	33.392	5.74	25.081	289.0	0.166
75	11.87	33.472	4.85	25.448	254.2	0.234
100	10.79	33.642	4.05	25.777	222.9	0.294
125	10.30	33.786	3.49	25.973	204.3	0.348
150	9.82	33.890	3.08	26.136	188.7	0.398
200	9.06	34.061	2.48	26.394	164.3	0.488
250	8.62	34.167	1.80	26.546	149.8	0.569
300	8.15	34.205	1.43	26.647	140.2	0.644
400	7.32	34.266	0.79	26.818	124.0	0.782
500	6.54	34.300	0.45	26.952	111.3	0.906

RV DAVID STARR JORDAN — CALCOFI CRUISE 7712 — 90037

LATITUDE	LONGITUDE	MO/DAY/YR	MESSENGER TIME	BOTTOM	WIND	SPEED	WEATHER	DOMINANT WAVES
33 11.0N	118 22.4W	12/16/77	1952 GMT	1156M	250	8KT	1	250 12 10

Z	T	S	O2	PO4	SIO3	NO2	NO3	DT
2	17.21	33.574	5.76	0.08	0.	0.00	0.0	354.6
12	17.09	33.570	5.75	0.08	0.	0.00	0.0	352.2
30	15.55	33.440	6.09	0.17	1.	0.00	0.0	328.1
39	14.12	33.404	5.97	0.24	2.	0.11	0.0	301.4
49	13.13	33.391	5.57	0.43	4.	0.34	0.8	283.2
62	12.25	33.458	4.96	0.40	7.	0.05	0.7	261.9
77	11.61	33.505	4.65	0.74	9.	0.03	9.9	247.0
96	10.75	33.633	4.09	1.00	15.	0.03	14.0	222.8
118	10.26	33.766	3.52	1.31	20.	0.02	19.0	204.9
138	9.67	33.912	3.00	1.57	26.	0.00	22.6	184.6
166	9.39	33.966	2.77	1.69	29.	0.00	24.0	176.3
194	9.21	34.024	2.58	1.72	31.	0.01	25.0	169.2
223	9.04	34.105	2.21	1.92	35.	0.00	26.8	160.6
261	8.63	34.164	1.82	2.08	41.	0.01	28.5	150.1
318	7.71	34.190	1.34	2.37	51.	0.00	32.4	135.0
389	7.15	34.230	0.91	2.55	53.	0.02	34.7	124.4
461	6.54	34.265	0.60	2.75	70.	0.00	37.4	113.9
541	6.15	34.306	0.39	2.92	78.	0.01	36.9U	106.0

Z	T	S	O2	SIGT	DT	DD
0	17.21	33.574	5.76	24.392	354.6	0.000
10	17.11	33.573	5.75	24.413	352.7	0.035
20	16.62	33.520	5.92	24.489	345.5	0.070
30	15.55	33.440	6.09	24.671	328.1	0.104
50	13.05	33.397	5.52	25.162	281.3	0.165
75	11.68	33.500	4.68	25.504	248.8	0.232
100	10.65	33.659	3.98	25.814	219.3	0.291
125	10.04	33.822	3.32	26.046	197.3	0.344
150	9.50	33.947	2.86	26.233	179.5	0.391
200	9.18	34.042	2.51	26.360	167.4	0.480
250	8.77	34.153	1.92	26.512	153.0	0.562
300	8.00	34.186	1.48	26.656	139.4	0.638
400	7.05	34.236	0.85	26.831	122.7	0.774
500	6.31	34.286	0.48	26.970	109.6	0.897

RV DAVID STARR JORDAN — CALCOFI CRUISE 7712 — 90045

LATITUDE	LONGITUDE	MO/DAY/YR	MESSENGER TIME	BOTTOM	WIND	SPEED	WEATHER	DOMINANT WAVES
32 54.5N	118 55.5W	12/16/77	1426 GMT	1664M	300	10KT	0	300 10 8

Z	T	S	O2	PO4	SIO3	NO2	NO3	DT	Z	T	S	O2	SIGT	DT	DD
1	16.39	33.561	5.79	0.07	1.	0.00	0.0	337.3	0	16.39	33.561	5.79	24.574	337.3	0.000
11	16.36	33.561	5.77	0.07	2.	0.00	0.0	336.7	10	16.36	33.563	5.77	24.580	336.7	0.034
29	16.37	33.561	5.76	0.06	1.	0.01	0.0	336.9	20	16.37	33.563	5.77	24.580	336.8	0.067
38	14.47	33.411	5.94	0.18	3.	0.05	0.4	307.9	30	16.17	33.544	5.79	24.610	333.9	0.101
48	13.45	33.396	5.74	0.33	4.	0.25	2.2	288.9	50	13.21	33.391	5.67	25.126	284.7	0.163
62	11.87	33.382	5.18	0.65	8.	0.05	7.7	260.7	75	11.13	33.492	4.68	25.600	239.7	0.229
76	11.09	33.500	4.65	0.87	12.	0.02	12.7	238.4	100	10.49	33.628	4.20	25.818	219.0	0.287
96	10.62	33.597	4.30	1.05	15.	0.00	14.7	223.3	125	9.86	33.790	3.64	26.051	196.8	0.339
118	9.96	33.758	3.75	1.29	21.	0.00	19.1	200.6	150	9.42	33.904	3.16	26.213	181.4	0.387
138	9.70	33.838	3.45	1.40	23.	0.00	20.9	190.6	200	8.64	34.051	2.53	26.453	158.7	0.474
165	9.07	33.979	2.81	1.68	30.	0.00	25.0	170.4	250	8.10	34.104	2.17	26.577	146.8	0.552
194	8.71	34.039	2.58	1.85	34.	0.00	26.7	160.5	300	7.79	34.158	1.64	26.665	138.5	0.626
222	8.38	34.082	2.34	1.92	39.	0.00	28.1	152.5	400	7.11	34.254	0.74	26.836	122.2	0.762
261	8.00	34.110	2.10	2.15	44.	0.01	30.0	145.0	500	6.37	34.305	0.39	26.978	108.8	0.884
319	7.70	34.182	1.40	2.41	51.	0.06	32.3	135.4							
390	7.19	34.247	0.80	2.71	61.	0.02	35.3	123.7							
461	6.65	34.283	0.49	2.86	69.	0.00	37.4	114.0							
536	6.11	34.324	0.34	3.04	79.	0.00	39.5	104.2							

RV DAVID STARR JORDAN — CALCOFI CRUISE 7712 — 90053

LATITUDE	LONGITUDE	MO/DAY/YR	MESSENGER TIME	BOTTOM	WIND	SPEED	WEATHER	DOMINANT WAVES
32 39.0N	119 28.5W	12/16/77	0940 GMT	1369M	320	19KT		

Z	T	S	O2	PO4	SIO3	NO2	NO3	DT	Z	T	S	O2	SIGT	DT	DD
2	14.46	33.429	5.90	0.34	2.	0.00	1.3	306.4	0	14.46	33.429	5.90	24.899	306.4	0.000
11	14.45	33.430	5.86	0.35	2.	0.00	1.4	306.1	10	14.45	33.432	5.86	24.902	306.1	0.031
30	14.46	33.429	5.96	0.38	2.	0.01	1.5	306.4	20	14.45	33.431	5.92	24.900	306.2	0.061
39	14.37	33.426	5.86	0.39	2.	0.03	1.7	304.8	30	14.46	33.429	5.96	24.899	306.4	0.092
48	13.40	33.394	5.49	0.56	5.	0.22	4.9	288.1	50	13.15	33.392	5.42	25.139	283.5	0.151
62	11.81	33.416	5.02	0.62	8.	0.13	6.5	257.1	75	11.20	33.532	4.57	25.618	238.0	0.217
76	11.17	33.540	4.54	0.92	12.	0.00	12.5	236.8	100	10.49	33.707	3.94	25.880	213.1	0.274
94	10.66	33.660	4.09	1.11	16.	0.00	15.7	219.3	125	9.91	33.867	3.39	26.103	191.9	0.325
117	10.05	33.824	3.55	1.35	21.	0.00	19.8	197.2	150	9.50	33.980	2.91	26.260	177.0	0.372
136	9.75	33.916	3.19	1.50	25.	0.00	22.0	185.6	200	9.09	34.071	2.46	26.397	164.0	0.459
163	9.30	34.024	2.69	1.71	30.	0.00	25.0	170.6	250	8.44	34.145	1.96	26.557	148.8	0.539
191	9.19	34.050	2.57	1.78	32.	0.00	25.6	166.9	300	8.08	34.198	1.49	26.653	139.6	0.613
219	8.84	34.113	2.22	1.88	37.	0.00	27.4	157.0	400	7.26	34.256	0.82	26.817	124.1	0.751
256	8.37	34.148	1.91	2.16	42.	0.00	29.5	147.5	500	6.37	34.301	0.41	26.974	109.2	0.874
311	8.02	34.208	1.39	2.23	49.	0.00	31.6	138.0							
381	7.43	34.242	0.95	2.51	57.	0.00	34.1	127.3							
449	6.83	34.285	0.55	2.60	67.	0.00	36.6	116.1							
522	6.17	34.302	0.40	2.77	77.	0.00	38.9	106.6							

RV DAVID STARR JORDAN — CALCOFI CRUISE 7712 — 90060

LATITUDE	LONGITUDE	MO/DAY/YR	MESSENGER TIME	BOTTOM	WIND	SPEED	WEATHER	DOMINANT WAVES
32 25.0N	119 57.6W	12/16/77	0410 GMT	957M	320	28KT		

Z	T	S	O2	PO4	SIO3	NO2	NO3	DT	Z	T	S	O2	SIGT	DT	DD
1	15.85	33.497	5.85	0.30	2.	0.00	0.1	330.3	0	15.85	33.497	5.85	24.648	330.3	0.000
9	15.84	33.497	5.78	0.37	2.	0.00	0.1	330.1	10	15.84	33.499	5.79	24.650	330.1	0.033
28	15.85	33.496	5.93	0.39	2.	0.00	0.1	330.4	20	15.85	33.499	5.87	24.648	330.2	0.066
38	15.83	33.492	5.84	0.27	2.	0.00	0.1	330.3	30	15.85	33.497	5.91	24.647	330.4	0.099
47	13.35	33.288	5.94	0.61	4.	0.08	1.7	294.9	50	12.93	33.270	5.88	25.089	288.4	0.161
61	12.08	33.264	5.55	0.56	7.	0.05	5.2	273.1	75	11.26	33.302	5.24	25.428	256.0	0.230
77	11.17	33.310	5.19	0.92	10.	0.12	9.4	253.8	100	10.41	33.529	4.42	25.754	225.0	0.290
95	10.58	33.478	4.60	1.21	14.	0.01	14.1	231.4	125	9.73	33.760	3.66	26.051	196.8	0.344
119	9.84	33.706	3.79	1.55	21.	0.00	20.0	202.6	150	9.08	33.918	3.26	26.279	175.2	0.391
138	9.48	33.858	3.43	1.67	25.		20.4	185.6	200	8.45	34.030	2.76	26.464	157.6	0.476
166	8.61	33.969	3.07	1.70	30.		21.2	164.2	250	7.74	34.072	2.25	26.605	144.2	0.553
194	8.56	34.022	2.82	1.98	35.		26.5	159.6	300	7.33	34.136	1.59	26.713	134.0	0.625
222	8.02	34.048	2.53	2.01	41.		28.3	149.9	400	6.60	34.235	0.75	26.891	117.1	0.756
260	7.67	34.080	2.14	2.25	46.		30.2	142.6	500	5.87	34.298	0.36	27.036	103.3	0.872
316	7.21	34.158	1.37	2.51	56.		30.4	130.6							
386	6.73	34.224	0.83	2.51	66.		30.0U	119.4							
456	6.12	34.269	0.49	3.25U	77.		39.2	108.4							
530	5.75	34.315	0.30	2.37U	84.		35.4U	100.6							

RV DAVID STARR JORDAN — CALCOFI CRUISE 7712 — 90070

LATITUDE	LONGITUDE	MO/DAY/YR	MESSENGER TIME	BOTTOM	WIND	SPEED	WEATHER	DOMINANT WAVES
32 04.5N	120 38.5W	12/15/77	2249 GMT	3738M	340	20KT	1	270 4 10

Z	T	S	O2	PO4	SIO3	NO2	NO3	DT	Z	T	S	O2	SIGT	DT	DD
1	15.91	33.538	5.79	0.23	1.	0.00	0.0	328.6	0	15.91	33.538	5.79	24.666	328.6	0.000
10	15.86	33.532	5.85	0.30	1.	0.00	0.0	328.0	10	15.86	33.532	5.85	24.672	328.0	0.033
29	15.62	33.516	5.97	0.30	1.	0.00	0.0	324.0	20	15.72	33.519	5.94	24.693	326.0	0.066
38	15.66	33.544	5.89	0.30	1.	0.00	0.0	322.8	30	15.62	33.521	5.96	24.715	323.9	0.098
47	15.64	33.552	5.83	0.30	2.	0.01	0.0	321.8	50	15.14	33.531	5.73	24.829	313.0	0.162
61	12.67	33.412	5.35	0.66	6.	0.27	6.6	273.0	75	10.02	33.204	5.17	25.570	242.6	0.232
75	10.02	33.204	5.17	0.95	12.	0.01	12.5	242.6	100	9.79	33.564	4.24	25.886	212.5	0.289
94	9.90	33.489	4.43	1.20	17.	0.01	17.0	219.6	125	9.41	33.775	3.54	26.114	190.9	0.340
117	9.48	33.724	3.76	1.42	22.	0.00	21.3	195.6	150	9.05	33.896	3.19	26.266	176.4	0.387
136	9.32	33.827	3.30	1.56	25.	0.00	23.4	185.5	200	8.05	34.015	2.78	26.513	152.9	0.471
165	8.71	33.953	3.14	1.69	30.	0.01	24.4	166.9	250	7.45	34.066	2.10	26.641	140.8	0.546
194	8.13	34.007	2.84	1.85	36.	0.00	27.6	154.5	300	7.23	34.155	1.38	26.743	131.1	0.616
222	7.82	34.035	2.55	1.99	41.	0.00	29.6	148.0	400	6.54	34.229	0.73	26.896	116.6	0.745
260	7.34	34.078	1.93	2.25	49.	0.00	32.5	138.3	500	5.92	34.286	0.41	27.021	104.7	0.862
318	7.21	34.186	1.18	2.52	56.	0.00	34.9	128.5							
390	6.61	34.223	0.77	2.66	66.	0.00	37.5	117.9							
461	6.14	34.263	0.51	2.78	74.	0.00	39.5	109.1							
536	5.73	34.306	0.35	2.98	82.	0.00	41.1	101.0							

RV DAVID STARR JORDAN — CALCOFI CRUISE 7712 — 90080

LATITUDE	LONGITUDE	MO/DAY/YR	MESSENGER TIME	BOTTOM	WIND	SPEED	WEATHER	DOMINANT WAVES
31 44.5N	121 19.5W	12/15/77	1709 GMT	3499M	280	15KT	2	300 4 6

Z	T	S	O2	PO4	SIO3	NO2	NO3	DT	Z	T	S	O2	SIGT	DT	DD
2	15.04	33.278	5.88	0.19	1.	0.00	0.0	329.3	0	15.04	33.278	5.88	24.659	329.3	0.000
12	15.02	33.282	5.91	0.21	1.	0.00	0.0	328.6	10	15.02	33.284	5.91	24.665	328.7	0.033
30	14.99	33.284	5.91	0.16	1.	0.00	0.0	327.8	20	15.01	33.283	5.91	24.668	328.4	0.066
39	14.88	33.275	6.01	0.23	1.	0.00	0.0	326.2	30	14.99	33.284	5.91	24.674	327.8	0.099
49	14.90	33.280	5.94	0.15	1.	0.01	0.0	326.3	50	14.89	33.280	5.94	24.692	326.1	0.164
63	14.72	33.257	5.93	0.22	1.	0.05	0.0	324.3	75	12.20	32.996	6.03	25.016	295.3	0.242
77	11.75	32.958	6.04		4.	0.25	2.0	289.8	100	10.41	33.114	5.40	25.431	255.8	0.312
96	10.60	33.027	5.65	0.81	7.	0.03	6.8	265.1	125	9.51	33.620	4.00	25.977	203.9	0.370
119	9.69	33.544	4.18	1.32	18.	0.00	18.9	212.2	150	8.95	33.819	3.44	26.223	180.5	0.418
138	9.18	33.731	3.74	1.51	24.	0.00	22.1	190.4	200	8.16	34.014	2.67	26.497	154.5	0.504
167	8.67	33.909	3.05	1.74	31.	0.00	25.7	169.6	250	7.61	34.052	2.22	26.608	143.9	0.580
195	8.20	34.007	2.70	1.90	37.	0.00	27.9	155.5	300	7.01	34.093	1.64	26.724	132.9	0.652
224	8.00	34.025	2.54	1.82	39.	0.00	28.6	151.3	400	6.24	34.165	0.90	26.883	117.8	0.782
262	7.41	34.064	2.05	2.19	48.	0.00	31.6	140.3	500	5.77	34.280	0.44	27.034	103.5	0.899
320	6.85	34.104	1.46	2.45	57.	0.04	34.7	129.9							
391	6.30	34.153	0.95	2.74	68.	0.00	37.7	119.3							
461	5.93	34.240	0.59	2.87	77.	0.00	39.4	108.3							
537	5.65	34.309	0.33	2.97	86.	0.00	40.7	99.8							

RV DAVID STARR JORDAN — CALCOFI CRUISE 7712 — 93029

LATITUDE	LONGITUDE	MO/DAY/YR	MESSENGER TIME	BOTTOM	WIND	SPEED	WEATHER	DOMINANT WAVES
32 52.8N	117 26.3W	12/14/77	0123 GMT	593M	300	9KT	4	280 3 6

