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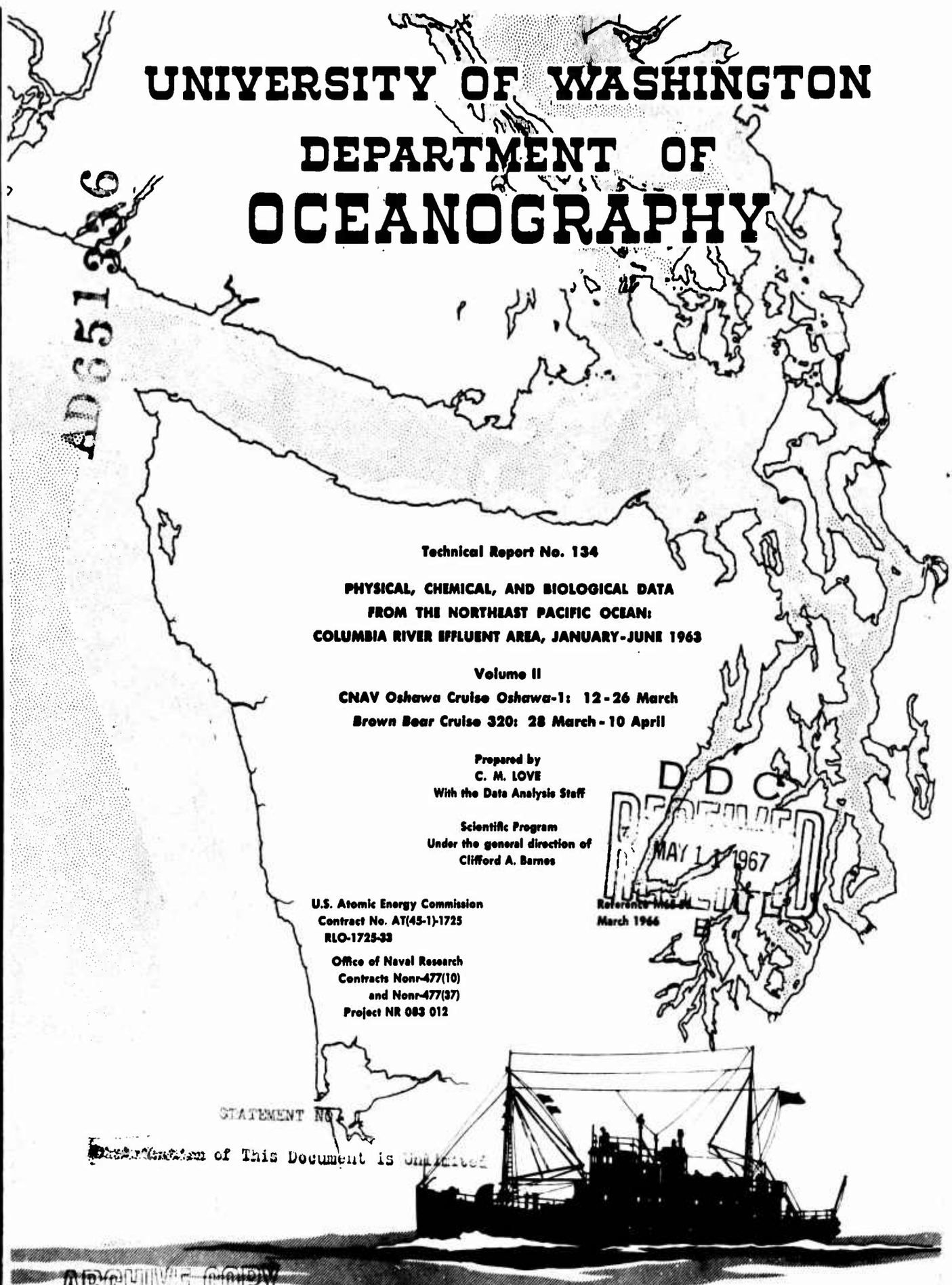

Technical Report No. 134

PHYSICAL, CHEMICAL, AND BIOLOGICAL DATA FROM THE NORTHEAST PACIFIC OCEAN: COLUMBIA RIVER EFFLUENT AREA, JANUARY-JUNE 1963

Volume II

CNAV *Oshawa* Cruise *Oshawa*-1: 12-26 March

Brown Bear Cruise 320: 28 March-10 April

Prepared by
C. M. LOVE
With the Data Analysis Staff

Scientific Program
Under the general direction of
Clifford A. Barnes

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Contract No. AT(45-1)-1725
RLO-1725-33

Office of Naval Research
Contracts Nonr-477(10)
and Nonr-477(37)
Project NR 083 012

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March 1966

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Reference M65-56
March 1966

RICHARD H. FLEMING
Chairman

CLIFFORD A. BARNES
Principal Investigator

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TABLE OF CONTENTS

Page

INTRODUCTION 1

EXPLANATION OF DATA TABLES 1

Abbreviations and Headings Used in Data Tables 1

Codes Used for Reporting Observations 6

DATA TABLES 13

LIST OF FIGURES

Page

1. Station locations Cruise Oshawa-1, 12-26 March 1963 12

2. Station locations Brown Bear Cruise 320, 28 March - 10 April 1963 138

INTRODUCTION

This report constitutes Volume II of Technical Report No. 134 and contains data from Cruise Oshawa-1, 12-26 March 1963, and Brown Bear Cruise 320, 28 March - 10 April 1963. A discussion of the objectives of these cruises and the scientific program of which they were a part will be found in Volume I, together with descriptions of the observations made, the methods of collecting samples and the methods of determination of properties. A list of the personnel engaged in collecting and preparing the data and a bibliography will also be found in Volume I.

The cruise tracks and station locations for cruises Oshawa-1 and Brown Bear 320 will be found in Figures 1 and 2 of this volume.

EXPLANATION OF DATA TABLES

The information in the data tables was transcribed directly from IBM cards using an IBM 1401 Data Processing System. A blank space in the tables or headings indicates that no observation was taken. The original data and the interpolated and computed values punched on the cards are in most cases recorded or coded in accordance with the procedures used by the National Oceanographic Data Center; however, some weather information is coded with U.S. Navy Hydrographic Office codes. The codes used to describe weather and sea conditions, etc., will be found in NODC Publication M-2 (National Oceanographic Data Center, 1964) or in H.O. Publication No. 606-c (U.S. Navy Hydrographic Office, 1956) and H.O. Publication No. 607 (U.S. Navy Hydrographic Office, 1955a). (See References in Volume I.) Some changes were made in the card format, but these do not affect the arrangement of the data in this report. Abbreviations and column headings are described below and, where necessary, the NODC or Hydrographic Office numerical codes have been reproduced to aid in interpreting the data.