Z	T	S	O2	PO4	SIO3	NO2	NO3	DT	Z	T	S	O2	SIGT	DT	DD
2	17.02	33.550	5.71	0.04	0.		0.0	352.1	0	17.02	33.550	5.71	24.419	352.1	0.000
12	17.02	33.549	5.78	0.19	1.		0.0	352.2	10	17.02	33.551	5.76	24.418	352.2	0.035
30	16.37	33.499	6.12	0.19	1.		0.0	341.4	20	16.73	33.528	6.00	24.468	347.4	0.070
41	15.05	33.444	5.63	0.20	2.		0.0	317.4	30	16.37	33.499	6.12	24.531	341.4	0.105
51	14.60	33.435	5.41	0.32	4.		1.2	308.8	50	14.63	33.437	5.43	24.868	309.3	0.170
65	14.09	33.439	5.26	0.37	5.		2.4	298.3	75	13.22	33.439	5.19	25.161	281.4	0.244
79	12.86	33.443	5.14	0.36	6.		3.4	274.3	100	12.13	33.558	4.35	25.466	252.5	0.312
98	12.17	33.547	4.41	0.51	6.		10.0	253.9	125	11.45	33.641	3.90	25.657	234.3	0.373
121	11.63	33.633	3.91	0.73	11.		13.1	237.9	150	10.41	33.753	3.59	25.928	208.5	0.429
140	10.74	33.677	3.86	1.06	15.		15.7	219.4	200	9.40	34.017	2.59	26.305	172.7	0.526
167	9.99	33.888	3.07	1.11	17.		21.9	191.5	250	8.64	34.089	2.25	26.483	155.8	0.611
194	9.46	33.999	2.66	1.52	24.		24.9	174.9	300	8.04	34.171	1.63	26.637	141.1	0.687
221	9.19	34.057	2.41	1.70	29.		26.1	166.4	400	7.30	34.264	0.83	26.818	124.0	0.826
259	8.46	34.097	2.20	1.73	32.		32.1	152.5	500	6.41	34.305	0.44	26.972	109.4	0.949
315	7.94	34.196	1.40	2.23	49.		34.3	137.7							
386	7.43	34.257	0.91	2.55	58.		34.7	126.2							
457	6.77	34.285	0.56	2.71	67.		36.7	115.4							
533	6.16	34.320	0.40	3.20	79.		38.6	105.1							

RV DAVID STARR JORDAN — CALCOFI CRUISE 7712 — 93030

LATITUDE	LONGITUDE	MO/DAY/YR	MESSENGER TIME	BOTTOM	WIND	SPEED	WEATHER	DOMINANT WAVES
32 50.5N	117 31.0W	12/14/77	0351 GMT	851M	320	7KT		

Z	T	S	O2	PO4	SIO3	NO2	NO3	DT	Z	T	S	O2	SIGT	DT	DD
1	17.12	33.559	5.73	0.14	2.	0.00	0.9	353.7	0	17.12	33.559	5.73	24.402	353.7	0.000
11	17.08	33.557	5.73	0.40	4.	0.51	1.5	352.9	10	17.08	33.559	5.73	24.409	353.0	0.035
30	15.07	33.444	5.56	0.40	5.	0.31	2.4	317.8	20	16.21	33.503	5.68	24.569	337.8	0.070
39	14.55	33.430	5.40	0.50	5.	0.34	2.8	308.1	30	15.07	33.444	5.56	24.779	317.8	0.103
49	14.21	33.430	5.38	0.49	5.	0.34	2.7	301.3	50	14.13	33.433	5.35	24.969	299.7	0.165
63	13.09	33.454	4.97	0.68	7.	0.02	6.2	277.8	75	12.63	33.495	4.93	25.321	266.2	0.236
76	12.60	33.497	4.93	0.72	9.	0.02	8.2	265.4	100	12.06	33.579	4.22	25.495	249.6	0.301
95	12.14	33.563	4.32	0.90	11.	0.02	10.9	252.2	125	11.48	33.646	3.89	25.655	234.4	0.362
119	11.68	33.627	3.95	1.08	14.	0.00	13.6	239.3	150	10.73	33.723	3.65	25.849	216.0	0.419
136	11.09	33.678	3.80	1.26	17.	0.00	15.8	225.2	200	9.46	33.987	2.68	26.271	175.9	0.519
164	10.41	33.776	3.44	1.40	20.	0.00	19.1	206.6	250	8.62	34.071	2.34	26.472	156.8	0.604
193	9.63	33.965	2.74	1.76	27.	0.00	23.9	180.1	300	8.37	34.177	1.64	26.592	145.4	0.682
221	9.02	34.022	2.57	1.73	32.	0.00	25.8	166.4	400	7.25	34.241	0.83	26.807	125.0	0.823
258	8.54	34.083	2.26	1.87	37.	0.00	27.9	154.8	500	6.41	34.304	0.37	26.971	109.5	0.947
313	8.33	34.201	1.44	2.23	45.	0.00	30.4	142.9							
384	7.42	34.229	0.93	2.48	57.	0.00	33.9	128.1							
456	6.74	34.280	0.52	2.63	67.	0.00	36.8	115.3							
533	6.21	34.316	0.30	2.77	77.	0.00	38.8	106.0							

RV DAVID STARR JORDAN — CALCOFI CRUISE 7712 — 93040

LATITUDE	LONGITUDE	MO/DAY/YR	MESSENGER TIME	BOTTOM	WIND	SPEED	WEATHER	DOMINANT WAVES
32 29.9N	118 11.5W	12/14/77	1059 GMT	1757M	290	6KT		

Z	T	S	O2	PO4	SIO3	NO2	NO3	DT	Z	T	S	O2	SIGT	DT	DD
0	17.02	33.581	5.76	0.12	1.	0.00	0.1	349.8	0	17.02	33.581	5.76	24.443	349.8	0.000
10	16.99	33.581	5.76	0.12	1.	0.00	0.2	349.2	10	16.99	33.581	5.76	24.450	349.2	0.035
29	14.70	33.382	6.22	0.23	2.	0.00	0.1	314.7	20	15.98	33.472	6.07	24.596	335.2	0.069
39	13.38	33.401	5.79	0.45	4.	0.14	2.3	287.2	30	14.56	33.383	6.19	24.840	312.0	0.102
48	12.52	33.446	5.21	0.76	6.	0.11	6.6	267.7	50	12.38	33.461	5.10	25.344	264.1	0.159
63	11.75	33.537	4.55	0.96	10.	0.00	10.6	247.1	75	11.61	33.563	4.33	25.567	242.8	0.223
77	11.60	33.565	4.30	1.09	11.	0.00	12.6	242.4	100	10.96	33.697	3.69	25.788	221.8	0.282
96	11.09	33.667	3.83	1.30	16.	0.00	16.0	226.1	125	10.36	33.847	3.10	26.010	200.7	0.335
120	10.42	33.826	3.12	1.61	21.	0.00	20.4	203.1	150	10.11	33.938	2.87	26.124	189.9	0.385
139	10.25	33.890	3.07	1.79	24.	0.00	21.7	195.6	200	9.67	34.108	2.16	26.331	170.2	0.477
167	9.91	34.008	2.51	1.91	28.	0.00	24.1	181.3	250	9.16	34.184	1.85	26.474	156.6	0.561
195	9.70	34.090	2.23	2.34	31.	0.00	25.6	171.9	300	8.41	34.237	1.36	26.634	141.4	0.638
223	9.51	34.170	1.87	2.30	34.	0.00	27.0	163.0	400	7.25	34.263	0.76	26.824	123.4	0.776
260	9.01	34.183	1.84	2.32	38.	0.00	28.3	154.3	500	6.62	34.282	0.49	26.927	113.7	0.901
316	8.17	34.258	1.14	2.70	48.	0.00	31.8	136.4							
387	7.33	34.256	0.81	2.85	58.	0.00	34.6	124.9							
459	6.95	34.286	0.57	3.04	64.	0.00	36.2	117.6							
535	6.28	34.280	0.46	3.28	70.	0.00	37.2	109.6							

RV DAVID STARR JORDAN — CALCOFI CRUISE 7712 — 93050

LATITUDE	LONGITUDE	MO/DAY/YR	MESSENGER TIME	BOTTOM	WIND	SPEED	WEATHER	DOMINANT WAVES
32 11.0N	118 53.0W	12/14/77	1750 GMT	1341M	300	20KT	1	290 6 7

Z	T	S	O2	PO4	SIO3	NO2	NO3	DT	Z	T	S	O2	SIGT	DT	DD
1	16.54	33.475	5.68	0.20	1.	0.00	0.0	346.9	0	16.54	33.475	5.68	24.474	346.9	0.000
11	16.53	33.477	5.63	0.25	1.	0.00	0.1	346.5	10	16.53	33.479	5.63	24.477	346.6	0.035
30	16.52	33.479	5.77	0.25	1.	0.00	0.1	346.2	20	16.53	33.480	5.70	24.479	346.4	0.069
40	14.16	33.282	6.08	0.25	2.	0.02	0.3	311.2	30	16.52	33.479	5.77	24.481	346.2	0.104
49	12.99	33.245	5.94	0.35	3.	0.10	1.7	291.4	50	12.89	33.244	5.92	25.074	289.7	0.168
62	12.08	33.252	5.60	0.51	6.	0.09	4.3	274.0	75	11.72	33.309	5.32	25.350	263.5	0.237
77	11.68	33.320	5.27	0.55	7.	0.06	8.0	261.9	100	10.82	33.589	4.37	25.730	227.3	0.299
96	10.98	33.540	4.56	0.74	12.	0.01	12.8	233.6	125	9.92	33.819	3.46	26.065	195.5	0.353
119	10.10	33.781	3.58	1.18	20.	0.00	19.4	201.2	150	9.54	33.953	3.02	26.233	179.5	0.400
137	9.63	33.878	3.27	1.18	24.	0.03	19.4	186.5	200	9.06	34.147	2.18	26.461	157.8	0.486
164	9.50	34.025	2.76	1.57	27.	0.01	23.6	173.6	250	8.48	34.228	1.53	26.615	143.2	0.564
192	9.17	34.123	2.32	1.88	34.	0.01	26.2	161.2	300	8.09	34.254	1.22	26.696	135.6	0.636
219	8.81	34.192	1.87	1.96	39.	0.01	27.9	150.7	400	6.99	34.287	0.75	26.880	118.1	0.768
257	8.42	34.231	1.47	2.47U	46.	0.01	30.5U	142.0	500	5.99	34.306	0.45	27.027	104.1	0.886
313	7.99	34.258	1.16	2.19	51.	0.04	29.8	133.8							
383	7.28	34.299	0.80	2.54	60.	0.01	33.4	121.0							
455	6.14	34.254 A	0.60	2.82	74.	0.00	38.3	109.8							
532	5.88	34.333	0.34	2.98	81.	0.00	39.6	100.8							

A) AN ERROR OF 0.002 (-0.08 PPT) IN THE CONDUCTIVITY RATIO HAS BEEN ASSUMED FOR THIS VALUE.

RV DAVID STARR JORDAN — CALCOFI CRUISE 7712 — 93060

LATITUDE	LONGITUDE	MO/DAY/YR	MESSENGER TIME	BOTTOM	WIND	SPEED	WEATHER	DOMINANT WAVES
31 50.1N	119 34.0W	12/15/77	0024 GMT	1856M	310	21KT	1	310 9 6

Z	T	S	O2	PO4	SIO3	NO2	NO3	DT	Z	T	S	O2	SIGT	DT	DD
1	17.02	33.563	5.71	0.31	1.	0.00	0.1	351.2	0	17.02	33.563	5.71	24.429	351.2	0.000
11	17.00	33.567	5.73	0.19	1.	0.00	0.1	350.4	10	17.00	33.568	5.73	24.436	350.5	0.035
29	15.79	33.472	6.05	0.19	1.	0.00	0.1	330.9	20	16.40	33.519	5.92	24.539	340.6	0.070
39	13.22	33.350	5.89	0.34	3.	0.19	1.2	287.9	30	15.51	33.456	6.04	24.690	326.3	0.103
48	12.88	33.382	5.66	0.42	4.	0.21	3.1	279.1	50	12.83	33.387	5.62	25.198	278.0	0.164
62	12.50	33.406	5.39	0.57	6.	0.14	5.1	270.3	75	11.80	33.471	4.96	25.459	253.1	0.231
76	11.74	33.475	4.92	0.65	9.	0.07	9.5	251.5	100	10.53	33.664	4.01	25.839	217.0	0.290
94	10.72	33.618	4.17	1.07	15.	0.02	15.6	223.4	125	9.87	33.824	3.55	26.076	194.4	0.342
117	10.12	33.775	3.69	1.27	20.	0.01	19.1	201.9	150	9.25	33.957	3.06	26.282	176.8	0.389
137	9.51	33.888	3.35	1.50	25.	0.01	22.0	183.9	200	8.53	34.073	2.52	26.487	155.4	0.473
163	9.04	34.010	2.80	1.73	31.	0.00	25.0	167.6	250	7.95	34.106	2.08	26.601	144.6	0.550
191	8.60	34.058	2.62	1.96	35.	0.00	26.9	157.5	300	7.50	34.161	1.47	26.710	134.3	0.622
219	8.38	34.094	2.31	2.07	39.	0.00	28.3	151.6	400	6.64	34.244	0.66	26.894	116.7	0.753
256	7.86	34.107	2.03	2.34	45.	0.00	30.4	143.2	500	5.94	34.287	0.37	27.018	105.0	0.870
313	7.41	34.178	1.30	2.45	54.	0.00	33.1	131.8							
384	6.78	34.239	0.73	2.72	65.	0.00	36.2	118.9							
456	6.19	34.259	0.48	2.83	74.	0.00	38.3	110.0							
532	5.82	34.314	0.32	3.13	82.	0.00	40.1	101.5							

RV DAVID STARR JORDAN — CALCOFI CRUISE 7712 — 93070

LATITUDE	LONGITUDE	MO/DAY/YR	MESSENGER TIME	BOTTOM	WIND	SPEED	WEATHER	DOMINANT WAVES
31 30.2N	120 14.0W	12/15/77	0554 GMT	3832M	310	24KT		

Z	T	S	O2	PO4	SIO3	NO2	NO3	DT	Z	T	S	O2	SIGT	DT	DD
1	16.69	33.551	5.76	0.14	1.	0.00	0.0	344.7	0	16.69	33.551	5.76	24.497	344.7	0.000
10	16.68	33.550	5.81	0.13	1.	0.00	0.0	344.5	10	16.68	33.550	5.81	24.498	344.5	0.034
29	16.70	33.550	5.90	0.12	1.	0.00	0.0	345.0	20	16.69	33.552	5.87	24.496	344.8	0.069
39	16.60	33.536	5.88	0.18	1.	0.00	0.0	343.8	30	16.69	33.550	5.90	24.495	344.8	0.104
48	15.18	33.359	6.17	0.20	2.	0.00	0.0	326.3	50	14.72	33.325	6.16	24.761	319.6	0.170
62	12.31	33.218	5.90	0.41	5.	0.06	1.4	280.7	75	11.73	33.296	5.62	25.338	264.7	0.244
76	11.72	33.303	5.59		7.	0.02	7.6	263.8	100	10.29	33.500	4.56	25.753	225.1	0.305
94	10.53	33.446	4.78		12.	0.01	13.0	233.0	125	9.69	33.724	3.68	26.028	199.0	0.359
117	9.84	33.649	3.98	1.18	19.	0.00	19.8	206.8	150	9.28	33.877	3.03	26.215	181.2	0.407
136	9.52	33.812	3.30	1.34	24.		21.7	189.7	200	8.31	34.034	2.51	26.490	155.2	0.493
163	9.04	33.916	2.87	1.61	29.		25.1	174.6	250	7.72	34.100	1.88	26.630	141.9	0.569
190	8.48	34.011	2.61	1.99	35.		28.0	159.2	300	7.19	34.147	1.29	26.742	131.2	0.640
217	8.07	34.061	2.32	1.95	41.		29.4	149.6	400	6.45	34.210	0.75	26.891	117.0	0.769
254	7.68	34.102	1.83	2.05	47.		31.7	141.1	500	5.95	34.295	0.32	27.023	104.5	0.886
310	7.09	34.154	1.19	2.20	57.		32.6	129.3							
381	6.55	34.194	0.86	2.39	66.		36.0	119.4							
453	6.21	34.254	0.47	2.72	73.		38.9	110.7							
529	5.78	34.319	0.27	2.79	82.		39.8	100.6							

RV DAVID STARR JORDAN — CALCOFI CRUISE 7712 — 93080

LATITUDE	LONGITUDE	MO/DAY/YR	MESSENGER TIME	BOTTOM	WIND	SPEED	WEATHER	DOMINANT WAVES
31 10.0N	120 54.4W	12/15/77	1142 GMT	3926M	310	19KT		

Z	T	S	O2	PO4	SIO3	NO2	NO3	DT	Z	T	S	O2	SIGT	DT	DD
1	16.46	33.266	5.71	0.14	1.	0.00	0.0	360.4	0	16.46	33.266	5.71	24.332	360.4	0.000
11	16.42	33.273	5.75	0.07	1.	0.00	0.0	359.0	10	16.42	33.275	5.75	24.346	359.1	0.036
29	16.45	33.272	5.85	0.06	1.	0.00	0.0	359.7	20	16.44	33.275	5.81	24.343	359.4	0.072
39	16.04	33.296	5.80	0.06	1.	0.00	0.0	349.1	30	16.42	33.277	5.84	24.347	359.0	0.108
48	15.38	33.307	5.88	0.03	1.	0.07	0.0	334.3	50	14.97	33.271	5.92	24.666	328.5	0.177
62	12.63	33.062	6.10	0.09	3.	0.07		298.0	75	12.44	33.068	5.83	25.029	294.1	0.255
76	12.43	33.069	5.80	0.09	3.	0.09	1.3	293.8	100	10.52	33.173	5.37	25.458	253.2	0.324
95	10.72	33.127	5.47	0.47	8.	0.03	8.5	259.7	125	9.98	33.463	4.67	25.776	223.0	0.384
118	10.14	33.369	4.91	0.86	13.	0.01	14.0	232.3	150	9.52	33.713	3.87	26.047	197.2	0.437
137	9.73	33.609	4.24	1.10	18.	0.00	18.5	208.0	200	8.71	33.989	3.02	26.393	164.4	0.529
165	9.31	33.800	3.53	1.31	24.	0.01	22.3	187.3	250	7.83	34.057	2.45	26.579	146.6	0.609
193	8.86	33.968	3.09	1.48	29.	0.01	24.8	168.0	300	7.24	34.107	1.75	26.704	134.9	0.682
221	8.27	34.022	2.81	1.66	35.	0.00	27.3	155.4	400	6.37	34.207	0.78	26.900	116.2	0.812
258	7.73	34.063	2.34	2.12	44.	0.00	30.6	144.7	500	5.67	34.274	0.41	27.042	102.7	0.928
315	7.09	34.121	1.55	2.36	54.	0.01	34.1	131.8							
386	6.50	34.198	0.86	2.72	66.	0.00	37.8	118.4							
456	5.89	34.236	0.54	2.91	77.	0.00	40.1	108.1							
531	5.59	34.305	0.35	2.99	84.	0.00	41.2	99.4							