Abbreviations and Headings Used in Data Tables

DATE	For Observed Values the date given is Greenwich day/month/year. For Biological Data the date given is local (ship's time, +8 zone) day/month/year.
HR (Hour)	Greenwich mean time to the nearest tenth of an hour of the messenger drop on the first cast.
LAT (Latitude and LONG (Longitude)	In degrees and minutes; or in degrees, minutes, and tenths of minutes on some stations.

SNDG (Depth of water)	Depth of water in meters at the station as determined by the ship's echo sounder. This depth was generally recorded immediately after the ship arrived on station.
WEA (Weather)	State of the weather. One of two possible codes was used for reporting present weather. A two-digit number in this space indicates use of WMO Code 4677, shown on page 9 ; one number preceded by an X indicates use of WMO Code 4501, shown on page 11. The X has no significance except to indicate which code was used.
WIND VEL __ DIR __ (Wind velocity and direction)	Wind velocity in knots. Wind direction, see code, page 8 .
BAROM (Barometric pressure)	To obtain the barometric pressure in millibars, add 900 if this number is above 50; add 1000 if below 50.
TEMP DRY __ WET __ (Air temperature, dry, wet bulb)	In degrees Celsius
RELHU (Relative Humidity)	Expressed in per cent.
WTRCLR (Water color)	Expressed according to the Forel-Ule scale. See code, page 10.
SECD1 (Water transparency)	Depth in meters to which a 12-inch (30.5 cm) Secchi disk could be seen on daylight stations.
SEA __ DIR __ (Sea state and direction)	State of the sea, see code, page 8 . Direction from which sea was coming, see code, page 8 .
SWELL __ DIR __ (Swell amount and direction)	Height and wave length of swell, see code, page 8 . Direction from which swell was coming, see code, page 8 .
DOM WAVE DIR __ HT __ PER __ (Dominant wave direction, height, and period)	Dominant wave characteristics (National Oceanographic Data Center, 1964) were reported on some cruises instead of sea and swell. Direction from which waves were coming, see code, page 8 . Height of waves, see code, page 8 . Period of waves, see code, page 11.

CLOUD TYPE __ AMT __ (Cloud type and amount)	Cloud type, see code, page 7 . Amount of cloud cover, see code, page 7 .
VIS (Visibility)	Range of visibility. See code, page 7 .
WIRE ANGLE(S)	In degrees. Wire angles are tabulated only for those casts whose numbers appear in the "Cast" column at the left of the page, i.e., casts from which data were obtained. The first number is the wire angle for Cast 1, or the lowest numbered cast appearing, the second for Cast 2, etc. Dashes (- -) indicate the wire angle was not recorded for that cast.
CST (Cast)	Cast number.
DEPTH	Depth in meters from which sample was obtained.
TEMP (Temperature)	In degrees Celsius.
SAL (Salinity)	In parts per thousand ($^{o}/oo$).
SIGMA-T (σ_t)	An expression for the density of sea water at atmospheric pressure, having the indicated temperature and salinity. To convert sigma-t values to density, divide by 1000 and add 1; thus sigma-t 22.42 = density 1.02242.
OXYGEN (Dissolved Oxygen)	
ML/L	In milliliters per liter
MGA/L	In milligram-atoms per liter
AOU (Apparent oxygen utilization)	In milligram-atoms per liter
SATN (Saturation)	Per cent of oxygen saturation
PHOS (Phosphate-phosphorus)	In microgram-atoms per liter (μg-at/l)
NITR (Nitrate-nitrogen)	In microgram-atoms per liter (μg-at/l)
SIL (Silicate-silicon)	In microgram-atoms per liter (μg-at/l)
CHL-A (Chlorophyll a)	In milligrams per cubic meter

PRODUCTIVITY, LAB-I (Incubator productivity)	Expressed as milligrams carbon assimilated per cubic meter per hour.
PRODUCTIVITY, DECK-I (Simulated in situ productivity)	Expressed as milligrams carbon assimilated per cubic meter per day.
LIGHT SAT	Data from light saturation experiments. Refer to text, page 6 of Volume I.
PROD (Productivity)	Productivity of sample receiving the indicated amount of illumination. Expressed as milligrams of carbon assimilated per cubic meter per hour.
FILT (Filter)	Indicates the per cent of total incubator illumination transmitted to the sample through a neutral density filter. The total incubator illumination in units of lux is listed at the bottom of the Biological Data section.
IRRAD (Irradiance)	Per cent of surface solar radiation reaching the indicated depth.
OXY (Dissolved oxygen)	Units are indicated in the column heading. In the Biological Data section oxygen is reported in milligram-atoms per liter. In the Interpolated and Computed Values oxygen is reported in milliliters per liter.
WATER COLUMN VALUES	Integrated values over the water column from the surface to the bottom of the euphotic zone for CPL-A, LAB-I, and DECK-I. The values at 100 meters and below are not included in this integration because they are below the euphotic zone.
MESSENGER TIME	Messenger time (ship's time, +8 zone) of the productivity cast.
INCOMING SOLAR RADIATION - AM ___ PM ___	Expressed in calories per square centimeter. The AM value is the integrated value of incoming radiation from sunrise to ship's noon; PM represents from ship's noon to sunset.
ZOOPLANKTON	Indicates that zooplankton samples were collected at this station. The information following indicates the type of sampler or net used, the type of tow made, the times of the tow, and the depths sampled, as follows:

(CLARKE-BUMPUS)	Clarke-Bumpus sampler
(HALF-METER NET)	Half-meter net
(MIDWATER TRAWL)	Midwater trawl
HORIZ	Horizontal tow
VERT	Vertical tow
OBL	Oblique tow
STEP	Stepped tow
TIME (from - to)	Ship's time (+8 zone) of the tow
DEPTHS	Depths sampled

Example: Station 318-6

ZOOPLANKTON (CLARKE-BUMPUS) HORIZ - TIME 0154-0204 DEPTHS 100, 70
0232-0243 30, 0

means that two horizontal tows using Clarke-Bumpus were made. The first tow began at 0154 ship's time, lasted until 0204 and sampled at 70 and 100 meters (two samplers on the wire). The second tow sampled at the surface and 30 meters and lasted from 0232 to 0243 ship's time.

LIGHT SATURATION INCUBATOR ILLUMINATION	Total incubator illumination for light saturation experiments. Expressed in lux.
SP VOL ANOMALY (Specific volume anomaly, $10^5\delta$)	The anomaly of specific volume at the indicated temperature, salinity, and pressure compared to a standard water of 0°C temperature and 35 °/oo salinity, at the same pressure. Tabular values multiplied by 10^{-5} will give the anomaly in units of cubic centimeters per gram.
GEOPOT ANOMALY (Geopotential anomaly, $\Sigma\Delta D$)	Geopotential anomaly in dynamic meters of the layer of water between the surface and the indicated depth.
POT ENERGY (Potential energy anomaly)	Potential energy anomaly in units of 10^8 ergs per square centimeter of the layer of water between the surface and the indicated depth.

VAR RATIO (Variance ratio)	The ratio of the variance of the interpolation polynomial to the variance of the measurement. The value of the variance ratio is an indication of the adequacy of the vertical spacing of the observed values upon which the interpolation is based. See page 7 of Volume I. Values close to 1 indicate optimum spacing. Values greater than 3 indicate that the vertical spacing is inadequate to represent faithfully the distribution of properties in this region of the curve. In the case of missing values, where different combinations of observed values may be used to interpolate at the same depth, the variance ratio which indicates the worst spacing has been printed. Values greater than 100 have been printed as 99.99. If the observed depth corresponds to a desired standard depth, no interpolation is made and the variance ratio is not computed.
E(T) (Temperature interpolation error)	Interpolation error, in degrees Celsius, of the temperature value at this depth. For a discussion of the interpolation error, see page 7 of Volume I. If the observed depth corresponds to a desired standard depth, the interpolation error will be zero.
E(S) (Salinity interpolation error)	Interpolation error, in parts per thousand, of the salinity value at this depth. See comments under E(T) above.
E(O) (Oxygen interpolation error)	Interpolation error, in milliliters per liter, of the oxygen value at this depth. See comments under E(T) above.
*	Indicates a questionable value. See page 8 of Volume I.
‡	Indicates a hand-interpolated value. See page 8 of Volume I.

Codes Used for Reporting Observations

Taken from National Oceanographic Data Center Publication M-2, "Processing Physical and Chemical Data from Oceanographic Stations," or U.S. Navy Hydrographic Office Publication No. 606-c, "Hydrographic Office Observers Manual. Bathythermograph Observations," or U.S. Navy Hydrographic Office Publication No. 607, "Instruction Manual for Oceanographic Observations."

Cloud Type (taken from NODC Publication M-2) WMO Code 0500

Code

0	Cirrus	Ci
1	Cirrocumulus	Cc
2	Cirrostratus	Cs
3	Altocumulus	Ac
4	Altostratus	As
5	Nimbostratus	Ns
6	Stratocumulus	Sc
7	Stratus	St
8	Cumulus	Cu
9	Cumulonimbus	Cb
x	Cloud not visible owing to darkness, fog, duststorm, sandstorm, or other analogous phenomena	

Amount of Cloud Cover (taken from NODC Publication M-2) WMO Code 2700

Code

0	0	0
1	1 okta or less, but not zero	1/10 or less, but not zero
2	2 oktas	2/10 - 3/10
3	3 oktas	4/10
4	4 oktas	5/10
5	5 oktas	6/10
6	6 oktas	7/10 - 8/10
7	7 oktas or more, but not 8 oktas	9/10 or more, but not 10/10
8	8 oktas	10/10
9	Sky obscured, or cloud amount cannot be estimated	

Visibility (taken from NODC Publication M-2) WMO Code 4300

Code

0	Less than 50 metres	(less than 55 yards)
1	50-200 metres	(approx. 55-220 yards)
2	200-500 metres	(approx. 220-550 yards)
3	500-1,000 metres	(approx. 550 yards-5/8 n.m.)
4	1- 2 km	(approx. 5/8-1 n.m.)
5	2- 4 km	(approx. 1- 2 n.m.)
6	4-10 km	(approx. 2- 6 n.m.)
7	10-20 km	(approx. 6-12 n.m.)
8	20-50 km	(approx. 12-30 n.m.)
9	50 km or more	(30 n.m. or more)

Direction (taken from NODC Publication M-2)
Compass Direction from which Wind, Sea, or Swell is coming

Code

00	Calm, or no value
01 to 36	Each value represents 1/10 of the true direction in degrees, measured clockwise from the north, with 36 representing true north.

State of the Sea - Wind Waves (taken from NODC Publication M-2)
WMO Code 3700

Code	Description	Height (Feet)
0	Calm (Glassy)	0
1	Calm (Rippled)	0 - 1/3
2	Smooth (Wavelets)	1/3 - 1 2/3
3	Slight	1 2/3 - 4
4	Moderate	4 - 8
5	Rough	8 - 13
6	Very Rough	13 - 20
7	High	20 - 30
8	Very High	30 - 45
9	Phenomenal	over 45

Swell Conditions (taken from H.O. 606-c or H.O. 607)

Code	Approx. Height in Feet	Description		Approx. Length in Feet
0	0	No swell		0
1 2	1 - 6	Low swell	Short or average Long	0 - 600 Above 600
3 4 5	6 - 12	Moderate	Short Average Long	0 - 300 300 - 600 Above 600
6 7 8	Greater than 12	High	Short Average Long	0 - 300 300 - 600 Above 600
9	---	Confused		