RV DAVID STARR JORDAN — CALCOFI CRUISE 7712 — 94031

LATITUDE	LONGITUDE	MO/DAY/YR	MESSENGER TIME	BOTTOM	WIND	SPEED	WEATHER	DOMINANT WAVES
32 38.0N	117 27.0W	12/ 5/77	2224 GMT	371M	270	4KT	4	270 2 6

Z	T	S	O2	PO4	SIO3	NO2	NO3	DT	Z	T	S	O2	SIGT	DT	DD
2A	17.75	33.582	5.75					366.4	0	17.75	33.582	5.75	24.269	366.4	0.000
12	17.20	33.565	5.80					355.1	10	17.36	33.575	5.79	24.357	358.0	0.036
23	15.91	33.486	6.00					332.4	20	16.26	33.508	5.95	24.561	338.6	0.071
32	15.35	33.463	5.99					322.2	30	15.46	33.469	5.99	24.711	324.3	0.104
52	13.50	33.399	5.76					289.7	50	13.69	33.403	5.78	25.038	293.1	0.166
75	12.33	33.536	4.68					257.6	75	12.33	33.536	4.68	25.411	257.6	0.236
98	11.84	33.602	4.00					243.9	100	11.83	33.606	3.95	25.559	243.5	0.299
123	11.65	33.643	3.56					237.5	125	11.60	33.653	3.56	25.638	236.1	0.359
146	11.00	33.747						218.6	150	10.86	33.759	3.52	25.854	215.6	0.417
170	10.25	33.807	3.49					201.7	200	9.73	33.950	2.86	26.198	182.8	0.518
193	9.89	33.897	3.08					189.2	250	8.86	34.122	2.17	26.474	156.6	0.605
216	9.37	34.062	2.38					168.8	300	8.56	34.211	1.60	26.591	145.6	0.683
240	9.09	34.123						160.0							
262	8.62	34.122	2.15					153.0							
287	8.64	34.201	1.70					147.5							
310	8.47	34.210	1.55					144.3							
334	8.27	34.233	1.43					139.7							
357	7.98	34.244	1.21					134.7							

RV DAVID STARR JORDAN — CALCOFI CRUISE 7712 — 94031

LATITUDE	LONGITUDE	MO/DAY/YR	MESSENGER TIME	BOTTOM	WIND	SPEED	WEATHER	DOMINANT WAVES
32 38.0N	117 27.0W	12/ 6/77	2135 GMT					

Z	T	S	O2	PO4	SIO3	NO2	NO3	DT	Z	T	S	O2	SIGT	DT	DD
4A	17.04	33.661	5.70					344.5	0	17.10	33.660	5.70	24.484	345.9	0.000
13	16.90	33.643	5.81					342.6	10	16.95	33.651	5.76	24.512	343.2	0.034
28	15.09	33.543	6.11					310.9	20	16.11	33.595	5.96	24.663	328.9	0.068
36	14.59	33.525	6.14					302.0	30	14.96	33.539	6.12	24.875	308.6	0.100
44	13.91	33.516	5.95					289.1	50	13.48	33.533	5.70	25.181	279.5	0.159
57	13.06	33.555	5.41					269.8	75	12.39	33.587	5.06	25.438	255.1	0.226
72	12.48	33.576	5.14					257.4							
96	11.96	33.692	4.27					239.4							

RV DAVID STARR JORDAN — CALCOFI CRUISE 7712 — 97030

LATITUDE	LONGITUDE	MO/DAY/YR	MESSENGER TIME	BOTTOM	WIND	SPEED	WEATHER	DOMINANT WAVES
32 16.1N	117 07.1W	12/13/77	0037 GMT	56M	340	16KT	1	340 3 4

Z	T	S	O2	PO4	SIO3	NO2	NO3	DT	Z	T	S	O2	SIGT	DT	DD
1	16.87	33.533	5.91	0.18	1.	0.00	0.0	350.0	0	16.87	33.533	5.91	24.441	350.0	0.000
10	16.84	33.526	5.98	0.15	1.	0.00	0.0	349.8	10	16.84	33.526	5.98	24.443	349.8	0.035
20	16.10	33.482	6.06	0.20	1.	0.00	0.0	336.8	20	16.10	33.482	6.06	24.580	336.8	0.069
29	15.30	33.450	5.78	0.31	4.	0.24	1.0	322.1	30	15.24	33.449	5.75	24.744	321.1	0.102
49	14.49	33.450	5.34	0.43	6.	0.26	2.5	305.5	50	14.45	33.453	5.34	24.919	304.4	0.165

RV DAVID STARR JORDAN — CALCOFI CRUISE 7712 — 97035

LATITUDE	LONGITUDE	MO/DAY/YR	MESSENGER TIME	BOTTOM	WIND	SPEED	WEATHER	DOMINANT WAVES
32 05.5N	117 27.4W	12/12/77	2044 GMT	1295M	330	12KT	1	330 3 4

Z	T	S	O2	PO4	SIO3	NO2	NO3	DT	Z	T	S	O2	SIGT	DT	DD
1	17.35	33.496	5.55	0.18	1.	0.00	0.0	363.5	0	17.35	33.496	5.55	24.300	363.5	0.000
11	17.27	33.496	5.58	0.17	1.	0.00	0.0	361.7	10	17.28	33.498	5.58	24.317	361.9	0.036
30	15.63	33.280	5.96	0.16	1.	0.00	0.0	341.5	20	16.72	33.412	5.73	24.383	355.5	0.072
39	14.27	33.187	6.17	0.15	1.	0.00	0.0	320.3	30	15.65	33.280	5.96	24.530	341.5	0.107
48	13.76	33.180	6.07	0.14	2.	0.00	0.0	310.8	50	13.66	33.185	6.06	24.875	308.6	0.172
62	13.06	33.246	5.87	0.36	6.	0.12	2.5	292.5	75	12.24	33.420	5.11	25.338	264.7	0.244
76	12.18	33.432	5.05	0.74	8.	0.00	8.7	262.5	100	11.46	33.576	4.30	25.604	239.3	0.308
94	11.62	33.547	4.44	0.88	12.	0.00	13.3	244.1	125	10.81	33.672	3.89	25.796	221.0	0.366
118	11.00	33.644	3.99	1.19	18.	0.00	17.3	226.2	150	10.33	33.852	3.23	26.019	199.8	0.419
136	10.53	33.723	3.71	1.18	21.	0.00	18.5	212.5	200	9.61	34.108	2.33	26.342	169.2	0.513
164	10.18	33.981	2.75	1.60	26.	0.00	23.1	187.7	250	8.99	34.149	2.00	26.473	156.7	0.597
192	9.71	34.101	2.35	1.73	31.	0.00	25.5	171.3	300	8.36	34.171	1.72	26.590	145.6	0.675
220	9.38	34.107	2.31	1.78	35.	0.00	27.4	165.6	400	7.33	34.255	0.82	26.807	125.0	0.816
258	8.89	34.159	1.91	2.08	41.	0.00	29.4	154.3	500	6.38	34.293	0.42	26.966	109.9	0.941
314	8.19	34.172	1.66	2.51	47.	0.01	31.9	143.1							
384	7.52	34.249	0.91	2.66	57.	0.01	34.2	128.0							
456	6.70	34.268	0.59	2.76	65.	0.00	36.3	115.7							
532	6.24	34.315	0.31	3.12	76.	0.00	39.2	106.5							

A) THE POSITION WAS NOT RECORDED FOR THIS TRAINING STATION AND IS ONLY APPROXIMATE.

RV DAVID STARR JORDAN — CALCOFI CRUISE 7712 — 97040

LATITUDE	LONGITUDE	MO/DAY/YR	MESSENGER TIME	BOTTOM	WIND	SPEED	WEATHER	DOMINANT WAVES
31 56.0N	117 48.0W	12/12/77	1714 GMT	1387M	340	15KT	1	320 4 5

Z	T	S	O2	PO4	SIO3	NO2	NO3	DT	Z	T	S	O2	SIGT	DT	DD
1	17.06	33.523	5.62	0.07	1.		0.0	355.0	0	17.06	33.523	5.62	24.389	355.0	0.000
11	17.05	33.523	5.68	0.08	1.		0.0	354.7	10	17.05	33.525	5.68	24.391	354.7	0.036
30	17.07	33.521	5.67	0.09	2.		0.0	355.3	20	17.06	33.524	5.68	24.388	355.0	0.071
40	16.33	33.438	5.77	0.10	2.		0.0	345.0	30	17.07	33.521	5.67	24.385	355.3	0.107
49	14.92	33.278	6.05	0.12	2.		0.0	326.8	50	14.75	33.273	6.05	24.715	323.9	0.175
63	12.78	33.270	5.77	0.44	4.		1.9	285.5	75	11.56	33.298	5.38	25.371	261.5	0.248
78	11.35	33.311	5.27	0.66	8.		7.0	256.8	100	11.11	33.584	4.29	25.673	232.7	0.311
97	11.13	33.554	4.41	0.89	11.		11.2	235.1	125	10.73	33.743	3.57	25.866	214.4	0.367
120	10.89	33.721	3.66	1.14	15.		14.6	218.7	150	10.07	33.853	3.18	26.066	195.4	0.419
139	10.25	33.795	3.38	1.18	18.		17.0	202.6	200	9.30	34.076	2.39	26.368	166.7	0.511
167	9.87	33.942	2.86	1.30	25.		21.5	185.6	250	8.76	34.155	1.98	26.515	152.8	0.593
195	9.38	34.067	2.42	1.45	30.		23.8	168.6	300	8.35	34.235	1.33	26.641	140.7	0.669
223	8.96	34.098	2.30	1.53	33.		25.3	159.9	400	7.35	34.265	0.86	26.811	124.6	0.808
260	8.71	34.176	1.84	1.77	38.		27.0	150.4	500	6.59	34.293	0.51	26.938	112.6	0.933
315	8.20	34.249	1.17	1.96	46.		29.8	137.5							
386	7.46	34.262	0.91	2.36	57.		33.0	126.2							
456	6.96	34.274	0.67	2.64	70.		36.0	118.6							
531	6.31	34.310	0.40	2.67	76.		37.3	107.7							

RV DAVID STARR JORDAN — CALCOFI CRUISE 7712 — 97050

LATITUDE	LONGITUDE	MO/DAY/YR	MESSENGER TIME	BOTTOM	WIND	SPEED	WEATHER	DOMINANT WAVES
31 36.0N	118 30.6W	12/12/77	1055 GMT	2416M	320	15KT		

Z	T	S	O2	PO4	SIO3	NO2	NO3	DT	Z	T	S	O2	SIGT	DT	DD
1	17.36	33.514	5.62	0.29	2.	0.00	0.0	362.4	0	17.36	33.514	5.62	24.311	362.4	0.000
10	17.37	33.509	5.61	0.26	2.	0.01	0.0	363.0	10	17.37	33.509	5.61	24.305	363.0	0.036
29	16.00	33.404	5.96	0.23	2.	0.01	0.0	340.3	20	16.77	33.473	5.79	24.417	352.2	0.072
39	15.27	33.281	5.98	0.21	2.	0.00	0.0	333.8	30	15.96	33.395	5.96	24.543	340.3	0.107
48	13.35	33.182	6.13	0.28	3.	0.03	0.7	302.7	50	13.05	33.173	6.10	24.989	297.9	0.171
62	11.84	33.170	5.76	0.53	6.	0.20	4.5	275.8	75	11.26	33.298	5.29	25.425	256.3	0.240
77	11.21	33.319	5.22	0.74	9.	0.05	9.1	253.8	100	10.55	33.490	4.60	25.701	230.1	0.302
95	10.71	33.452	4.75	0.93	12.	0.02	13.0	235.5	125	9.86	33.653	3.98	25.945	206.9	0.357
119	9.98	33.618	4.09	1.21	18.	0.00	17.6	211.3	150	9.41	33.804	3.58	26.137	188.6	0.407
138	9.63	33.722	3.77	1.33	22.	0.01	19.4	198.1	200	8.64	34.007	2.70	26.418	161.9	0.496
166	9.12	33.901	3.32	1.56	28.	0.00	22.9	176.9	250	8.09	34.086	2.21	26.563	148.1	0.576
194	8.69	33.989	2.77	1.70	33.	0.00	25.5	163.9	300	7.38	34.101	1.79	26.679	137.2	0.649
222	8.45	34.053	2.49	1.88	37.	0.00	27.5	155.7	400	6.47	34.211	0.82	26.891	117.1	0.782
259	7.96	34.090	2.12	2.07	44.	0.00	29.3	145.9	500	6.06	34.314	0.35	27.025	104.3	0.899
314	7.19	34.103	1.69	2.32	53.	0.00	32.4	134.4							
383	6.52	34.179		2.62	65.	0.00	35.5	120.1							
452	6.35	34.294	0.42	2.81	73.	0.00	36.9	109.4							
525	5.85	34.316	0.31	2.91	81.	0.00	39.3	101.7							

RV DAVID STARR JORDAN — CALCOFI CRUISE 7712 — 97060

LATITUDE	LONGITUDE	MO/DAY/YR	MESSENGER TIME	BOTTOM	WIND	SPEED	WEATHER	DOMINANT WAVES
31 15.7N	119 10.0W	12/12/77	0356 GMT	3546M	330	15KT		

Z	T	S	O2	PO4	SIO3	NO2	NO3	DT	Z	T	S	O2	SIGT	DT	DD
1	16.57	33.609	5.70	0.02	1.	0.03	0.0	337.8	0	16.57	33.609	5.70	24.569	337.8	0.000
10	16.55	33.609	5.71	0.00	1.	0.03	0.0	337.4	10	16.55	33.609	5.71	24.574	337.4	0.034
30	16.56	33.610	5.80	0.00	1.	0.00	0.0	337.5	20	16.56	33.611	5.76	24.573	337.4	0.068
39	15.43	33.551	5.81	0.07	2.	0.05	0.5	317.5	30	16.56	33.610	5.80	24.572	337.5	0.101
46	13.63	33.426	5.64	0.23	5.	0.17	2.8	290.2	50	12.83	33.374	5.54	25.187	279.0	0.163
62	11.28	33.318	5.17	0.62	9.	0.08	8.5	255.1	75	10.88	33.471	4.60	25.629	237.0	0.228
75	10.88	33.471	4.60	0.86	13.	0.04	12.4	237.0	100	10.02	33.726	3.60	25.974	204.1	0.284
94	10.19	33.690	3.73	1.29	20.	0.04	18.2	209.4	125	9.41	33.833	3.22	26.160	186.5	0.333
118	9.58	33.794	3.34	1.56	24.	0.00	20.7	191.9	150	8.91	33.944	2.80	26.327	170.6	0.378
137	9.14	33.894	3.01	1.59	29.	0.00	22.8	177.7	200	8.18	34.047	2.37	26.520	152.3	0.461
166	8.66	33.986	2.59	1.78	35.	0.00	25.5	163.7	250	7.58	34.107	1.80	26.655	139.5	0.536
195	8.26	34.037	2.42	1.95	39.	0.00	26.7	154.1	300	7.10	34.149	1.29	26.756	129.9	0.605
223	7.84	34.084	2.09	2.15	45.	0.00	28.4	144.7	400	6.36	34.232	0.66	26.920	114.3	0.732
264	7.47	34.114	1.66	2.32	51.	0.00	30.5	137.4	500	5.59	34.273	0.42	27.050	101.9	0.846
323	6.88	34.171	1.08	2.60	61.	0.00	33.5	125.3							
394	6.42	34.229	0.68	2.77	71.	0.00	36.1	115.1							
467	5.78	34.250	0.50	2.83	81.	0.00	38.3	105.8							
547	5.44	34.316	0.32	3.04	89.	0.00	39.5	96.9							

RV ALEJANDRO DE HUMBOLDT CALCOFI CRUISE 7712 100030

LATITUDE	LONGITUDE	MO/DAY/YR	MESSENGER TIME	BOTTOM	WIND	SPEED	WEATHER	DOMINANT WAVES
31 40.6N	116 46.3W	11/29/77	1220 GMT	408M	230	7KT	0	

Z	T	S	O2	PO4	SIO3	NO2	NO3	DT	Z	T	S	O2	SIGT	DT	DD
0	15.54	33.448	5.82					327.3	0	15.54	33.448	5.82	24.679	327.3	0.000
10	15.48	33.443	5.89					326.4	10	15.48	33.443	5.89	24.689	326.4	0.033
31	15.13	33.431	5.84					320.0	20	15.31	33.439	5.87	24.721	323.3	0.065
46	13.75	33.418	5.50					293.1	30	15.15	33.434	5.84	24.753	320.3	0.097
62	12.91	33.464	4.99					273.6	50	13.47	33.430	5.36	25.102	287.0	0.158
77	12.80	33.485 A	4.84					270.0	75	12.81	33.489	4.85	25.280	270.1	0.229
92	12.63	33.501 A	4.77					265.7	100	12.59	33.531	4.65	25.355	263.0	0.296
112	12.51	33.576 A	4.44					258.0	125	12.24	33.611	4.23	25.485	250.6	0.361
137	11.91	33.639 A	4.03					242.4	150	11.52	33.685	3.78	25.676	232.5	0.422
167	10.97	33.756 A	3.41					217.4	200	9.86	34.000	2.58	26.215	181.2	0.527
202	9.80	34.014	2.53					179.1	250	8.89	34.152	1.93	26.491	155.0	0.613
237	9.04	34.125	2.06					159.1	300	8.54	34.223	1.46	26.602	144.5	0.691
278	8.69	34.192	1.67					148.9							
324	8.36	34.247	1.24					140.0							
365	7.85	34.270	0.93					131.0							