NUMERICAL WEATHER CODES—PRESENT WEATHER

00 Cloud development NOT observed or NOT observable during past hour	**01** Clouds generally dissolving or becoming less developed during past hour	**02** State of sky on the whole unchanged during past hour	**03** Clouds generally forming or developing during past hour	**04** Visibility reduced by smoke	**05** Haze	**06** Widespread dust in suspension in the air NOT raised by wind at time of observation	**07** Dust or sand raised by wind at time of observation	**08** Well developed dust devil(s) within past hour	**09** Duststorm or sandstorm within sight of or at station during past hour
10 Light fog	**11** Patches of shallow fog at station NOT deeper than 6 feet on land	**12** More or less continuous shallow fog at station NOT deeper than 6 feet on land	**13** Lightning visible, no thunder heard	**14** Precipitation within sight but NOT reaching the ground	**15** Precipitation within sight reaching the ground but distant from station	**16** Precipitation within sight reaching the ground near to but NOT at station	**17** Thunder heard but no precipitation at the station	**18** Squall(s) within sight during past hour	**19** Funnel cloud(s) within sight during past hour
20 Drizzle (NOT freezing) and NOT falling as showers) during past hour but NOT at time of ob	**21** Rain (NOT freezing) and NOT falling as showers) during past hour but NOT at time of ob	**22** Snow (NOT falling as showers) during past hour but NOT at time of observation	**23** Rain and snow (NOT falling as showers) during past hour but NOT at time of observation	**24** Freezing drizzle or freezing rain (NOT falling as showers) during past hour but NOT at time of observation	**25** Showers of rain during past hour but NOT at time of observation	**26** Showers of snow or of rain and snow during past hour but NOT at time of observation	**27** Showers of hail or of rain and rain during past hour but NOT at time of observation	**28** Fog during past hour but NOT at time of observation	**29** Thunderstorm (with or without precipitation) during past hour but NOT at time of observation
30 Slight or moderate duststorm or sandstorm has decreased during past hour	**31** Slight or moderate duststorm or sandstorm no appreciable change during past hour	**32** Slight or moderate duststorm or sandstorm has increased during past hour	**33** Severe duststorm or sandstorm has decreased during past hour	**34** Severe duststorm or sandstorm no appreciable change during past hour	**35** Severe duststorm or sandstorm has increased during past hour	**36** Slight or moderate drifting snow generally low	**37** Heavy drifting snow generally low	**38** Slight or moderate drifting snow generally high	**39** Heavy drifting snow generally high
40 Fog at distance at time of observation but NOT at station during past hour	**41** Fog in patches	**42** Fog, sky discernible has become thinner during past hour	**43** Fog, sky NOT discernible has become thinner during past hour	**44** Fog, sky discernible no appreciable change during past hour	**45** Fog, sky NOT discernible no appreciable change during past hour	**46** Fog, sky discernible has begun or become thicker during past hour	**47** Fog, sky NOT discernible has begun or become thicker during past hour	**48** Fog depositing rime, sky discernible	**49** Fog depositing rime, sky not discernible
50 Intermittent drizzle (NOT freezing) slight at time of observation	**51** Continuous drizzle (NOT freezing) slight at time of observation	**52** Intermittent drizzle (NOT freezing) moderate at time of ob	**53** Continuous drizzle (NOT freezing) moderate at time of ob	**54** Intermittent drizzle (NOT freezing) thick at time of observation	**55** Continuous drizzle (NOT freezing) thick at time of observation	**56** Slight freezing drizzle	**57** Moderate or thick freezing drizzle	**58** Drizzle and rain, slight	**59** Drizzle and rain, moderate or heavy
60 Intermittent rain (NOT freezing) slight at time of observation	**61** Continuous rain (NOT freezing) slight at time of observation	**62** Intermittent rain (NOT freezing) moderate at time of ob	**63** Continuous rain (NOT freezing) moderate at time of observation	**64** Intermittent rain (NOT freezing) heavy at time of observation	**65** Continuous rain (NOT freezing) heavy at time of observation	**66** Slight freezing rain	**67** Moderate or heavy freezing rain	**68** Rain or drizzle and snow, slight	**69** Rain or drizzle and snow, moderate or heavy
70 Intermittent fall of snowflakes slight at time of observation	**71** Continuous fall of snowflakes slight at time of observation	**72** Intermittent fall of snowflakes moderate at time of observation	**73** Continuous fall of snowflakes moderate at time of observation	**74** Intermittent fall of snowflakes heavy at time of observation	**75** Continuous fall of snowflakes heavy at time of observation	**76** Ice needles (with or without fog)	**77** Granular snow (with or without fog)	**78** Isolated starlike snow crystals (with or without fog)	**79** Ice pellets (sleet U. S. definition)
80 Slight rain shower(s)	**81** Moderate or heavy rain shower(s)	**82** Violent rain shower(s)	**83** Slight shower(s) of rain and snow mixed	**84** Moderate or heavy shower(s) of rain and snow mixed	**85** Slight snow shower(s)	**86** Moderate or heavy snow shower(s)	**87** Slight shower(s) of soft or small hail with or without rain or rain and snow mixed	**88** Moderate or heavy shower(s) of soft or small hail with or with but rain or rain and snow mixed	**89** Slight shower(s) of hail with or without rain or rain and snow mixed not associated with thunder
90 Moderate or heavy shower(s) of hail with or without rain or rain and snow mixed not associated with thunder	**91** Slight rain at time of ob thunderstorm during past hour but NOT at time of observation	**92** Moderate or heavy rain at time of ob thunderstorm during past hour but NOT at time of observation	**93** Slight snow or rain and snow mixed or hail at time of observation thunderstorm during past hour but not at time of observations	**94** Mod or heavy snow or rain and snow mixed or hail at time of ob thunderstorm during past hour but NOT at time of observation	**95** Slight or mod thunderstorm without hail but with rain and/or snow at time of observation	**96** Slight or moderate thunderstorm with hail at time of observation	**97** Heavy thunderstorm without hail but with rain and or snow at time of observation	**98** Thunderstorm combined with duststorm or sandstorm at time of observation	**99** Heavy thunderstorm with hail at time of observation

This code will be found in NODC Publ. M-2. WMO Code 4677

Water Color (taken from NODC Publication M-2)

Forel-Ule scale and conversions from per cent yellow and per cent brown scales

Per Cent Yellow	Per Cent Brown	Forel-Ule Scale	Code
0		I	01
2		II	02
5		III	03
9		IV	04
14		V	05
20		VI	06
27		VII	07
35		VIII	08
44		IX	09
54		X	10
65	0	XI	11
	2	XII	12
	5	XIII	13
	9	XIV	14
	14	XV	15
	20	XVI	16
	27	XVII	17
	35	XVIII	18
	44	XIX	19
	54	XX	20
	65	XXI	21