RV ALEJANDRO DE HUMBOLDT CALCOFI CRUISE 7712 100035

LATITUDE	LONGITUDE	MO/DAY/YR	MESSENGER TIME	BOTTOM	WIND	SPEED	WEATHER	DOMINANT WAVES
31 30.5N	117 07.0W	11/29/77	1747 GMT	1165M	340	5KT	0	290 7 7

Z	T	S	O2	PO4	SIO3	NO2	NO3	DT	Z	T	S	O2	SIGT	DT	DD
0	17.48	33.514	5.67					365.1	0	17.48	33.514	5.67	24.282	365.1	0.000
10	17.40	33.512	5.69					363.4	10	17.40	33.512	5.69	24.300	363.4	0.036
31	16.56	33.491	5.91					349.8	20	17.00	33.479	5.76	24.368	357.0	0.073
42	14.72	33.338	6.15					318.3	30	16.60	33.446	5.89	24.436	350.5	0.108
52	13.17	33.368	6.10					285.6	50	13.43	33.359	6.11	25.056	291.5	0.172
67	12.78	33.403	5.84					275.7	75	12.42	33.427	5.69	25.309	267.3	0.243
83	12.04	33.451	5.52					258.6	100	11.55	33.521	5.01	25.546	244.8	0.307
103	11.47	33.533	4.91					242.5	125	10.76	33.668	4.32	25.802	220.5	0.366
129	10.63	33.692	4.23					216.4	150	10.03	33.803	3.84	26.034	198.4	0.419
150	10.03	33.803	3.84					198.4	200	9.78	34.136	2.62	26.334	169.9	0.513
180	9.81	34.034	2.95					177.8	250	8.81	34.141	2.28	26.497	154.5	0.596
211	9.77	34.177	2.51					166.6	300	8.40	34.206	1.56	26.611	143.6	0.673
241	8.91	34.131	2.41					156.7	400	7.20	34.257	0.95	26.826	123.2	0.813
282	8.60	34.192	1.74					147.5	500	6.46	34.306		26.967	109.9	0.936
343	7.86	34.225	1.27					134.5							
419	7.01	34.266	0.87					119.9							
495	6.49	34.303	0.83U					110.5							
578	6.04	34.337	0.63U					102.4							

RV ALEJANDRO DE HUMBOLDT CALCOFI CRUISE 7712 100040

LATITUDE	LONGITUDE	MO/DAY/YR	MESSENGER TIME	BOTTOM	WIND	SPEED	WEATHER	DOMINANT WAVES
31 21.1N	117 26.9W	11/29/77	2159 GMT	1800M	280	5KT	0	290 6 6

Z	T	S	O2	PO4	SIO3	NO2	NO3	DT	Z	T	S	O2	SIGT	DT	DD
0	17.73	33.544	5.79					368.7	0	17.73	33.544	5.79	24.245	368.7	0.000
10	17.50	33.533	5.71					364.2	10	17.50	33.533	5.71	24.292	364.2	0.037
31	17.44	33.522	5.73					363.6	20	17.47	33.530	5.72	24.295	363.9	0.073
41	16.39	33.388	5.91					350.0	30	17.44	33.524	5.73	24.298	363.7	0.110
51	14.62	33.274	6.26					321.0	50	14.80	33.285	6.23	24.713	324.1	0.179
66	12.73	33.230	6.03					287.5	75	12.13	33.231	5.82	25.213	276.5	0.254
82	11.81	33.242	5.64					269.9	100	11.12	33.366	5.16	25.503	249.0	0.320
102	11.06	33.383	5.10					246.5	125	10.33	33.643	4.37	25.858	215.2	0.379
127	10.28	33.664	4.31					212.8	150	10.03	33.819	3.64	26.046	197.3	0.431
148	10.07	33.808	3.69					198.7	200	9.01	33.997	2.91	26.352	168.2	0.524
178	9.39	33.925	3.07					179.3	250	8.37	34.116	2.27	26.546	149.9	0.606
208	8.89	34.018	2.86					164.8	300	7.96	34.200	1.55	26.672	137.8	0.680
239	8.51	34.096	2.44					153.4	400	7.31	34.285	0.67	26.833	122.5	0.816
279	8.04	34.158	1.84					142.0	500	6.37	34.319	0.42	26.989	107.8	0.938
340	7.86	34.265	1.06					131.5							
415	7.15	34.284	0.46U					120.4							
492	6.43	34.315	0.44					108.8							
573	5.92	34.344	0.33					100.4							

A) THESE VALUES WERE DETERMINED THREE DAYS AFTER THE OTHER SALINITIES ON THIS CAST.

RV ALEJANDRO DE HUMBOLDT CALCOFI CRUISE 7712 100050

LATITUDE	LONGITUDE	MO/DAY/YR	MESSENGER TIME	BOTTOM	WIND	SPEED	WEATHER	DOMINANT WAVES
31 00.4N	118 07.0W	11/30/77	0528 GMT	1700M	290	5KT	1	290 6 5

Z	T	S	O2	PO4	SIO3	NO2	NO3	DT	Z	T	S	O2	SIGT	DT	DD
0	17.15	33.407	5.76					365.4	0	17.15	33.407	5.76	24.279	365.4	0.000
10	17.08	33.409	5.77					363.7	10	17.08	33.409	5.77	24.297	363.7	0.036
31	15.92	33.396	5.97					339.2	20	16.61	33.406	5.86	24.404	353.6	0.072
42	15.36	33.387	6.04					328.0	30	15.99	33.399	5.96	24.539	340.6	0.107
52	14.15	33.285	6.14					310.7	50	14.40	33.306	6.13	24.815	314.4	0.173
67	13.11	33.328	5.94					287.4	75	12.39	33.331	5.70	25.239	274.0	0.247
83	11.74	33.342	5.44					261.3	100	11.19	33.488	5.03	25.585	241.1	0.312
104	11.11	33.525	4.94					236.9	125	10.24	33.660	4.43	25.886	212.5	0.369
130	10.04	33.685	4.31					207.3	150	9.57	33.776	3.94	26.090	193.1	0.420
150	9.57	33.776	3.94					193.1	200	8.53	34.007	3.12	26.435	160.4	0.510
181	8.93	33.934	3.31					171.6	250	7.92	34.047	2.56	26.559	148.6	0.590
212	8.31	34.036	3.02					154.9	300	7.34	34.089	1.92	26.675	137.5	0.663
243	7.99	34.042	2.64					149.9	400	6.72	34.238	0.80	26.878	118.3	0.797
284	7.55	34.074	2.14					141.4	500	6.08	34.312	0.37	27.020	104.8	0.915
345	6.83	34.139	1.33					127.0							
421	6.71	34.272	0.65					115.6							
497	6.10	34.310	0.38					105.1							
577	5.68	34.337	0.27					98.1							

RV ALEJANDRO DE HUMBOLDT CALCOFI CRUISE 7712 100060

LATITUDE	LONGITUDE	MO/DAY/YR	MESSENGER TIME	BOTTOM	WIND	SPEED	WEATHER	DOMINANT WAVES
30 40.5N	118 47.5W	11/30/77	1252 GMT	2981M	290	5KT	0	290 4 5

Z	T	S	O2	PO4	SIO3	NO2	NO3	DT	Z	T	S	O2	SIGT	DT	DD
0	16.95	33.408	5.68					360.9	0	16.95	33.408	5.68	24.327	360.9	0.000
10	16.81	33.479	5.74					352.6	10	16.81	33.479	5.74	24.414	352.6	0.036
31	16.63	33.477	5.77					348.7	20	16.72	33.478	5.75	24.432	350.9	0.071
41	16.22	33.478	5.83					339.7	30	16.64	33.479	5.77	24.452	349.0	0.106
52	16.06	33.491	5.85					335.3	50	16.09	33.490	5.84	24.587	336.1	0.175
67	12.66	33.168	6.06					290.8	75	12.03	33.231	5.83	25.230	274.9	0.251
82	11.80	33.318	5.57					264.1	100	10.95	33.372	5.15	25.538	245.6	0.317
103	10.83	33.379	5.08					242.9	125	10.10	33.646	4.26	25.899	211.3	0.375
128	10.02	33.682	4.15					207.2	150	9.55	33.794	3.57	26.107	191.5	0.426
149	9.57	33.788	3.59					192.2	200	8.55	34.000	2.72	26.426	161.2	0.516
179	8.95	33.924	3.09					172.6	250	8.02	34.065	2.26	26.558	148.7	0.595
210	8.39	34.025	2.57					156.9	300	7.61	34.113	1.73	26.655	139.4	0.669
240	8.10	34.055	2.36					150.5	400	6.47	34.173	0.96	26.860	120.1	0.804
280	7.79	34.091	1.94					143.5	500	5.98	34.285	0.43	27.011	105.6	0.923
340	7.21	34.150	1.35					131.2							
416	6.30	34.179	0.88					117.4							
491	6.02	34.275	0.45					106.8							
573	5.61	34.336	0.31					97.4							

RV ALEJANDRO DE HUMBOLDT CALCOFI CRUISE 7712 100070

LATITUDE	LONGITUDE	MO/DAY/YR	MESSENGER TIME	BOTTOM	WIND	SPEED	WEATHER	DOMINANT WAVES
30 20.4N	119 27.5W	11/30/77	1907 GMT	3738M	320	12KT	0	320 6 3

Z	T	S	O2	PO4	SIO3	NO2	NO3	DT	Z	T	S	O2	SIGT	DT	DD
0	17.04	33.321	5.69					369.2	0	17.04	33.321	5.69	24.239	369.2	0.000
10	16.99	33.325	5.73					367.8	10	16.99	33.325	5.73	24.254	367.8	0.037
29	16.86	33.349	5.77					363.2	20	16.92	33.327	5.74	24.270	366.3	0.074
38	16.48	33.322	5.84					356.7	30	16.82	33.340	5.78	24.304	363.1	0.110
48	13.97	33.054	6.31					324.1	50	13.90	33.092	6.28	24.755	320.1	0.179
62	13.46	33.211	6.09					302.7	75	12.30	33.143	5.95	25.111	286.2	0.255
76	12.21	33.134	5.94					285.0	100	11.14	33.257	5.42	25.415	257.3	0.323
95	11.26	33.193	5.59					264.0	125	10.68	33.569	4.59	25.739	226.4	0.384
118	10.83	33.502	4.77					233.8	150	9.89	33.731	3.93	26.001	201.6	0.439
136	10.40	33.651	4.33					215.7	200	8.72	33.952	3.14	26.363	167.2	0.532
164	9.39	33.796	3.55					188.8	250	7.89	34.028	2.69	26.548	149.7	0.614
191	8.86	33.926	3.11					171.1	300	7.36	34.070	2.04	26.658	139.2	0.688
219	8.44	33.987	3.20					160.4	400	6.52	34.166	1.02	26.848	121.1	0.824
255	7.81	34.032	2.58					148.1	500	6.05	34.275	0.46	26.995	107.2	0.944
310	7.28	34.075	1.94					137.7							
380	6.63	34.137	1.20					124.6							
451	6.29	34.233	0.66					113.2							
529	5.91	34.290	0.40					104.3							

RV ALEJANDRO DE HUMBOLDT CALCOFI CRUISE 7712 100080

LATITUDE	LONGITUDE	MO/DAY/YR	MESSENGER TIME	BOTTOM	WIND	SPEED	WEATHER	DOMINANT WAVES
30 01.1N	120 07.1W	12/ 1/77	0128 GMT	3600M	310	25KT	1	330 7 5

Z	T	S	O2	PO4	SIO3	NO2	NO3	DT	Z	T	S	O2	SIGT	DT	DD
0	17.80	33.386	5.64					381.8	0	17.80	33.386	5.64	24.108	381.8	0.000
9	17.80	33.386	5.64					381.8	10	17.80	33.388	5.64	24.108	381.7	0.038
28	17.77	33.390	5.67					380.8	20	17.79	33.390	5.66	24.113	381.3	0.076
38	17.75	33.391	5.65					380.3	30	17.76	33.392	5.67	24.119	380.7	0.115
47	17.76	33.389	5.64					380.6	50	17.66	33.381	5.74	24.136	379.0	0.191
62	16.83	33.340	6.14					363.2	75	15.22	33.360	6.10	24.680	327.3	0.280
76	15.09	33.358	6.10					324.5	100	12.78	33.140	6.06	25.018	295.0	0.358
94	13.23	33.137	6.11					303.7	125	11.44	33.239	5.67	25.347	263.8	0.428
118	11.75	33.167	5.80					274.4	150	10.73	33.505	5.19	25.680	232.0	0.491
136	11.04	33.369	5.44					247.2	200	9.28	33.834	3.91	26.181	184.5	0.597
164	10.45	33.616	4.92					219.1	250	8.36	34.001	3.27	26.457	158.3	0.685
191	9.50	33.773	4.18					192.2	300	7.69	34.051	2.52	26.595	145.1	0.763
218	8.93	33.937	3.46					171.4	400	6.74	34.153	1.23	26.809	124.9	0.903
255	8.28	34.003	3.26					156.9	500	6.02	34.229	0.74	26.963	110.2	1.027
310	7.58	34.058	2.33					143.0							
380	6.89	34.130	1.43					128.5							
451	6.38	34.201	0.85					116.7							
531	5.79	34.238	0.67					106.8							

RV ALEJANDRO DE HUMBOLDT CALCOFI CRUISE 7712 103030

LATITUDE	LONGITUDE	MO/DAY/YR	MESSENGER TIME	BOTTOM	WIND	SPEED	WEATHER	DOMINANT WAVES
31 06.0N	116 24.5W	12/ 3/77	0611 GMT	55M			4	

Z	T	S	O2	PO4	SIO3	NO2	NO3	DT	Z	T	S	O2	SIGT	DT	DD
0	17.71	33.580	6.52					365.6	0	17.71	33.580	6.52	24.277	365.6	0.000
10	17.36	33.578	6.56					357.7	10	17.36	33.578	6.56	24.360	357.7	0.036
21	16.29	33.494	5.99					340.0	20	16.39	33.504	6.05	24.528	341.7	0.071
32	15.71	33.467	5.43					329.5	30	15.79	33.471	5.52	24.639	331.1	0.105
41	15.32	33.455	5.21					322.2							

RV ALEJANDRO DE HUMBOLDT CALCOFI CRUISE 7712 103035

LATITUDE	LONGITUDE	MO/DAY/YR	MESSENGER TIME	BOTTOM	WIND	SPEED	WEATHER	DOMINANT WAVES
30 56.0N	116 45.0W	12/ 3/77	0241 GMT	1700M	310	5KT	1	320 5 6

Z	T	S	O2	PO4	SIO3	NO2	NO3	DT	Z	T	S	O2	SIGT	DT	DD
1	18.31	33.615	6.13					377.0	0	18.31	33.615	6.13	24.158	377.0	0.000
11	17.94	33.587	5.90					370.4	10	18.00	33.594	5.92	24.217	371.4	0.037
31	15.75	33.391	5.94					335.9	20	16.95	33.461	5.92	24.366	357.1	0.074
41	15.41	33.569	5.43					315.7	30	15.86	33.395	5.94	24.566	338.1	0.109
51	14.67	33.584	5.29					299.3	50	14.75	33.587	5.30	24.958	300.7	0.173
66	14.15	33.626	5.00					285.7	75	13.41	33.664	4.61	25.295	268.7	0.244
82	12.84	33.697	4.24					255.2	100	12.32	33.790	3.20	25.609	238.8	0.308
102	12.29	33.797	3.11					237.7	125	11.80	33.844	3.14	25.749	225.6	0.367
127	11.75	33.844	3.14					224.5	150	10.80	33.890	3.02	25.968	204.7	0.422
148	10.85	33.879	3.05					206.3	200	9.51	34.002	2.76	26.276	175.4	0.519
178	10.18	34.012	2.65					185.4	250	8.81	34.126	2.17	26.485	155.6	0.603
209	9.25	33.994	2.81					172.0	300	8.60	34.247	1.41	26.613	143.5	0.681
239	8.83	34.080	2.39					159.3	400	7.51	34.275	0.87	26.797	126.0	0.822
280	8.75	34.224	1.59					147.4	500	6.62	34.303	0.51	26.942	112.2	0.948
342	8.16	34.253	1.21					136.6							
418	7.31	34.280	0.78					122.8							
494	6.67	34.300	0.53					113.0							
574	6.05	34.335	0.35					102.6							

RV ALEJANDRO DE HUMBOLDT CALCOFI CRUISE 7712 103040

LATITUDE	LONGITUDE	MO/DAY/YR	MESSENGER TIME	BOTTOM	WIND	SPEED	WEATHER	DOMINANT WAVES
30 46.0N	117 04.5W	12/ 2/77	2321 GMT	1900M	320	5KT	1	310 5 6

Z	T	S	O2	PO4	SIO3	NO2	NO3	DT	Z	T	S	O2	SIGT	DT	DD
0	17.85	33.462 A	5.63					377.4	0	17.85	33.462	5.63	24.154	377.4	0.000
10	17.60	33.459	5.67					371.9	10	17.60	33.459	5.67	24.212	371.9	0.037
29	17.31	33.433	5.74					367.2	20	17.45	33.447	5.71	24.238	369.4	0.075
39	15.56	33.248	6.07					342.4	30	17.14	33.415	5.77	24.285	364.9	0.111
49	14.51	33.190	6.21					324.9	50	14.42	33.192	6.20	24.724	323.1	0.180
64	13.44	33.255	6.05					299.1	75	13.12	33.376	5.55	25.132	284.2	0.257
78	13.05	33.408	5.39					280.4	100	11.89	33.538	4.70	25.494	249.7	0.324
98	12.02	33.530	4.74					252.4	125	10.57	33.608	4.40	25.788	221.8	0.384
123	10.63	33.601	4.41					223.2	150	9.99	33.731	4.05	25.984	203.2	0.437
143	10.16	33.673	4.31					210.1	200	9.07	34.034	2.79	26.371	166.4	0.532
172	9.50	33.914	3.15					181.8	250	8.72	34.188	1.90	26.547	149.7	0.613
202	9.05	34.039	2.77					165.6	300	8.31	34.244	1.35	26.654	139.6	0.687
232	8.88	34.151	2.18					154.7	400	7.21	34.273	0.75	26.839	122.0	0.824
271	8.52	34.214	1.63					144.7	500	6.33	34.313	0.47	26.989	107.7	0.946
331	8.07	34.261	1.13					134.7							
406	7.13	34.273	0.72					120.9							
482	6.47	34.308	0.48					109.8							
563	5.89	34.316	0.43					102.1							

A) AN ERROR OF 0.01 (-0.39 PPT) IN THE CONDUCTIVITY RATIO HAS BEEN ASSUMED FOR THIS VALUE.