Height of Dominant Waves (taken from NODC Publication M-2) WMO Code 1555

Code	
0	Less than 1/4 m (1 ft)
1	1/2 m (1 1/2 ft)
2	1 m (3 ft)
3	1 1/2 m (5 ft)
4	2 m (6 1/2 ft)
5	2 1/2 m (8 ft)
6	3 m (9 1/2 ft)
7	3 1/2 m (11 ft)
8	4 m (13 ft)
9	4 1/2 m (14 ft)
x	Height not determined

Code	If 50 is added to direction
0	5 m (16 ft)
1	5 1/2 m (17 1/2 ft)
2	6 m (19 ft)
3	6 1/2 m (21 ft)
4	7 m (22 1/2 ft)
5	7 1/2 m (24 ft)
6	8 m (25 1/2 ft)
7	8 1/2 m (27 ft)
8	9 m (29 ft)
9	9 1/2 m (30 1/2 ft)

Period of Dominant Waves (taken from NODC Publication M-2) WMO Code 3155

Code		CODE	
2	5 seconds or less	8	16 or 17 seconds
3	6 or 7 seconds	9	18 or 19 seconds
4	8 or 9 seconds	0	20 or 21 seconds
5	10 or 11 seconds	1	Over 21 seconds
6	12 or 13 seconds	x	Calm, or period not determined
7	14 or 15 seconds		

Present Weather (taken from NODC Publication M-2) WMO Code 4501

Code figure	
0	Clear (no cloud at any level)
1	Partly cloudy (scattered or broken)
2	Continuous layer(s) or cloud(s)
3	Sandstorm, duststorm, 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)

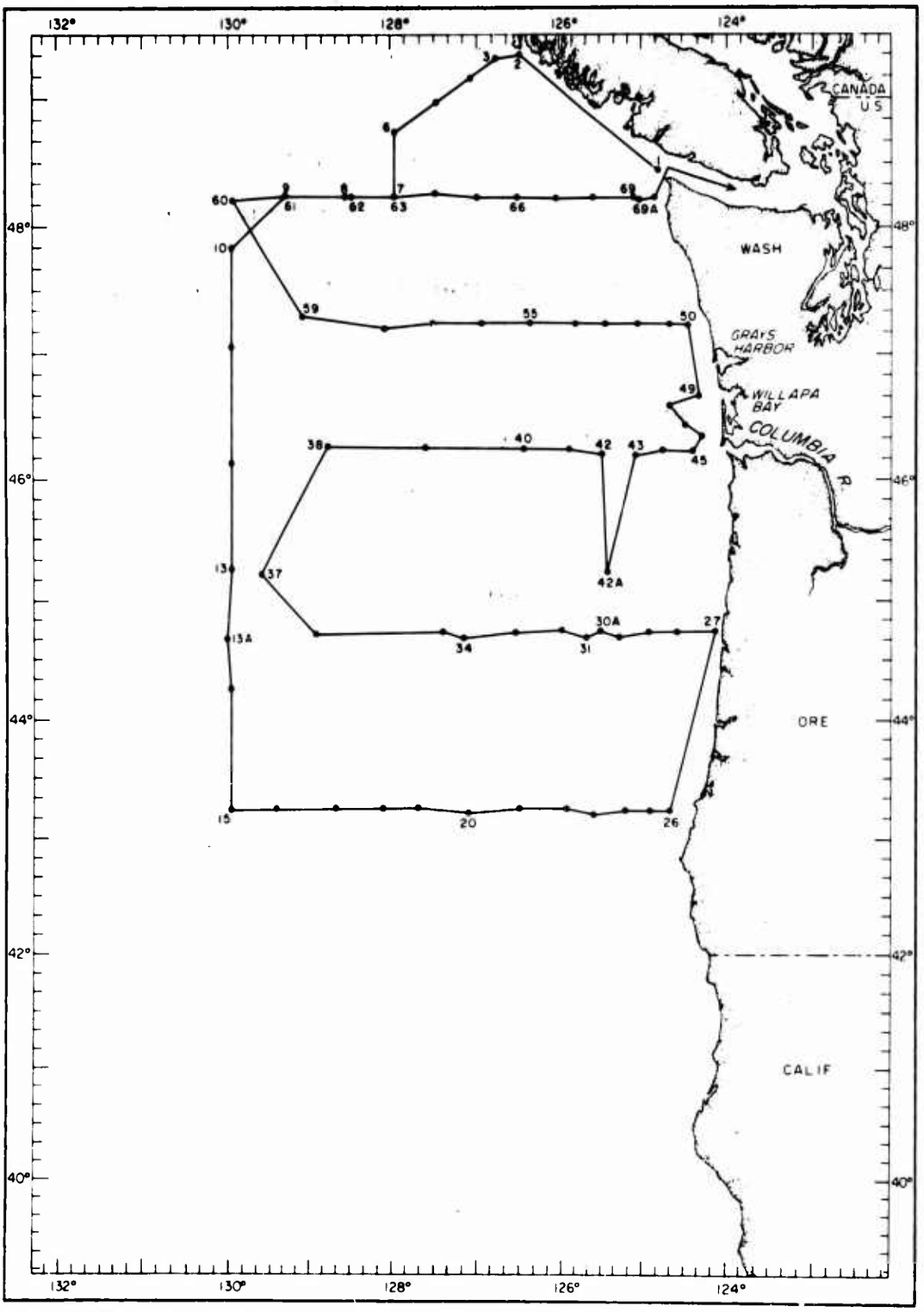

Fig. 1. Station locations Oshawa Cruise 001, 12-26 March 1963.