RV ALEJANDRO DE HUMBOLDT CALCOFI CRUISE 7712 103050

LATITUDE	LONGITUDE	MO/DAY/YR	MESSENGER TIME	BOTTOM	WIND	SPEED	WEATHER	DOMINANT WAVES
30 26.0N	117 44.3W	12/ 2/77	1706 GMT	2322M	330	5KT	1	280 5 6

Z	T	S	O2	PO4	SIO3	NO2	NO3	DT	Z	T	S	O2	SIGT	DT	DD
0	17.91	33.496	5.59					376.3	0	17.91	33.496	5.59	24.165	376.3	0.000
10	17.90	33.494	5.61					376.2	10	17.90	33.494	5.61	24.166	376.2	0.038
31	17.68	33.452	5.71					374.2	20	17.81	33.477	5.67	24.173	375.6	0.075
41	17.57	33.441	5.65					372.5	30	17.69	33.456	5.71	24.185	374.4	0.113
51	16.53	33.371	5.86					354.3	50	16.65	33.381	5.83	24.375	356.3	0.186
67	15.47	33.274	6.03					338.6	75	14.51	33.213	6.11	24.719	323.5	0.272
82	13.66	33.174	6.14					309.3	100	12.35	33.231	5.82	25.170	280.6	0.368
103	12.20	33.249	5.74					276.4	125	11.29	33.409	5.25	25.505	248.7	0.414
128	11.19	33.433	5.17					245.0	150	10.29	33.649	4.49	25.869	214.1	0.473
149	10.31	33.641	4.52					214.9	200	9.53	33.915	3.26	26.203	182.4	0.574
179	9.84	33.798	3.59					195.8	250	8.88	34.108	2.20	26.459	158.0	0.661
210	9.40	33.966	3.11					176.4	300	7.82	34.121	1.87	26.631	141.7	0.739
241	9.08	34.097	2.29					161.8	400	6.82	34.181	1.05	26.819	123.8	0.877
282	8.11	34.110	2.04					146.5	500	6.29	34.280	0.47	26.968	109.8	1.000
343	7.30	34.145	1.46					132.8							
420	6.70	34.195	0.92					121.2							
497	6.31	34.277	0.48					110.2							
579	5.77	34.325	0.32					100.1							

RV ALEJANDRO DE HUMBOLDT CALCOFI CRUISE 7712 103060

LATITUDE	LONGITUDE	MO/DAY/YR	MESSENGER TIME	BOTTOM	WIND	SPEED	WEATHER	DOMINANT WAVES
30 06.0N	118 25.0W	12/ 2/77	1115 GMT	3546M	310	8KT	1	300 5 6

Z	T	S	O2	PO4	SIO3	NO2	NO3	DT	Z	T	S	O2	SIGT	DT	DD
0	18.22	33.571	5.65					378.1	0	18.22	33.571	5.65	24.146	378.1	0.000
10	18.22	33.572	5.64					378.0	10	18.22	33.572	5.64	24.147	378.0	0.038
31	18.17	33.569	5.64					377.1	20	18.20	33.572	5.64	24.152	377.6	0.076
41	16.51	33.432	5.88					349.4	30	18.17	33.571	5.64	24.157	377.1	0.113
52	14.97	33.318	6.14					324.9	50	15.22	33.335	6.10	24.662	328.9	0.184
67	13.85	33.346	5.97					300.3	75	13.20	33.327	5.87	25.078	289.4	0.262
83	12.63	33.312	5.75					279.6	100	12.04	33.411	5.38	25.369	261.7	0.331
103	11.97	33.432	5.30					258.8	125	11.16	33.547	4.73	25.635	236.3	0.394
129	11.03	33.565	4.63					232.6	150	10.55	33.678	4.17	25.847	216.2	0.452
149	10.58	33.670	4.20					217.2	200	9.25	33.968	2.97	26.292	174.0	0.551
179	9.66	33.869	3.39					187.6	250	8.55	34.086	2.41	26.494	154.8	0.635
210	9.09	34.002	2.81					169.0	300	8.11	34.155	1.78	26.615	143.2	0.712
240	8.63	34.066	2.53					157.3	400	6.95	34.218	0.92	26.831	122.8	0.851
281	8.35	34.135	2.01					148.1	500	6.17	34.272	0.50	26.978	108.8	0.973
342	7.53	34.185	1.33					132.9							
418	6.80	34.225	0.83					120.2							
494	6.21	34.268	0.52					109.6							
576	5.64	34.324	0.31					98.6							

RV ALEJANDRO DE HUMBOLDT CALCOFI CRUISE 7712 103070

LATITUDE	LONGITUDE	MO/DAY/YR	MESSENGER TIME	BOTTOM	WIND	SPEED	WEATHER	DOMINANT WAVES
29 46.0N	119 04.7W	12/ 2/77	0521 GMT	3200M	310	10KT	1	320 6 6

Z	T	S	O2	PO4	SIO3	NO2	NO3	DT	Z	T	S	O2	SIGT	DT	DD
1	17.57	33.381	5.63					376.9	0	17.57	33.381	5.63	24.159	376.9	0.000
11	17.59	33.385	5.65					377.0	10	17.59	33.387	5.65	24.158	377.0	0.038
32	17.53	33.436	5.67					371.9	20	17.56	33.409	5.66	24.180	374.9	0.075
42	16.66	33.394	5.80					355.5	30	17.54	33.433	5.67	24.206	372.4	0.113
57	15.03	33.233	6.18					332.4	50	15.78	33.307	6.01	24.517	342.8	0.185
73	13.93	33.213	6.15					311.7	75	13.77	33.206	6.13	24.870	309.2	0.266
98	12.10	33.175	5.78					280.0	100	12.00	33.192	5.75	25.206	277.2	0.340
119	11.22	33.372	5.37					250.1	125	11.01	33.433	5.20	25.575	242.1	0.406
139	10.57	33.555	4.79					225.6	150	10.29	33.621	4.54	25.847	216.2	0.464
160	10.05	33.670	4.33					208.6	200	9.02	33.912	3.43	26.284	174.7	0.563
190	9.21	33.856	3.64					181.6	250	8.02	34.020	2.83	26.523	152.0	0.647
226	8.57	34.011	3.00					160.5	300	7.39	34.052	2.23	26.639	141.0	0.723
256	7.89	34.017	2.79					150.4	400	6.39	34.145	1.10	26.849	121.1	0.859
307	7.34	34.058	2.13					139.8	500	5.89	34.262	0.53	27.005	106.3	0.978
363	6.71	34.114	1.42					127.4	600	5.54	34.355	0.33	27.122	95.1	1.086
450	6.07	34.190	0.79					113.7							
536	5.79	34.309	0.40					101.5							
622	5.44	34.362	0.30					93.4							

RV ALEJANDRO DE HUMBOLDT — CALCOFI CRUISE 7712 — 103080

LATITUDE	LONGITUDE	MO/DAY/YR	MESSENGER	TIME	BOTTOM	WIND	SPEED	WEATHER	DOMINANT WAVES
29 26.0N	119 43.0W	12/ 1/77	2305	GMT	3661M	320	10KT	0	320 12 4

Z	T	S	O2	PO4	SIO3	NO2	NO3	DT	Z	T	S	O2	SIGT	DT	DD
0	18.56	33.541	5.48					388.3	0	18.56	33.541	5.48	24.039	388.3	0.000
10	18.42	33.539	5.54					385.1	10	18.42	33.539	5.54	24.073	385.1	0.039
30	18.37	33.540	5.56					383.9	20	18.40	33.541	5.55	24.079	384.5	0.077
61	15.62	33.302	6.19					339.7	30	18.37	33.540	5.56	24.086	383.9	0.116
71	15.11	33.322	6.11					327.5	50	16.68	33.371	6.00	24.360	357.7	0.190
87	14.69	33.420	5.99					311.7	75	14.99	33.343	6.08	24.718	323.6	0.276
102	14.14	33.539	5.78					291.9	100	14.25	33.530	5.81	25.020	294.9	0.354
117	12.50	33.479	5.53					264.9	125	12.07	33.503	5.42	25.433	255.5	0.423
142	11.56	33.580	5.16					240.6	150	11.29	33.607	5.00	25.660	234.0	0.485
163	10.84	33.649	4.72					223.1	200	9.56	33.845	3.81	26.144	188.0	0.592
193	9.72	33.810	3.98					193.0	250	8.66	34.057	2.77	26.454	158.5	0.681
223	9.15	33.944	3.29					174.2	300	8.03	34.146	1.91	26.620	142.8	0.759
253	8.61	34.067	2.72					157.0	400	7.16	34.226	1.03	26.808	125.0	0.899
303	8.00	34.147	1.86					142.2	500	6.37	34.281	0.57	26.959	110.6	1.023
358	7.56	34.199	1.32					132.3	600	5.88	34.351	0.34	27.077	99.4	1.136
443	6.77	34.248	0.80					118.1							
530	6.19	34.298	0.48					107.1							
617A	5.82	34.364	0.32					97.7							

RV DAVID STARR JORDAN — CALCOFI CRUISE 7712 — 107032

LATITUDE	LONGITUDE	MO/DAY/YR	MESSENGER	TIME	BOTTOM	WIND	SPEED	WEATHER	DOMINANT WAVES
30 25.7N	116 11.0W	12/10/77	2216	GMT	473M	330	7KT	1	330 3 7

Z	T	S	O2	PO4	SIO3	NO2	NO3	DT	Z	T	S	O2	SIGT	DT	DD
1	18.48	33.660	6.08	0.32	0.	0.00	0.0	377.7	0	18.48	33.660	6.08	24.150	377.7	0.000
11	18.14	33.676	5.87	0.30	0.	0.09	0.0	368.6	10	18.18	33.678	5.90	24.235	369.6	0.037
30	16.93	33.613	5.18	0.51	2.	0.43	1.9	345.5	20	17.62	33.653	5.52	24.353	358.4	0.074
44	15.93	33.590	5.11	0.47	4.	0.24	3.1	325.2	30	16.93	33.613	5.18	24.488	345.5	0.109
54	15.11	33.592	4.96	0.52	6.	0.03	4.2	307.8	50	15.42	33.592	5.02	24.815	314.4	0.175
68	14.69	33.595	4.83	0.63	7.	0.00	4.9	298.9	75	14.17	33.599	4.73	25.090	288.2	0.251
82	13.67	33.604	4.64	0.70	9.	0.00	7.4	277.9	100	13.32	33.632	4.45	25.289	269.3	0.321
97	13.41	33.618	4.55	0.73	9.	0.00	7.8	271.8	125	12.52	33.725	3.76	25.519	247.3	0.387
120	12.66	33.715	3.77	1.07	15.	0.00	12.7	250.5	150	11.57	33.783	3.60	25.745	225.9	0.447
139	12.09	33.746	3.75	1.10	15.	0.00	14.3	237.8	200	9.99	34.183	1.99	26.337	169.6	0.547
167	10.77	33.878	3.20	1.44	21.	0.00	20.0	205.1	250	9.15	34.274	1.51	26.546	149.8	0.630
195	10.09	34.158	2.09	1.97	32.	0.00	26.1	173.1	300	8.49	34.287	1.18	26.661	138.9	0.704
228	9.47	34.252	1.68	2.18	38.	0.00	28.4	156.3	400	7.30	34.270	0.80	26.824	123.4	0.841
279	8.77	34.278	1.34	2.34	45.	0.00	31.0	143.7							
332	8.07	34.293	0.96	2.50	52.	0.00	33.7	132.4							
391	7.37	34.271	0.84	2.58	60.	0.00	36.7	124.3							

RV DAVID STARR JORDAN — CALCOFI CRUISE 7712 — 107035

LATITUDE	LONGITUDE	MO/DAY/YR	MESSENGER	TIME	BOTTOM	WIND	SPEED	WEATHER	DOMINANT WAVES
30 21.5N	116 22.4W	12/11/77	0102	GMT	1757M	290	6KT	1	290 3 7

Z	T	S	O2	PO4	SIO3	NO2	NO3	DT	Z	T	S	O2	SIGT	DT	DD
1	18.42	33.660	5.86					376.3	0	18.42	33.660	5.86	24.165	376.3	0.000
11	18.24	33.645	5.84					373.2	10	18.26	33.648	5.84	24.193	373.6	0.038
30	17.61	33.659	5.05					357.5	20	18.07	33.661	5.45	24.252	368.0	0.075
39	16.75	33.606	5.12					342.0	30	17.61	33.659	5.05	24.362	357.5	0.111
49	15.51	33.602	4.88					315.4	50	15.44	33.603	4.88	24.820	313.9	0.178
63	14.66	33.599	4.87					298.0	75	13.71	33.618	4.62	25.200	277.7	0.253
77	13.55	33.621	4.56					274.3	100	12.48	33.710	3.88	25.516	247.6	0.319
95	12.66	33.688	4.05					252.5	125	11.72	33.784	3.41	25.718	228.5	0.379
119	11.90	33.775	3.40					232.3	150	11.14	33.877	3.13	25.897	211.5	0.435
138	11.36	33.805	3.42					220.5	200	9.42	34.014	2.86	26.300	173.2	0.533
166	10.79	33.970	2.74					198.6	250	8.76	34.130	2.31	26.495	154.7	0.617
195	9.53	34.000	2.89					175.9	300	8.58	34.272	1.39	26.635	141.3	0.694
222	9.09	34.074	2.63					163.6	400	7.56	34.304	0.78	26.813	124.5	0.833
260	8.68	34.148	2.18					152.0	500	6.58	34.312	0.50	26.954	111.0	0.957
317	8.54	34.316	1.08					137.4							
387	7.70	34.306	0.81					126.2							
458	6.98	34.300	0.63					117.0							
534	6.28	34.328	0.39					106.0							

A) THIS DEPTH WAS DETERMINED FROM AN EXTRAPOLATED DEPTH CURVE DUE TO MALFUNCTIONING OF THE UNPROTECTED THERMOMETER IN THE DEEPEST NANSEN BOTTLE.