CNAV OSHAWA CRUISE OS1 STATION 001 OBSERVED VALUES

TATOOSH ISLAND

DATE 13/03/63 HR 03.1 LAT 48-27 N LONG 124-51 W SNDG 283 WEA 02 WIND VEL 5 DIR 24
BAROM 25. TEMP DRY 7.2 WET 6.1 RELHU 85 WTRCLR SECDI SEA 2 DIR 24 SWELL 4 DIR 27
CLOUD TYPE AMT 2 VIS 7 WIRE ANGLE(S) 0, 7

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	MGA/L	AOU	SATN
1	0	8.07	31.283	24.37	6.27	0.560	0.027	95
1	5	7.96	31.293	24.39	6.06	0.541	0.047	92
1	10	7.99	31.302	24.40	6.15	0.549	0.038	93
1	25	7.66	31.407	24.53	5.65	0.505	0.087	85
1	35	7.68	31.511	24.61	5.42	0.484	0.107	82
1	55	7.82	32.399	25.28	4.35	0.389	0.197	66
1	80	7.78	33.405	26.08	3.33	0.297	0.285	51
1	105	7.50	33.580	26.25	3.03	0.271	0.314	46
1	130	7.48	33.707	26.36	2.70	0.241	0.344	41
1	155	7.18	33.816	26.48	2.46	0.220	0.369	37
1	173	7.09	33.856	26.53	2.37	0.212	0.378	36
1	198	6.88	33.895	26.59	2.25	0.201	0.391	34
1	277	6.38	33.984	26.72	1.83	0.163	0.436	27

CNAV OSHAWA CRUISE OS1 STATION 001 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	SAL
0	0.97			31.286
5	1.00			31.283
17	0.82			31.401
33	0.49			31.580

26.35 - WATER COLUMN VALUES

MESSENGER TIME 1911

CNAV OSHAWA CRUISE OS1 STATION 001 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	8.07	0.00	31.283	0.000	24.37	356.4	0.000	0.00	6.27	0.00	
10	7.99	0.00	31.302	0.000	24.40	354.1	0.036	0.02	6.15	0.00	
20	7.78	0.04	31.362	0.002	24.48	346.8	0.072	0.07	5.87	0.05	0.99
30	7.66	0.01	31.443	0.008	24.56	339.3	0.106	0.16	5.54	0.01	0.56
50	7.79	0.01	32.138	0.031	25.08	289.6	0.169	0.42	4.65	0.03	0.75
75	7.81	0.00	33.242	0.019	25.94	208.1	0.232	0.81	3.49	0.01	0.77
100	7.56	0.01	33.580	0.021	26.25	179.8	0.281	1.24	3.06	0.02	0.77
150	7.24	0.01	33.797	0.001	26.46	160.2	0.367	2.33	2.50	0.00	0.82
200	6.86	0.00	33.898	0.000	26.59	148.4	0.444	3.72	2.24	0.00	9.67
250	6.44	0.03	33.949	0.003	26.69	139.6	0.517	5.39	1.99	0.00	56.20

CNAV OSHAWA CRUISE OS1 STATION 002 OBSERVED VALUES

DATE 13/03/63 HR 12.3 LAT 49-20 N LONG 126-33 W SNDG 73 WEA 03 WIND VEL 5 DIR 36
BAROM 22. TEMP DRY 6.7 WET 5.0 RELHU 77 WTRCLR SECDI SEA 1 DIR 32 SWELL 3 DIR 27
CLOUD TYPE AMT 2 VIS 7 WIRE ANGLE(S) 0

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN AOU	OXYGEN SATN
1	0	8.49	32.105	24.95				
1	5	8.48	32.130	24.97				
1	10	8.59	32.363	25.14				
1	20	8.71						
1	30	7.99	33.368	26.02				
1	50	7.96	33.462	26.09				

CNAV OSHAWA CRUISE OS1 STATION 002 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	8.49	0.00	32.105	0.000	24.95	301.1	0.000	0.00			
10	8.59	0.00	32.363	0.000	25.14	283.5	0.030	0.02			
20	8.71	0.00	32.915	0.043	25.55	244.3	0.057	0.06			1.32
30	7.99	0.00	33.368	0.000	26.02	200.5	0.079	0.11			0.56
50	7.96	0.00	33.462	0.000	26.09	193.4	0.119	0.27			0.75

CNAV OSHAWA CRUISE OS1 STATION 003 OBSERVED VALUES

DATE 13/03/63 HR 14.2 LAT 49-16 N LONG 126-50 W SNDG WEA 03 WIND VEL 5 DIR 10
BAROM 20. TEMP DRY 5.6 WET 3.9 RELHU 76 WTRCLR SECDI SEA DIR SWELL 3 DIR 27
CLOUD TYPE AMT 7 VIS 7 WIRE ANGLE(S) 0

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN AOU	OXYGEN SATN
1	0	8.49	32.072*	24.93				
1	5	8.47	31.622	24.58				
1	10	8.52	31.637	24.58				
1	20	8.58	31.737	24.65				
1	30	8.20	32.985	25.69				
1	50	7.88	33.493	26.13	3.71	0.331	0.249	57
1	75	7.43	33.817	26.45	2.85	0.255	0.330	44
1	100	6.67	33.938	26.65	2.25	0.201	0.394	34
1	130	6.44	33.958	26.70	2.12	0.189	0.409	32

CNAV OSHAWA CRUISE OS1 STATION 003 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	SAL
0	0.42		17.80	31.648
0			16.56	

MESSENGER TIME 0620 INCOMING SOLAR RADIATION - AM 77 PM 64

THE SECOND PRODUCTIVITY VALUE WAS INCUBATED AT 50 PERCENT LIGHT INTENSITY INSTEAD OF 100 PERCENT

CNAV OSHAWA CRUISE OS1 STATION 003 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	8.49	0.00									
10	8.52	0.00	31.637	0.000	24.58	336.5					
20	8.58	0.00	31.737	0.000	24.65	330.0					
30	8.20	0.00	32.985	0.000	25.69	232.0					
50	7.88	0.00	33.493	0.000	26.13	190.0			3.71	0.00	
75	7.43	0.00	33.817	0.000	26.45	160.1			2.85	0.00	
100	6.67	0.00	33.938	0.000	26.65	141.4			2.25	0.00	

CNAV OSHAWA CRUISE OS1 STATION 004 OBSERVED VALUES

DATE 13/03/63 HR 16.5 LAT 49-08 N LONG 127-09 W SNDG 1298 WEA 60 WIND VEL 10 DIR 15
BAROM 18. TEMP DRY 5.6 WET 4.4 RELHU 83 WTRCLR SECDI SEA 1 DIR 15 SWELL 2 DIR 27
CLOUD TYPE AMT 8 VIS 7 WIRE ANGLE(S) 10, 6, 5

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN AOU	OXYGEN SATN
1	0	8.43	31.724	24.67	6.66	0.595	-0.015	103
1	5	8.42	31.756	24.69	6.67	0.596	-0.016	103
1	10	8.44	31.736	24.67	6.72	0.600	-0.020	104
1	20	8.44	31.762	24.69	6.77	0.605	-0.025	104
1	29	8.46	31.766	24.69	6.68	0.597	-0.017	103
1	49	8.52	32.655	25.38	5.59	0.499	0.076	87
1	74	7.82	33.242	25.94	4.65	0.415	0.167	71
1	98	7.52	33.609	26.27	3.91	0.349	0.235	60
1	123	7.59	33.797	26.41	2.96	0.264	0.319	45
1	147	7.22	33.886	26.53	3.08	0.275	0.313	47
2	174	6.88	33.868*	26.57	2.91	0.260	0.333	44
2	199	6.68	33.958	26.66	2.51	0.224	0.371	38
2	298	5.72	34.018	26.83	1.74	0.155	0.433	27
2	497	4.63	34.185	27.09	0.62	0.055	0.569	9
3	745	4.02	34.294	27.24	0.28	0.025	0.609	4
3	995	3.38	34.422	27.41	0.31	0.028	0.616	4

CNAV OSHAWA CRUISE OS1 STATION 004 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	SAL
0	0.65			31.731
6	0.75			31.733
19	0.66			31.752
38	0.37			32.091

23.14 - WATER COLUMN VALUES

MESSENGER TIME 0830 INCOMING SOLAR RADIATION - AM 77 PM 64

CNAV OSHAWA CRUISE OS1 STATION 004 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	8.43	0.00	31.724	0.000	24.67	328.6	0.000	0.00	6.66	0.00	
10	8.44	0.00	31.736	0.000	24.67	328.0	0.034	0.02	6.72	0.00	
20	8.44	0.00	31.762	0.000	24.69	326.2	0.067	0.07	6.77	0.00	
30	8.47	0.00	31.800	0.013	24.72	323.9	0.099	0.15	6.64	0.01	0.99
50	8.50	0.01	32.686	0.002	25.41	258.8	0.158	0.39	5.55	0.00	0.95
75	7.80	0.00	33.261	0.000	25.96	206.6	0.217	0.75	4.62	0.00	0.94
100	7.53	0.01	33.629	0.001	26.29	175.8	0.265	1.18	3.82	0.02	0.89
150	7.18	0.00	33.893	0.001	26.54	152.2	0.347	2.23	3.08	0.00	0.99
200	6.67	0.00	33.959	0.000	26.67	141.3	0.421	3.55	2.50	0.00	1.02
250	6.18	0.02	33.994	0.005	26.76	133.1	0.491	5.14	2.02	0.05	1.26
300	5.70	0.00	34.020	0.000	26.84	125.9	0.556	6.99	1.73	0.00	1.00
400	5.06	0.02	34.104	0.006	26.98	112.9	0.676	11.29	1.08	0.01	0.78
500	4.62	0.00	34.187	0.000	27.10	102.7	0.785	16.30	0.61	0.00	0.99
600	4.33	0.03	34.236	0.005	27.17	96.7	0.886	21.98	0.39	0.03	0.69
700	4.10	0.02	34.278	0.003	27.22	91.9	0.981	28.33	0.28	0.02	0.78
800	3.91	0.02	34.316	0.003	27.27	87.8	1.072	35.33	0.28	0.02	1.21

CNAV OSHAWA CRUISE OS1 STATION 005 OBSERVED VALUES

DATE 13/03/63 HR 20.4 LAT 48-57 N LONG 127-31 W SNDG 2103 WEA 18 WIND VEL 20 DIR 19
BAROM 14. TEMP DRY 6.7 WET 6.7 RELHU 99 WTRCLR SECDI SEA 3 DIR 19 SWELL 2 DIR 27
CLOUD TYPE AMT 8 VIS 6 WIRE ANGLE(S) 23,15,--

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN AOU	OXYGEN SATN
1	0	8.53	32.105	24.95	6.66	0.595	-0.018	103
1	5	8.53	32.098	24.94	6.70	0.598	-0.021	104
1	9	8.54	32.134	24.97	6.74	0.602	-0.025	104
1	18	8.50	32.095	24.94	6.72	0.600	-0.023	104
1	28	8.52	32.107	24.95	6.75	0.603	-0.026	104
1	46	8.63	32.153	24.97	6.68	0.597	-0.021	104
1	69	8.60	32.489	25.24	6.24	0.557	0.017	97
1	92	7.72	33.218	25.94	4.72	0.422	0.162	72
1	116	7.86	33.737	26.32	3.09	0.276	0.303	48
1	139	7.62	33.774	26.39	2.77	0.247	0.335	42
2	147	7.60	33.774	26.39	2.77	0.247	0.335	42
2	171	7.54	33.840	26.45	2.65	0.237	0.347	41
2	195	7.38	33.799*	26.44	2.60	0.232	0.354	40
2	239	6.38	33.982	26.72	2.12	0.189	0.410	32
2	492	4.96	34.083	26.98	0.88	0.079	0.542	13
2	739	4.12	34.266	27.21	0.30	0.027	0.606	4
3	968	3.72	34.358	27.33	0.26	0.023	0.615	4
3	1452	2.72	34.502	27.53	0.68	0.061	0.594	9
3	1743	2.32	34.540	28.43	0.85	0.076	0.585	11

CNAV OSHAWA CRUISE OS1 STATION 005 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	SAL
0	0.68		12.62	32.178
7	0.69		11.58	32.162
23	0.68		1.88	32.171
46	0.55		0.00	32.283
	29.86		214.00	- WATER COLUMN VALUES