RV DAVID STARR JORDAN CALCOFI CRUISE 7712 107040

LATITUDE	LONGITUDE	MO/DAY/YR	MESSENGER TIME	BOTTOM	WIND	SPEED	WEATHER	DOMINANT WAVES
30 11.8N	116 41.0W	12/11/77	0430 GMT	2791M	300	6KT		

Z	T	S	O2	PO4	SIO3	NO2	NO3	DT	Z	T	S	O2	SIGT	DT	DD
1	18.06	33.665	6.48	0.62	0.	0.00	0.2	367.5	0	18.06	33.665	6.48	24.257	367.5	0.000
11	17.88	33.649	6.19	0.56	0.	0.02	0.1	364.5	10	17.90	33.649	6.21	24.283	365.0	0.037
30	16.44	33.489	6.02	0.50	0.	0.19	0.0	343.7	20	17.41	33.590	6.09	24.357	358.0	0.073
39	15.10	33.396	5.89	0.63	1.	0.03	0.4	321.9	30	16.44	33.489	6.02	24.507	343.7	0.108
48	13.49	33.401	5.61	0.73	3.	0.00	3.8	289.3	50	13.31	33.407	5.55	25.118	285.5	0.171
62	12.73	33.443	5.16	0.85	5.	0.00	6.1	271.8	75	12.28	33.538	4.48	25.420	256.8	0.239
76	12.25	33.543	4.43	1.15	8.	0.00	10.2	255.6	100	11.21	33.623	4.03	25.687	231.4	0.301
95	11.33	33.603	4.12	1.50	12.	0.00	14.2	234.9	125	10.64	33.773	3.45	25.904	210.8	0.357
117	10.87	33.704	3.68	1.51	16.	0.00	17.1	219.6	150	9.95	33.933	3.01	26.147	187.7	0.407
136	10.32	33.865	3.15	1.70	21.	0.00	20.9	198.5	200	9.31	34.138	2.27	26.413	162.4	0.497
164	9.66	33.982	2.91	1.80	26.	0.00	23.3	179.3	250	8.80	34.206	1.77	26.549	149.5	0.577
191	9.41	34.105	2.43	2.27	30.	0.00	25.8	166.3	300	8.29	34.236	1.35	26.651	139.8	0.652
219	9.11	34.187	1.97	2.16	35.	0.00	27.7	155.6	400	7.18	34.279	0.74	26.847	121.2	0.788
255	8.75	34.205	1.75	2.15	39.	0.00	29.8	148.8	500	6.32	34.321	0.42	26.996	107.1	0.909
312	8.16	34.243	1.24	2.43	42.	0.00	32.3	137.4							
383	7.35	34.271	0.81	2.58	52.	0.00	35.2	124.0							
455	6.67	34.301	0.55A	2.74	61.	0.00	37.4	112.9							
531	6.12	34.333	0.35	2.84	71.	0.00	39.7	103.6							

RV DAVID STARR JORDAN CALCOFI CRUISE 7712 107050

LATITUDE	LONGITUDE	MO/DAY/YR	MESSENGER TIME	BOTTOM	WIND	SPEED	WEATHER	DOMINANT WAVES
29 50.3N	117 22.2W	12/11/77	0945 GMT	2509M	270	10KT		

Z	T	S	O2	PO4	SIO3	NO2	NO3	DT	Z	T	S	O2	SIGT	DT	DD
3	17.73	33.497	5.56		2.	0.00	0.0	372.1	0	17.73	33.497	5.56	24.209	372.1	0.000
12	17.69	33.496	5.57		1.	0.00	0.0	371.2	10	17.70	33.498	5.57	24.217	371.4	0.037
32	17.73	33.496	5.57		1.	0.01	0.0	372.2	20	17.71	33.499	5.57	24.215	371.5	0.074
40	17.70	33.492	5.59		1.	0.06	0.0	371.8	30	17.73	33.498	5.57	24.210	372.0	0.112
48	16.52	33.361	5.86		2.	0.00	0.0	354.8	50	16.26	33.339	5.91	24.432	350.9	0.184
60	15.16	33.263	6.06		2.	0.05	0.0	332.9	75	13.99	33.258	6.04	24.865	309.6	0.267
74	14.08	33.261	6.05		3.	0.20	0.0	311.1	100	12.01	33.327	5.48	25.308	267.4	0.340
92	12.47	33.228	5.76	0.36	5.	0.01	2.9	282.8	125	10.73	33.575	4.68	25.734	226.9	0.402
114	11.35	33.516	4.96	0.64	10.	0.00	8.9	241.7	150	9.82	33.729	4.18	26.011	200.6	0.456
132	10.37	33.601	4.53	0.77	14.	0.00	14.4	218.9	200	9.27	34.123	2.29	26.409	162.8	0.549
159	9.64	33.800	3.96	1.21	21.	0.00	18.8	192.4	250	8.92	34.228	1.61	26.547	149.7	0.629
186	9.25	34.042	2.69	1.75	31.	0.00	24.7	168.5	300	8.36	34.268	1.19	26.665	138.5	0.704
214	9.29	34.173	2.02	1.97	36.	0.00	26.6	159.4	400	7.26	34.276	0.75	26.833	122.6	0.840
251	8.91	34.228	1.60	2.18	38.	0.00	28.7	149.5	500	6.37	34.304	0.40	26.976	109.0	0.963
306	8.29	34.269	1.15	2.24	48.	0.00	30.5	137.3							
376	7.52	34.274	0.84	2.73	58.	0.00	34.9	126.1							
448	6.79	34.281	0.57	2.74	67.	0.00	36.8	115.9							
524	6.21	34.318	0.32	2.89	77.	0.00	38.7	105.9							

RV DAVID STARR JORDAN CALCOFI CRUISE 7712 107060

LATITUDE	LONGITUDE	MO/DAY/YR	MESSENGER TIME	BOTTOM	WIND	SPEED	WEATHER	DOMINANT WAVES
29 32.0N	118 02.0W	12/11/77	1448 GMT	2791M	310	5KT	2	310 2 7

Z	T	S	O2	PO4	SIO3	NO2	NO3	DT	Z	T	S	O2	SIGT	DT	DD
2	17.93	33.575	5.63	0.11	1.	0.03	0.0	371.0	0	17.93	33.575	5.63	24.220	371.0	0.080
11	17.90	33.575	5.67	0.10	1.	0.00	0.0	370.3	10	17.90	33.577	5.67	24.227	370.4	0.037
31	17.95	33.576	5.64	0.10	1.	0.00	0.0	371.4	20	17.92	33.577	5.66	24.223	370.8	0.074
41	17.93	33.579	5.63	0.09	2.	0.00	0.0	370.7	30	17.95	33.578	5.64	24.217	371.4	0.111
50	15.98	33.365	5.87	0.08	2.	0.00	0.0	342.8	50	15.98	33.365	5.87	24.517	342.8	0.183
65	14.28	33.318	6.08	0.15	4.	0.01	0.0	310.9	75	13.47	33.326	5.89	25.024	294.5	0.263
79	13.20	33.334	5.78	0.21	4.	0.01	0.0	288.7	100	12.16	33.459	5.16	25.383	260.4	0.333
98	12.23	33.439	5.26	0.34	6.	0.15	1.3	262.9	125	11.41	33.698	4.00	25.708	229.4	0.395
121	11.54	33.660	4.13	0.54	9.	0.00	3.5	234.4	150	10.76	33.890	3.31	25.974	204.1	0.450
140	10.96	33.820	3.60	0.99	16.	0.00	13.1	212.6	200	9.37	34.014	2.91	26.308	172.4	0.546
167	10.42	33.972	2.94	1.53	27.	0.00	21.2	192.3	250	8.44	34.115	2.34	26.534	150.9	0.629
196	9.49	34.011	2.92	1.64	31.	0.00	23.7	174.5	300	8.13	34.221	1.52	26.663	138.7	0.704
222	8.78	34.032	2.83	1.75	37.	0.00	25.8	162.1	400	7.19	34.306	0.62	26.866	119.4	0.838
259	8.38	34.144	2.15	2.04	44.	0.00	28.8	147.9	500	6.16	34.298	0.46	27.000	106.8	0.958
315	8.05	34.239	1.33	2.37	49.	0.00	31.7	136.1							
386	7.35	34.303	0.67	2.67	58.	0.00	34.4	121.7							
457	6.57	34.300	0.52	2.86	68.	0.00	38.6	111.7							
534	5.86	34.294	0.43	3.00	81.	0.00	40.9	103.4							

A) A TRANSPOSITION ERROR IN RECORDING THE BURETTE READING FOR THIS SAMPLE HAS BEEN ASSUMED.

RV DAVID STARR JORDAN — CALCOFI CRUISE 7712 — 110035

LATITUDE	LONGITUDE	MO/DAY/YR	MESSENGER TIME	BOTTOM	WIND	SPEED	WEATHER	DOMINANT WAVES
29 46.0N	116 00.0W	12/10/77	1441 GMT	1243M	320	6KT	2	330 3 6

Z	T	S	O2	PO4	SIO3	NO2	NO3	DT	Z	T	S	O2	SIGT	DT	DD
1	18.36	33.602	5.69	0.10	0.	0.00	0.0	379.1	0	18.36	33.602	5.69	24.135	379.1	0.000
10	18.36	33.601	5.71	0.09	0.	0.01	0.0	379.2	10	18.36	33.601	5.71	24.135	379.2	0.038
29	18.34	33.594	5.76	0.09	0.	0.36	0.0	379.2	20	18.35	33.599	5.74	24.134	379.2	0.076
39	16.92	33.469	5.64	0.14	1.	0.23	0.1	355.8	30	18.22	33.584	5.74	24.154	377.3	0.114
48	15.56	33.398	5.90	0.16	2.	0.11	0.1	331.4	50	15.37	33.396	5.89	24.675	327.7	0.185
63	14.47	33.390	5.85	0.17	2.	0.08	0.5	309.5	75	13.62	33.380	5.70	25.035	293.5	0.263
77	13.50	33.382	5.65	0.30	3.	0.00	2.2	290.9	100	13.02	33.656	4.35	25.369	261.6	0.333
96	13.23	33.642	4.45	0.65	8.	0.00	8.1	266.6	125	11.64	33.688	3.93	25.659	234.1	0.395
118	11.93	33.665	4.08	0.96	9.	0.00	13.2	240.9	150	10.65	33.769	3.58	25.899	211.3	0.452
137	11.19	33.729	3.69	1.20	17.	0.00	16.4	223.2	200	9.57	34.032	2.74	26.288	174.3	0.550
166	10.08	33.825	3.45	1.40	22.	0.00	20.5	197.6	250	9.33	34.238	1.75	26.489	155.2	0.634
194	9.61	33.988	2.92	1.62	27.	0.00	23.4	178.1	300	8.59	34.257	1.35	26.622	142.6	0.712
222	9.50	34.171	2.12	2.02	34.	0.00	27.0	162.8	400	7.68	34.301	0.73	26.792	126.4	0.852
260	9.24	34.244	1.67	2.17	38.	0.00	28.5	153.3	500	6.66	34.313	0.49	26.945	111.9	0.978
316	8.32	34.256	1.24	2.46	47.	0.00	32.2	138.7							
386	7.83	34.299	0.77	2.74	55.	0.00	34.1	128.5							
456	7.07	34.302	0.62	2.78	64.	0.00	36.2	118.0							
532	6.39	34.322	0.38	2.93	74.	0.00	39.1	107.8							

RV DAVID STARR JORDAN — CALCOFI CRUISE 7712 — 110040

LATITUDE	LONGITUDE	MO/DAY/YR	MESSENGER TIME	BOTTOM	WIND	SPEED	WEATHER	DOMINANT WAVES
29 36.5N	116 19.6W	12/10/77	1058 GMT	2509M	330	4KT		

Z	T	S	O2	PO4	SIO3	NO2	NO3	DT	Z	T	S	O2	SIGT	DT	DD
1	18.56	33.644	5.60	0.32	0.	0.02	0.1	380.8	0	18.56	33.644	5.60	24.118	380.8	0.000
11	18.55	33.646	5.67	0.20	0.	0.05	0.0	380.4	10	18.55	33.647	5.66	24.121	380.5	0.038
30	18.06	33.576	5.70	0.15	1.	0.11	0.0	374.0	20	18.32	33.614	5.68	24.154	377.4	0.076
39	15.58	33.321	6.08	0.10	1.	0.08	0.0	337.4	30	18.06	33.576	5.70	24.189	374.0	0.114
49	14.92	33.325	6.01	0.31	3.	0.01	0.0	323.4	50	14.86	33.331	6.00	24.736	321.9	0.183
63	14.12	33.392	5.83	0.33	4.	0.01	3.1	302.3	75	13.47	33.449	5.49	25.118	285.5	0.260
77	13.36	33.454	5.43	0.46	6.	0.01	6.3	282.9	100	12.14	33.472	5.12	25.397	259.0	0.328
96	12.34	33.463	5.19	0.71	11.	0.01	11.5	263.2	125	10.99	33.578	4.54	25.690	231.2	0.390
120	11.21	33.542	4.69	0.96	16.	0.01	16.3	237.3	150	10.10	33.767	3.78	25.992	202.4	0.445
139	10.45	33.682	4.10	1.39	24.	0.01	21.4	214.2	200	9.24	34.008	2.81	26.323	171.0	0.540
167	9.68	33.877	3.36					187.4	250	8.84	34.181	1.94	26.522	152.0	0.623
195	9.25	33.977	2.93	1.57	30.	0.01	25.4	173.3	300	8.31	34.230	1.41	26.643	140.6	0.699
223	9.23	34.135	2.29	1.70	34.	0.00	26.3	161.3	400	7.42	34.285	0.77	26.818	123.9	0.837
260	8.67	34.184	1.85	1.95	41.	0.00	29.3	149.2	500	6.42	34.319	0.44	26.981	108.5	0.960
316	8.20	34.244	1.26	2.27	48.	0.00	31.1	137.9							
385	7.59	34.282	0.83	2.52	57.	0.00	34.7	126.5							
456	6.79	34.296	0.59	2.72	68.	0.00	37.5	114.8							
531	6.22	34.339	0.33	3.06	77.	0.00	39.9	104.4							

RV DAVID STARR JORDAN — CALCOFI CRUISE 7712 — 110050

LATITUDE	LONGITUDE	MO/DAY/YR	MESSENGER TIME	BOTTOM	WIND	SPEED	WEATHER	DOMINANT WAVES
29 16.0N	116 58.0W	12/10/77	0447 GMT	3358M	270	3KT		

Z	T	S	O2	PO4	SIO3	NO2	NO3	DT	Z	T	S	O2	SIGT	DT	DD
1	17.90	33.544	5.67	0.66	3.	0.00	0.0	372.6	0	17.90	33.544	5.67	24.204	372.6	0.000
11	17.87	33.537	5.66	0.40	2.	0.00	0.0	372.4	10	17.87	33.540	5.66	24.206	372.4	0.037
27	17.82	33.520	5.69	0.15	1.	0.00	0.0	372.5	20	17.85	33.533	5.67	24.205	372.5	0.075
39	17.67	33.509	5.72	0.12	1.	0.00	0.0	369.8	30	17.78	33.519	5.70	24.212	371.8	0.112
48	16.36	33.414	5.86	0.09	2.	0.10	0.0	347.4	50	15.97	33.393	5.87	24.539	340.7	0.183
62	13.91	33.320	5.96	0.18	3.	0.20	0.3	303.4	75	13.16	33.374	5.75	25.122	285.2	0.262
76	13.13	33.377	5.73	0.27	4.	0.06	2.0	284.2	100	11.64	33.442	5.09	25.467	252.3	0.330
95	11.85	33.429	5.16	0.67	8.	0.00	8.3	256.9	125	10.83	33.568	4.57	25.711	229.1	0.391
118	11.06	33.508	4.80	0.83	11.	0.00	11.9	237.3	150	10.15	33.755	3.88	25.975	204.0	0.445
136	10.50	33.664	4.20	1.01	16.	0.00	16.1	216.4	200	9.11	34.006	2.90	26.342	169.1	0.540
164	9.85	33.829	3.62	1.25	18.	0.00	20.0	193.6	250	8.36	34.114	2.18	26.545	149.9	0.622
192	9.29	33.974	3.04	1.68	29.	0.00	24.8	174.1	300	7.80	34.154	1.67	26.660	139.0	0.697
219	8.73	34.063	2.59	1.84	35.	0.00	27.7	159.0	400	6.63	34.196	0.98	26.857	120.3	0.832
256	8.30	34.118	2.11	2.06	41.	0.00	29.6	148.7	500	6.10	34.288	0.47	26.999	106.8	0.952
312	7.66	34.158	1.57	2.31	50.	0.00	32.9	136.7							
381	6.74	34.178	1.10	2.51	62.	0.00	36.1	123.0							
450	6.42	34.245	0.70	2.76	71.	0.00	38.6	113.9							
524	5.92	34.306	0.38	2.91	81.	0.00	41.0	103.2							

RV DAVID STARR JORDAN — CALCOFI CRUISE 7712 — 110060

LATITUDE	LONGITUDE	MO/DAY/YR	MESSENGER TIME	BOTTOM	WIND	SPEED	WEATHER	DOMINANT WAVES
28 56.4N	117 39.0W	12/ 9/77	2250 GMT	3546M	340	11KT	2	330 4 6

Z	T	S	O2	PO4	SIO3	NO2	NO3	DT	Z	T	S	O2	SIGT	DT	DD
2	18.75	33.690	5.71	0.40	1.		0.0	382.0	0	18.75	33.690	5.71	24.105	382.0	0.000
12	18.56	33.694	5.71	0.30	3.		0.0	377.2	10	18.60	33.694	5.71	24.146	378.1	0.038
31	18.03	33.542	5.61	0.40	0.		0.0	375.8	20	18.31	33.624	5.66	24.162	376.6	0.076
40	18.01	33.538	5.67	0.09	0.		0.0	375.6	30	18.05	33.550	5.61	24.170	375.8	0.114
50	16.40	33.404	5.93	0.20	0.		0.0	349.0	50	16.40	33.404	5.93	24.451	349.0	0.186
64	14.70	33.299	6.01	0.23	2.		0.0	320.8	75	14.38	33.385	5.95	24.881	308.1	0.269
79	14.32	33.422	5.90	0.31	2.		0.0	304.1	100	12.89	33.460	5.54	25.242	273.7	0.342
98	13.02	33.456	5.58	0.46	3.		2.0	276.3	125	11.39	33.539	5.01	25.588	240.9	0.407
121	11.63	33.513	5.09	0.72	8.		7.9	246.8	150	10.39	33.725	4.19	25.911	210.1	0.464
139	10.67	33.637	4.68	0.94	14.		12.3	221.2	200	8.98	33.950	3.43	26.319	171.4	0.561
167	10.06	33.840	3.52	1.50	21.		20.1	196.2	250	8.47	34.085	2.37	26.505	153.7	0.645
195	9.06	33.930	3.55	1.63	26.		23.0	173.9	300	7.92	34.155	1.76	26.643	140.6	0.721
223	8.78	34.024	2.79	1.89	33.		26.5	162.7	400	6.87	34.230	0.86	26.851	120.9	0.857
259	8.37	34.099	2.27	2.24	39.		29.0	151.1	500	6.19	34.297	0.48	26.994	107.3	0.978
315	7.76	34.168	1.60	2.55	50.		32.9	137.3							
384	7.03	34.219	0.95	2.95	62.		36.4	123.7							
454	6.43	34.262	0.63	3.10	71.		38.9	112.8							
530	6.10	34.320	0.40	3.23	78.		40.0	104.4							

RV DAVID STARR JORDAN — CALCOFI CRUISE 7712 — 113035

LATITUDE	LONGITUDE	MO/DAY/YR	MESSENGER TIME	BOTTOM	WIND	SPEED	WEATHER	DOMINANT WAVES
29 11.7N	115 37.9W	12/ 9/77	0126 GMT	1206M	290	12KT	1	270 2 7

Z	T	S	O2	PO4	SIO3	NO2	NO3	DT	Z	T	S	O2	SIGT	DT	DD
1	18.44	33.749	6.00	0.24	0.	0.03	0.8	370.3	0	18.44	33.749	6.00	24.228	370.3	0.000
11	18.33	33.747	5.76	0.23	0.	0.09	0.5	367.9	10	18.34	33.749	5.78	24.251	368.1	0.037
30	18.17	33.713	5.70	0.22	0.	0.15	0.3	366.6	20	18.25	33.732	5.73	24.260	367.3	0.074
39	16.26	33.428	5.79	0.34	3.	0.19	0.3	344.2	30	18.17	33.713	5.70	24.267	366.6	0.111
49	15.22	33.387	5.87	0.71	3.	0.02	0.6	325.0	50	15.17	33.403	5.84	24.724	323.0	0.180
63	14.48	33.554	5.37	0.44	4.	0.02	1.8	297.6	75	12.98	33.417	5.43	25.192	278.6	0.255
77	12.73	33.390	5.45	0.43	6.	0.01	3.7	275.7	100	12.01	33.560	4.77	25.490	250.2	0.322
96	12.01	33.522	4.97	0.97	8.	0.00	7.5	252.9	125	11.83	33.828	3.76	25.732	227.2	0.382
120	12.00	33.764	3.84	0.94	14.	0.00	13.4	234.9	150	10.62	33.911	3.56	26.016	200.1	0.436
138	11.25	33.953	3.67	1.30	17.	0.00	15.8	207.7	200	9.55	33.938	3.09	26.218	180.9	0.534
167	9.83	33.802	3.44	2.07	23.	0.00	19.9	195.3	250	9.45	34.295	1.58	26.514	152.8	0.619
195	9.40	33.853	3.43	1.53	26.	0.00	21.7	184.8	300	8.53	34.253	1.39	26.627	142.1	0.696
223	10.17	34.311	1.56	2.47	35.	0.00	27.2	163.1	400	7.56	34.324	0.64	26.829	122.9	0.834
260	9.26	34.277	1.59	2.39	39.	0.00	27.9	151.2	500	6.58	34.337	0.45	26.975	109.1	0.957
315	8.30	34.257	1.26	2.53	48.	0.00	31.0	138.3							
384	7.72	34.323	0.68	2.80	58.	0.00	33.4	125.2							
454	7.00	34.319	0.59	3.03		0.00	35.9	115.8							
529	6.33	34.354	0.33	3.11		0.00	38.4	104.7							

RV DAVID STARR JORDAN — CALCOFI CRUISE 7712 — 113040

LATITUDE	LONGITUDE	MO/DAY/YR	MESSENGER TIME	BOTTOM	WIND	SPEED	WEATHER	DOMINANT WAVES
29 02.0N	115 57.0W	12/ 9/77	0509 GMT	1763M	290	8KT		

Z	T	S	O2	PO4	SIO3	NO2	NO3	DT	Z	T	S	O2	SIGT	DT	DD
1	19.08	33.830	5.75	0.60	3.	0.37	0.0	379.8	0	19.08	33.830	5.75	24.129	379.8	0.000
11	19.07	33.830	5.79	0.67	3.	0.11	0.5	379.5	10	19.07	33.831	5.79	24.131	379.5	0.038
30	18.91	33.820	5.65	0.83	5.	0.03	1.7	376.4	20	18.99	33.827	5.72	24.147	378.0	0.076
39	17.54	33.725	5.41	0.90	5.	0.01	1.7	351.1	30	18.91	33.820	5.65	24.164	376.4	0.114
47	16.85	33.692	5.24	0.99	7.	0.00	4.6	337.9	50	16.41	33.655	5.28	24.640	331.0	0.185
63	14.49	33.510	5.51	1.17	11.	0.00	10.2	301.1	75	13.59	33.508	5.30	25.140	283.4	0.262
78	13.45	33.521	5.19	1.53	17.	0.00	16.2	279.7	100	12.96	33.787	3.95	25.481	250.9	0.329
96	13.07	33.752	4.14	1.70	22.	0.00	18.8	255.5	125	12.12	33.903	3.12	25.735	226.9	0.390
120	12.32	33.893	3.23	2.20	26.	0.00	23.7	231.2	150	11.69	34.045	2.49	25.925	208.8	0.445
138	11.68	33.933	2.87	2.55	31.	0.00	26.1	216.7	200	11.20	34.336	1.36	26.241	178.7	0.544
166	11.71	34.179	1.97	2.27	34.	0.00	26.7	199.1	250	10.51	34.416	1.01	26.428	161.0	0.631
194	11.41	34.348	1.32	2.50	39.	0.00	28.2	181.4	300	9.38	34.392	0.92	26.601	144.5	0.711
223	10.46	34.281	1.55	2.55	46.	0.00	30.6	170.1	400	7.73	34.310	0.78	26.793	126.4	0.853
260	10.55	34.468	0.79	2.90	56.	0.00	33.5	157.8	500	6.68	34.324	0.47	26.952	111.3	0.978
317	9.00	34.357	0.97	2.99	66.	0.00	36.2	141.3							
387	7.90	34.314	0.81	3.33	76.	0.00	38.3	128.4							
457	7.09	34.306	0.62	3.07	66.	0.00	36.3	118.0							
532	6.41	34.346	0.34	3.16	77.	0.00	39.3	106.2							

RV DAVID STARR JORDAN — CALCOFI CRUISE 7712 — 113060

LATITUDE	LONGITUDE	MO/DAY/YR	MESSENGER TIME	BOTTOM	WIND	SPEED	WEATHER	DOMINANT WAVES
28 41.5N	116 36.6W	12/ 9/77	1142 GMT	3546M	360	3KT		

Z	T	S	O2	PO4	SIO3	NO2	NO3	DT	Z	T	S	O2	SIGT	DT	DD
1	19.16	33.742	5.54	0.17	0.	0.00	0.3	388.1	0	19.16	33.742	5.54	24.041	388.1	0.000
11	19.07	33.745	5.56	0.14	0.	0.00	0.3	385.7	10	19.08	33.746	5.56	24.065	385.8	0.039
30	19.09	33.747	5.66	0.11	0.	0.48	0.0	386.0	20	19.08	33.747	5.63	24.065	385.8	0.077
39	19.09	33.752	5.55	0.09	1.	0.06	0.4	385.7	30	19.09	33.747	5.66	24.063	386.0	0.116
48	17.95	33.624	5.37	0.06	3.	0.04	0.8	367.9	50	17.51	33.594	5.42	24.334	360.2	0.191
63	14.92	33.498	5.71	0.03	3.	0.02	0.8	310.7	75	14.39	33.595	5.38	25.040	292.9	0.273
77	14.36	33.612	5.30	0.11	7.	0.00	2.4	291.0	100	12.50	33.635	4.70	25.454	253.5	0.342
97	12.64	33.621	4.82	0.36	11.	0.00	7.5	257.1	125	11.76	33.821	3.60	25.739	226.4	0.403
120	11.88	33.766	3.82	0.81	13.	0.00	14.1	232.6	150	11.23	34.059	2.63	26.021	199.6	0.457
140	11.43	33.980	2.97	1.06	19.	0.00	19.2	208.8	200	10.38	34.254	1.88	26.324	170.8	0.551
167	10.92	34.156	2.20	1.64	26.	0.00	24.0	187.1	250	9.81	34.345	1.27	26.493	154.9	0.635
196	10.44	34.247	1.92	1.68	30.	0.00	26.1	172.3	300	9.44	34.432	0.72	26.622	142.6	0.712
224	10.07	34.286	1.61	1.88	34.	0.00	27.7	163.3	400	8.22	34.391	0.51	26.783	127.3	0.854
262	9.71	34.372	1.11		39.	0.00	28.7	151.2	500	6.93	34.343	0.43	26.931	113.2	0.981
317	9.31	34.445	0.60	2.24	44.	0.00	30.2	139.5							
385	8.42	34.400	0.52	2.55	51.	0.00	32.9	129.5							
458A	7.46	34.358	0.47	2.66	59.		35.8	119.0							
536A	6.50	34.333	0.40	2.70	71.		37.2	108.3							

RV DAVID STARR JORDAN — CALCOFI CRUISE 7712 — 113060

LATITUDE	LONGITUDE	MO/DAY/YR	MESSENGER TIME	BOTTOM	WIND	SPEED	WEATHER	DOMINANT WAVES
28 22.0N	117 16.0W	12/ 9/77	1701 GMT	3546M	240	5KT	1	340 2 7

Z	T	S	O2	PO4	SIO3	NO2	NO3	DT	Z	T	S	O2	SIGT	DT	DD
1	18.83	33.663	5.54	0.20	0.	0.00	0.6	385.9	0	18.83	33.663	5.54	24.065	385.9	0.000
11	18.67	33.663	5.56	0.17	0.	0.00	0.6	382.0	10	18.68	33.665	5.56	24.102	382.3	0.038
29	18.70	33.664	5.55	0.14	0.	0.00	0.5	382.7	20	18.69	33.665	5.56	24.101	382.4	0.077
39	18.68	33.664	5.59	0.11	3.	0.38	0.1	382.2	30	18.70	33.666	5.55	24.099	382.6	0.115
48	16.92	33.542	5.62	0.54	3.	0.00	1.0	350.4	50	16.58	33.542	5.61	24.514	343.1	0.188
62	15.04	33.604	5.38	0.51	4.	0.00	1.6	305.4	75	14.39	33.673	4.81	25.100	287.3	0.267
76	14.35	33.673	4.77	0.73	6.	0.00	4.9	286.3	100	12.12	33.585	4.63	25.489	250.3	0.335
95	12.06	33.481	5.01	0.88	9.	0.00	8.2	256.8	125	12.29	33.957	2.67	25.743	226.1	0.395
118	12.32	33.893	3.02	1.56	18.	0.00	19.0	231.2	150	12.04	34.130	1.93	25.926	208.6	0.450
137	12.25	34.049	2.24	2.22	22.	0.00	24.0	218.4	200	11.13	34.296	1.46	26.224	180.4	0.550
165	11.73	34.200	1.72	2.39	27.	0.00	28.2	197.9	250	10.34	34.369	1.22	26.420	161.8	0.638
193	11.23	34.276	1.51	2.37	33.	0.00	30.1	183.5	300	9.79	34.402	0.98	26.542	150.2	0.719
222	10.81	34.343	1.32	2.82	35.	0.00	32.7	171.4	400	8.29	34.389	0.54	26.770	128.5	0.865
259	10.20	34.372	1.19	2.63	39.	0.00	30.6	159.1	500	7.32	34.391	0.36	26.915	114.8	0.994
317	9.62	34.409	0.88	2.85	45.	0.00	31.4	147.0							
387	8.43	34.387	0.57		56.	0.00	35.6	130.6							
458	7.77	34.394	0.44	3.15	63.	0.00	37.1	120.6							
535	6.91	34.383	0.29	3.10	75.	0.00	40.8	109.9							

A) THIS DEPTH WAS DETERMINED FROM AN EXTRAPOLATED DEPTH CURVE DUE TO MALFUNCTIONING OF THE UNPROTECTED THERMOMETERS IN THF 2 DEEPEST NANSEN BOTTLES.

		Z	T	S	O2	PO4	SIO3	NO2	NO3	DT
87.032[5]	12/17/77 1448GMT 33 53.5N 118 26.4W BOTTOM 21M WIND 090 08KT WEATHER 2 DOMINANT WAVES 250 10 10	10	15.71	33.478	5.44					328.7
87.032[7]	12/17/77 1543GMT 33 54.5N 118 28.0W BOTTOM 34M WIND 090 08KT WEATHER 2 DOMINANT WAVES 250 10 10	10	16.29	33.545	5.78					336.3
87.033	12/17/77 1652GMT 33 53.9N 118 29.0W BOTTOM 50M WIND 090 04KT WEATHER 2 DOMINANT WAVES 250 10 10	10	16.35	33.545	5.80					337.6
87.034	12/17/77 1802GMT 33 51.6N 118 33.6W BOTTOM 71M WIND 090 08KT WEATHER 5 DOMINANT WAVES 250 10 10	10	16.65	33.540	5.81					344.6
87.035	12/17/77 1908GMT 33 50.0N 118 37.5W BOTTOM 482M WIND 130 10KT WEATHER 2 DOMINANT WAVES 250 10 10	10	16.73	33.539	5.74					346.4
87.055	12/18/77 1225GMT 33 10.0N 120 00.0W BOTTOM 1110M WIND 280 18KT WEATHER DOMINANT WAVES	10	14.40	33.402	5.90					307.2
90.027[6]	12/17/77 0926GMT 33 29.0N 117 45.5W BOTTOM 52M WIND 070 03KT WEATHER DOMINANT WAVES	10	16.81	33.555	5.74					347.0
90.028	12/17/77 0748GMT 33 28.5N 117 46.7W BOTTOM 408M WIND 120 04KT WEATHER DOMINANT WAVES	10	16.93	33.566	5.78					348.9
90.029	12/17/77 0606GMT 33 27.0N 117 49.5W BOTTOM 621M WIND 100 07KT WEATHER DOMINANT WAVES	10	16.46	33.537	5.86					340.6
90.030	12/17/77 0350GMT 33 25.0N 117 53.5W BOTTOM 611M WIND 030 05KT WEATHER DOMINANT WAVES	10	16.66	33.553	5.81					343.9
90.031	12/17/77 0204GMT 33 23.0N 117 57.7W BOTTOM 427M WIND 310 09KT WEATHER DOMINANT WAVES	10	17.13	33.575	5.77					352.7
93.026[7]	12/13/77 2030GMT 32 57.2N 117 17.4W BOTTOM 37M WIND 290 08KT WEATHER 1 DOMINANT WAVES 270 04 10	10	16.75	33.545	5.78	0.18	1.	0.00	0.1	346.4
93.026[9]	12/13/77 2223GMT 32 57.0N 117 18.3W BOTTOM 131M WIND 310 11KT WEATHER 1 DOMINANT WAVES 290 05 09	10	16.93	33.554	5.73	0.15	2.	0.00	0.1	349.8
93.028	12/13/77 2334GMT 32 54.8N 117 21.9W BOTTOM 593M WIND 300 08KT WEATHER 4 DOMINANT WAVES 280 03 08	10	16.91	33.548	5.77	0.12	1.	0.00	0.2	349.8
93.035	12/14/77 0722GMT 32 41.0N 117 52.4W BOTTOM 621M WIND 320 04KT WEATHER DOMINANT WAVES	10	17.20	33.594	5.64					352.9
93.045	12/14/77 1432GMT 32 20.2N 118 31.6W BOTTOM 1295M WIND 320 11KT WEATHER 1 DOMINANT WAVES 270 05 10	10	16.90	33.578	5.80	0.29	1.	0.01	0.0	347.4
93.055	12/14/77 2107GMT 32 00.0N 119 13.6W BOTTOM 1485M WIND 300 19KT WEATHER 1 DOMINANT WAVES 300 08 07	10	17.19	33.628	5.66					350.2
97.029	12/13/77 0225GMT 32 17.5N 117 04.7W BOTTOM 47M WIND 300 15KT WEATHER DOMINANT WAVES	10	16.62	33.518	5.93	0.32	1.	0.01	0.2	345.5
97.032	12/12/77 2255GMT 32 11.9N 117 15.4W BOTTOM 1387M WIND 310 12KT WEATHER 1 DOMINANT WAVES 300 03 04	10	17.35	33.577	5.64	0.27	1.	0.01	0.1	357.6
97.045	12/12/77 1400GMT 31 46.0N 118 08.5W BOTTOM 1664M WIND 310 12KT WEATHER DOMINANT WAVES	10	16.89	33.461	5.64					355.7
97.055	12/12/77 0804GMT 31 25.5N 118 49.6W BOTTOM 687M WIND 320 15KT WEATHER DOMINANT WAVES	10	16.38	33.539	5.72					338.7

RV ALEJANDRO DE HUMBOLDT

CALCOFI CRUISE 7712 — 10 METER DATA

			Z	T	S	O2	PO4	SIO3	NO2	NO3	DT
100.029	11/29/77 1016GMT 31 42.1N 116 43.9W BOTTOM 145M WIND 090 07KT WEATHER 0 DOMINANT WAVES 260 02 03		10	15.31	33.438	5.87					325.2
100.045	11/30/77 0121GMT 31 10.7N 117 46.7W BOTTOM 1500M WIND 290 05KT WEATHER 1 DOMINANT WAVES 290 05 05		10	17.65	33.585	5.68					363.8
100.090	12/01/77 1550GMT 29 39.0N 120 47.0W BOTTOM 3926M WIND 300 30KT WEATHER 1 DOMINANT WAVES 300 12 08		10	18.23	33.507	5.61					383.0
103.045	12/02/77 2015GMT 30 36.0N 117 24.0W BOTTOM 1900M WIND 290 05KT WEATHER 1 DOMINANT WAVES 280 05 06		10	17.18	33.433	5.71					364.2
103.029	12/03/77 0701GMT 31 07.0N 116 21.0W BOTTOM 25M WIND KT WEATHER 4 DOMINANT WAVES		10	16.55	33.515	6.58					344.2

RV DAVID STARR JORDAN

CALCOFI CRUISE 7712 — 10 METER DATA

			Z	T	S	O2	PO4	SIO3	NO2	NO3	DT
107.031	12/10/77 2110GMT 30 27.9N 116 07.2W BOTTOM 37M WIND 330 04KT WEATHER 1 DOMINANT WAVES 330 03 07		10	17.98	33.642	5.95					367.3
107.045	12/11/77 0704GMT 30 01.6N 117 02.9W BOTTOM 1392M WIND 280 05KT WEATHER DOMINANT WAVES		10	17.77	33.565	5.77					368.1
110.032	12/10/77 1651GMT 29 51.2N 115 49.7W BOTTOM 52M WIND 060 08KT WEATHER 1 DOMINANT WAVES 090 03 07	[4]	10	17.92	33.702	5.27					361.6
110.045	12/10/77 0745GMT 29 26.5N 116 39.5W BOTTOM 845M WIND 250 03KT WEATHER DOMINANT WAVES		10	18.22	33.618	5.57	0.37	1.	0.00	0.0	374.7
113.029	12/08/77 2046GMT 29 24.5N 115 13.5W BOTTOM 26M WIND 250 10KT WEATHER 1 DOMINANT WAVES 290 02 07		10	18.84	33.766	5.78	0.43	0.	0.00	0.7	378.6
113.030	12/08/77 2220GMT 29 22.0N 115 18.0W BOTTOM 54M WIND 270 11KT WEATHER 1 DOMINANT WAVES 280 02 06		10	18.84	33.757	5.80	0.01	1.	0.14	0.1	379.3
113.045	12/09/77 0843GMT 28 52.0N 116 18.1W BOTTOM 2322M WIND 320 06KT WEATHER DOMINANT WAVES		10	18.73	33.677	5.68		1.		0.1	382.4

	DEPTH	CHL A	PHAEO
STATION 83051	1	0.85	0.19
12/20/77	11	0.62	0.24
0301 GMT	30	0.53	0.18
	66	0.25	0.24
33 52.0N	99	0.13	0.18
120 08.5W	118	0.08	0.16
STATION 83055	0	0.69	0.29
12/20/77	11	0.75	0.32
0018 GMT	29	0.62	0.36
	62	0.11	0.14
33 44.0N	76	0.02	0.14
120 24.5W	95	0.01	0.04
	137	0.01	0.05
STATION 83060	2	0.64	0.11
12/19/77	11	0.60	0.16
1952 GMT	30	0.55	0.22
	62	0.03	0.14
33 34.0N	75	0.03	0.14
120 45.0W	93	0.02	0.09
	134	0.01	0.03
STATION 83070	1	0.68	0.28
12/19/77	11	0.65	0.22
1424 GMT	29	0.57	0.34
33 14.4N	60	0.08	0.25
121 26.1W	74	0.01	0.03
STATION 83080	2	0.32	0.10
12/19/77	12	0.26	0.11
0837 GMT	31	0.31	0.19
	64	0.20	0.20
32 54.0N	78	0.14	0.11
122 08.0W	97	0.02	0.07
STATION 87070	2	0.25	0.10
12/18/77	12	0.23	0.09
2214 GMT	31	0.21	0.08
	63	0.17	0.14
32 39.5N	77	0.06	0.10
121 02.1W	96	0.03	0.07
STATION 87080	1	0.29	0.00
12/19/77	10	0.17	0.04
0340 GMT	29	0.24	0.07
	61	0.25	0.18
32 19.5N	75	0.15	0.14
121 43.0W	93	0.04	0.08
STATION 90045	1	0.35	0.11
12/16/77	11	0.29	0.13
1426 GMT	29	0.31	0.12
	62	0.19	0.14
32 54.5N	76	0.07	0.10
118 55.5W	96	0.03	0.09
STATION 90053	2	0.82	0.30
12/16/77	11	0.88	0.33
0940 GMT	30	0.85	0.34
	62	0.14	0.17
32 39.0N	76	0.10	0.08
119 28.5W	94	0.07	0.08
STATION 90060	1	0.18	0.07
12/16/77	9	0.20	0.07
0410 GMT	28	0.09	0.05
	61	0.19	0.21
32 25.0N	77	0.15	0.14
119 57.6W	95	0.11	0.05
STATION 90070	1	0.32	0.03
12/15/77	10	0.27	0.09
2249 GMT	29	0.30	0.09
	38	0.30	0.08
32 04.5N	47	0.31	0.09
120 38.5W	61	0.29	0.16
	75	0.05	0.08
	94	0.02	0.05
STATION 90080	2	0.23	0.06
12/15/77	12	0.19	0.09
1709 GMT	30	0.24	0.07
	39	0.23	0.09
31 44.5N	49	0.25	0.07
121 19.5W	63	0.21	0.08
	77	0.14	0.11
	96	0.12	0.05
	119	0.02	0.02
STATION 93050	1	0.11	0.03
12/14/77	11	0.13	0.04
1750 GMT	30	0.14	0.04
	40	0.24	0.16
32 11.0N	49	0.27	0.16
118 53.0W	62	0.20	0.17
	77	0.15	0.20
	96	0.07	0.06
STATION 93060	1	0.16	0.06
12/15/77	11	0.17	0.05
0024 GMT	29	0.32	0.07
	39	0.49	0.23
31 50.1N	48	0.41	0.25
119 34.0W	62	0.27	0.23
	76	0.13	0.17
	94	0.03	0.05
STATION 93070	1	0.15	0.04
12/15/77	10	0.16	0.04
0554 GMT	29	0.15	0.05
	39	0.16	0.08
31 30.2N	48	0.30	0.11
120 14.0W	62	0.26	0.11
	76	0.16	0.11
	94	0.07	0.07
	117	0.01	0.07
	136	0.01	0.10
	163	0.01	0.01
STATION 93080	1	0.08	0.04
12/15/77	11	0.10	0.04
1142 GMT	29	0.10	0.03
	39	0.15	0.04
31 10.0N	48	0.19	0.06
120 54.4W	62	0.20	0.11
	76	0.15	0.12
	95	0.11	0.08
	118	0.03	0.07
	137	0.01	0.04
STATION 97030	1	1.11	0.32
12/13/77	10	1.70	0.04
0037 GMT	20	2.27	0.69
32 16.1N	29	1.01	0.38
117 07.1W	49	0.31	0.23
STATION 97035	1	0.19	0.00
12/12/77	11	0.18	0.00
2044 GMT	30	0.14	0.11
	39	0.18	0.10
32 05.5N	48	0.30	0.16
117 27.4W	62	0.26	0.18
	76	0.11	0.14
	94	0.05	0.08
	118	0.01	0.14
STATION 97040	1	0.20	0.04
12/12/77	11	0.13	0.10
1714 GMT	30	0.16	0.04
	40	0.20	0.05
31 56.0N	49	0.23	0.19
117 48.0W	63	0.23	0.15
	78	0.13	0.09
	97	0.04	0.07
	120	0.01	0.04
	195	0.01	0.01
STATION 97050	1	0.22	0.00
12/12/77	10	0.36	0.00
1055 GMT	29	0.02	0.03
	48	0.12	0.04
31 36.0N	62	0.32	0.21
118 30.6W	77	0.10	0.03
	95	0.01	0.01
	119	0.13	0.02
	166	0.10	0.10
STATION 97060	1	0.16	0.07
12/12/77	10	0.18	0.07
0356 GMT	30	0.18	0.08
	39	0.27	0.17
31 15.7N	46	0.31	0.22
119 10.0W	62	0.23	0.20
	75	0.12	0.14
	94	0.06	0.07
	118	0.01	0.04

	DEPTH	CHL A	PHAEO
STATION 100030	0	4.24	2.40
11/29/77	62	0.84	1.32
1220 GMT	112	0.34	1.02
	167	0.13	0.33
31 40.6N	202	0.05	0.34
116 46.3W	237	0.09	0.37

	DEPTH	CHL A	PHAEO
STATION 100035	0	0.68	0.12
11/29/77	10	0.70	0.10
1747 GMT	31	1.34	0.64
	42	2.60	0.94
31 30.5N	52	1.61	1.14
117 07.0W	67	1.25	1.28
	83	0.69	0.74
	103	0.39	0.41
	129	0.13	0.23
	150	0.05	0.11
	180	0.02	0.09
	211	0.03	0.15

	DEPTH	CHL A	PHAEO
STATION 100040	0	0.49	0.19
11/29/77	10	0.42	0.18
2159 GMT	31	0.63	0.33
	41	1.19	0.45
31 21.1N	51	0.98	0.92
117 26.9W	66	1.18	1.42
	82	0.90	0.92
	102	0.55	0.55
	127	0.08	0.25
	148	0.06	0.18
	178	0.01	0.10
	208	0.01	0.10

	DEPTH	CHL A	PHAEO
STATION 100050	0	0.46	0.13
11/30/77	10	0.53	0.10
0528 GMT	31	0.70	0.29
	42	1.47	0.75
31 00.4N	52	1.82	1.19
118 07.0W	67	1.11	0.90
	83	0.76	0.73
	104	0.27	0.39
	130	0.12	0.15
	150	0.06	0.14
	181	0.02	0.05
	212	0.02	0.06

	DEPTH	CHL A	PHAEO
STATION 100060	0	0.49	0.12
11/30/77	10	0.46	0.23
1252 GMT	31	0.51	0.43
	41	0.51	0.51
30 40.5N	52	0.84	0.15
118 47.5W	67	0.55	0.63
	82	1.39	1.27
	103	0.69	0.54
	128	0.12	0.21
	149	0.03	0.14
	179	0.02	0.07
	210	0.01	0.08

	DEPTH	CHL A	PHAEO
STATION 100070	0	0.42	0.13
11/30/77	10	0.49	0.15
1907 GMT	29	0.46	0.21
	38	0.39	0.24
30 20.4N	48	0.76	0.47
119 27.5W	62	1.25	0.89
	76	0.97	0.98
	95	0.42	0.42
	118	0.62	0.81
	136	0.27	0.51
	164	0.04	0.18
	191	0.01	0.09

	DEPTH	CHL A	PHAEO
STATION 100080	0	0.42	0.30
12/01/77	28	0.09	0.54
0128 GMT	38	0.37	0.11
	47	0.39	0.13
30 01.1N	62	0.55	0.18
120 07.1W	76	0.62	0.39
	94	0.83	0.47
	118	0.53	0.81
	136	0.32	0.35
	164	0.13	0.18
	191	0.05	0.11

	DEPTH	CHL A	PHAEO
STATION 103030	0	12.04	18.91
12/03/77	10	15.58	18.67
0611 GMT	21	14.87	8.83
31 06.0N	32	9.14	3.93
116 24.5W	41	6.52	2.90

	DEPTH	CHL A	PHAEO
STATION 103035	1	7.79	11.31
12/03/77	11	12.74	14.91
0241 GMT	31	2.58	1.08
	41	2.17	1.35
30 56.0N	51	0.44	0.93
116 45.0W	66	0.25	0.49
	82	0.20	0.47
	102	0.13	0.56
	127	0.18	0.47
	148	0.06	0.27
	178	0.03	0.21
	209	0.01	0.19

	DEPTH	CHL A	PHAEO
STATION 103040	0	0.37	0.06
12/02/77	10	0.39	0.12
2321 GMT	29	0.46	0.32
	39	0.51	0.31
30 46.0N	49	0.84	0.39
117 04.5W	64	0.83	2.60
	78	0.90	0.97
	98	0.41	0.78
	123	0.32	0.32
	143	0.13	0.23
	172	0.01	0.09
	202	0.02	0.09

	DEPTH	CHL A	PHAEO
STATION 103050	0	0.05	0.80
12/02/77	10	0.37	0.08
1706 GMT	31	0.25	0.22
	41	0.41	0.07
30 26.0N	51	0.58	0.26
117 44.3W	67	0.76	0.45
	82	0.55	0.71
	103	0.48	0.92
	128	0.27	0.58
	149	0.11	0.16
	179	0.02	0.07
	210	0.01	0.05

	DEPTH	CHL A	PHAEO
STATION 103060	0	0.70	0.30
12/02/77	10	0.77	0.56
1115 GMT	31	1.20	0.93
	41	2.39	1.19
30 06.0N	52	0.63	0.57
118 25.0W	67	0.62	0.50
	83	0.48	0.70
	103	0.34	0.55
	129	0.13	0.27
	149	0.10	0.17

	DEPTH	CHL A	PHAEO
STATION 103070	1	0.39	0.11
12/02/77	11	0.37	0.13
0521 GMT	32	0.49	0.15
	42	0.62	0.27
29 46.0N	57	0.77	0.41
119 04.7W	73	0.90	0.92
	98	0.69	0.87
	119	0.41	0.64
	139	0.18	0.32
	160	0.09	0.14
	190	0.01	0.07
	226	0.01	0.08

	DEPTH	CHL A	PHAEO
STATION 103080	0	0.37	0.07
12/01/77	10	0.25	0.04
2305 GMT	30	0.32	0.09
	61	0.48	0.17
29 26.0N	71	0.32	0.22
119 43.0W	87	0.83	0.53
	102	0.83	0.66
	117	0.52	0.72
	142	0.25	0.38
	163	0.15	0.24
	193	0.04	0.11
	223	0.01	0.05

RV DAVID STARR JORDAN

CHLOROPHYLL-A AND PHAEOPHYTIN

CALCOFI CRUISE 7712

	DEPTH	CHL A	PHAEO
STATION 107032	1	2.57	0.39
12/10/77	11	4.55	1.08
2216 GMT	30	0.59	0.35
	44	0.18	0.32
30 25.7N	54	0.07	0.27
116 11.0W	68	0.04	0.14
	82	0.03	0.12
	97	0.06	0.16
	120	0.02	0.12
	139	0.03	0.09
	167	0.02	0.05
	195	0.01	0.05
STATION 107035	1	1.97	1.16
12/11/77	11	2.27	1.64
0102 GMT	30	0.78	0.49
	39	0.46	0.44
30 21.5N	49	0.17	0.26
116 22.4W	63	0.09	0.20
	77	0.03	0.14
	95	0.11	0.19
	119	0.05	0.12
	138	0.02	0.07
	166	0.01	0.05
STATION 107040	1	8.50	1.82
12/11/77	11	8.70	1.62
0430 GMT	30	3.66	0.85
	39	1.21	0.38
30 11.8N	48	0.07	0.17
116 41.0W	62	0.07	0.11
	76	0.05	0.06
	95	0.06	0.06
	117	0.01	0.04
	164	0.01	0.02
	191	0.07	0.05
STATION 107050	3	0.43	0.00
12/11/77	12	0.19	0.05
0945 GMT	32	0.18	0.06
	40	0.17	0.04
29 50.3N	48	0.29	0.10
117 22.2W	60	0.23	0.10
	74	0.15	0.08
	92	0.14	0.16
	114	0.04	0.08
	132	0.03	0.04
STATION 107060	2	0.59	0.17
12/11/77	11	0.55	0.11
1448 GMT	31	0.95	0.17
	41	0.88	0.13
29 32.0N	50	0.39	0.19
118 02.0W	65	0.19	0.11
	79	0.10	0.11
	98	0.05	0.06
	121	0.02	0.06
	140	0.05	0.00
	167	0.01	0.01
STATION 110035	1	1.28	0.29
12/10/77	10	1.05	0.34
1441 GMT	29	1.01	0.42
	39	0.62	0.32
29 46.0N	48	0.07	0.12
116 00.0W	63	0.10	0.13
	77	0.07	0.11
	96	0.01	0.05
	118	0.01	0.05
	137	0.01	0.04
	194	0.01	0.03
STATION 110040	1	1.58	0.79
12/10/77	11	1.38	0.93
1058 GMT	30	1.01	0.26
	39	0.26	0.16
29 36.5N	49	0.03	0.05
116 19.6W	63	0.05	0.05
	77	0.01	0.02
	96	0.05	0.06
	120	0.05	0.06
	139	0.09	0.06
STATION 110050	1	0.34	0.14
12/10/77	11	0.31	0.11
0447 GMT	27	0.31	0.10
	39	0.37	0.17
29 16.0N	48	1.01	0.34
116 58.0W	62	0.10	0.10
	76	0.04	0.09
	95	0.03	0.09
	118	0.01	0.06
STATION 110060	2	1.68	0.45
12/09/77	12	1.68	0.33
2250 GMT	31	0.13	0.32
	40	0.62	0.00
28 56.4N	50	0.45	0.19
117 39.0W	64	0.10	0.10
	79	0.07	0.18
	98	0.07	0.13
	121	0.05	0.08
	139	0.02	0.04
STATION 113035	1	5.34	2.49
12/09/77	11	5.22	2.92
0126 GMT	30	4.51	2.67
	39	0.82	0.53
29 11.7N	49	0.13	0.25
115 37.9W	63	0.04	0.10
	77	0.03	0.08
	96	0.06	0.05
	120	0.03	0.05
	167	0.03	0.05
	195	0.07	0.04
STATION 113040	1	0.83	0.30
12/09/77	11	4.86	0.85
0509 GMT	30	2.86	1.64
	39	1.00	0.48
29 02.0N	47	0.19	0.31
115 57.0W	63	0.03	0.15
	78	0.04	0.09
	96	0.03	0.09
	120	0.01	0.06
	166	0.01	0.03
	194	0.02	0.03
STATION 113050	1	0.79	1.40
12/09/77	11	1.46	0.79
1142 GMT	30	1.08	0.98
	39	1.58	0.61
28 41.5N	48	0.65	0.32
116 36.6W	63	0.02	0.09
	97	0.03	0.09
	120	0.05	0.08
STATION 113060	1	1.11	0.28
12/09/77	11	0.92	0.55
1701 GMT	29	0.46	0.11
	39	1.08	0.39
28 22.0N	48	0.39	0.23
117 16.0W	62	0.09	0.13
	76	0.05	0.01
	95	0.02	0.04

Secchi Disk Observations

CalCOFI Cruise 7712

Stat #	Mo	Dy	Local Time (+8: PST)	Depth (m)	Weather	Clouds Type/Amt	Comments
90.032	12	16	1445	20	0	- 0	Clear
100.035	11	29	0940	31	0	- -	Clear
103.045	12	02	1215	22	1	- -	
110.060	12	09	1420	12	2	6 8	
113.029	12	08	1255	9	1	1 6	

WEATHER
WMO Code 4501

Code	
0	Clear (no cloud at any level)
1	Partly cloudy (clouds scattered or broken)
2	Continuous layer(s) of cloud(s)
3	Sandstorm, dust storm, or blowing snow
4	Fog, thick dust, or haze
5	Drizzle
6	Rain
7	Snow, or rain and snow mixed
8	Shower(s)
9	Thunderstorm(s)

CLOUD TYPE
WMO Code 0500

Code	
0	Cirrus
1	Cirrocumulus
2	Cirrostratus
3	Altocumulus
4	Altostratus
5	Nimbostratus
6	Stratocumulus
7	Stratus
8	Cumulus
9	Cumulonimbus
/	Cloud not visible owing to darkness, fog, dust storm, sandstorm, or other phenomena

CLOUD AMOUNT
WMO Code 2700

Code	
0	0
1	1 Okta (eighth) or less, but not zero
2	2 Oktas
3	3 Oktas
4	4 Oktas
5	5 Oktas
6	6 Oktas
7	7 Oktas
8	8 Oktas
9	Sky obscured, or cloud amount cannot be estimated

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