MESSENGER TIME 1224 INCOMING SOLAR RADIATION - AM 77 PM 64

CNAV OSHAWA CRUISE OS1 STATION 005 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	8.53	0.00	32.105	0.000	24.95	301.6	0.000	0.00	6.66	0.00	
10	8.54	0.00	32.133	0.004	24.97	299.8	0.031	0.02	6.74	0.00	0.97
20	8.50	0.00	32.095	0.001	24.94	302.3	0.061	0.06	6.73	0.00	0.78
30	8.53	0.00	32.107	0.003	24.95	302.0	0.092	0.14	6.75	0.00	0.93
50	8.66	0.02	32.186	0.002	24.99	298.3	0.152	0.39	6.66	0.02	0.82
75	8.36	0.06	32.670	0.020	25.41	258.4	0.222	0.83	5.90	0.03	0.72
100	7.73	0.05	33.432	0.009	26.10	193.3	0.279	1.33	4.11	0.05	0.69
150	7.58	0.01	33.789	0.004	26.41	165.5	0.369	2.48	2.72	0.02	0.87
200	7.28	0.02	33.908	0.001	26.54	153.3	0.450	3.91	2.56	0.01	1.00
250	6.24	0.05	33.992	0.005	26.75	133.9	0.522	5.57	2.03	0.01	1.15
300	5.67	0.21	34.033	0.023	26.85	124.5	0.587	7.41	1.67	0.06	1.80
400	5.02	0.26	34.080	0.029	26.97	114.2	0.708	11.71	1.14	0.07	1.70
500	4.93	0.00	34.089	0.001	26.98	113.6	0.823	17.03	0.85	0.00	0.95
600	4.53	0.00	34.163	0.007	27.09	104.5	0.933	23.24	0.55	0.00	0.65
700	4.22	0.00	34.237	0.004	27.18	96.3	1.034	30.00	0.35	0.00	0.81
800	4.00	0.01	34.295	0.002	27.25	90.3	1.129	37.26	0.26	0.01	0.70
1000	3.65	0.01	34.370	0.000	27.34	82.3	1.303	53.35	0.28	0.01	0.97
1200	3.23	0.03	34.438	0.001	27.44	73.9	1.461	71.18	0.43	0.04	0.91
1500	2.64	0.01	34.511	0.000	27.55	63.4	1.670	99.98	0.72	0.01	0.98

CNAV OSHAWA CRUISE OS1 STATION 006 OBSERVED VALUES

DATE 14/03/63 HR 01.3 LAT 48-44 N LONG 128-00 W SNDG 274 WEA 01 WIND VEL 6 DIR 27
BAROM 09. TEMP DRY 5.6 WET 4.4 RELHU 83 WTRCLR SECDI SEA 2 DIR 27 SWELL 2 DIR 25
CLOUD TYPE AMT 7 VIS 7 WIRE ANGLE(S) 5.15

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN AOU	OXYGEN SATN
1	0	8.67	32.162	24.97	6.70	0.598	-0.023	104
1	5	8.66	32.164	24.97	6.70	0.598	-0.023	104
1	10	8.69	32.232	25.02	6.72	0.600	-0.026	104
1	20	8.70	32.200	25.00	6.65	0.594	-0.020	103
1	30	8.72	32.212	25.00	6.64	0.593	-0.019	103
1	50	8.74	32.272	25.05	6.61	0.590	-0.017	103
1	75	8.50	32.601	25.34	6.04	0.539	0.036	94
1	100	7.67	33.175	25.91	4.86	0.434	0.150	74
1	125	7.37	33.588	26.28	4.05	0.362	0.225	62
2	145	7.52	33.806	26.43	3.13	0.280	0.304	48
1	150	7.47	33.782	26.42	3.20	0.286	0.299	49
2	169	7.24	33.872	26.52	3.24	0.289	0.298	49
2	194	6.92	33.899	26.58	3.48	0.311	0.281	53
2	291	5.98	33.992	26.78	1.78	0.159	0.446	26
2	488	4.79	34.101	27.01	0.77	0.069	0.554	11
2	735	4.06	34.262	27.22	0.33	0.029	0.604	5
2	983	3.46	34.384	27.37	0.31	0.028	0.615	4
2	1481	2.52	34.516	27.56	1.00	0.089	0.569	14

CNAV OSHAWA CRUISE OS1 STATION 006 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	SAL
0	0.66			32.122
7	0.73			32.120
23	0.74			32.158
46	1.03			32.301

36.95 - WATER COLUMN VALUES

MESSENGER TIME 1800 INCOMING SOLAR RADIATION - AM 77 PM 64

CNAV OSHAWA CRUISE OS1 STATION 006 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	8.67	0.00	32.162	0.000	24.97	299.4	0.000	0.00	6.70	0.00	
10	8.69	0.00	32.232	0.000	25.02	294.6	0.030	0.02	6.72	0.00	
20	8.70	0.00	32.200	0.000	25.00	297.3	0.060	0.06	6.65	0.00	
30	8.72	0.00	32.212	0.000	25.00	296.9	0.090	0.14	6.64	0.00	
50	8.74	0.00	32.272	0.000	25.05	293.0	0.150	0.38	6.61	0.00	
75	8.50	0.00	32.601	0.000	25.34	265.5	0.220	0.83	6.04	0.00	
100	7.67	0.00	33.175	0.000	25.91	211.6	0.280	1.36	4.86	0.00	
150	7.47	0.00	33.782	0.000	26.42	164.5	0.375	2.55	3.20	0.00	
200	6.85	0.00	33.905	0.000	26.60	147.7	0.453	3.95	3.42	0.05	1.09
250	6.33	0.01	33.955	0.000	26.71	137.9	0.525	5.61	2.71	0.20	1.17
300	5.91	0.00	33.998	0.001	26.79	130.0	0.593	7.51	1.69	0.02	0.98
400	5.23	0.02	34.058	0.005	26.92	118.4	0.718	11.99	0.98	0.11	0.77
500	4.74	0.01	34.109	0.001	27.02	109.9	0.834	17.30	0.73	0.00	0.94
600	4.40	0.03	34.175	0.003	27.11	102.0	0.941	23.33	0.49	0.02	0.68
700	4.13	0.01	34.240	0.001	27.19	95.1	1.040	29.98	0.35	0.01	0.82
800	3.89	0.00	34.298	0.000	27.26	88.9	1.133	37.13	0.29	0.01	0.72
1000	3.42	0.00	34.391	0.000	27.38	78.1	1.302	52.67	0.32	0.00	1.15
1200	3.02	0.01	34.460	0.000	27.47	69.8	1.452	69.56	0.53	0.03	3.31

CNAV OSHAWA CRUISE OS1 STATION 007 OBSERVED VALUES

DATE 14/03/63 HR 06.8 LAT 48-14 N LONG 128-00 W SNDG 2651 WEA 02 WIND VEL 20 DIR 30
BAROM 07. TEMP DRY 5.6 WET 4.4 RELHU 83 WTRCLR SECDI SEA 3 DIR 28 SWELL 1 DIR 25
CLOUD TYPE AMT 4 VIS 7 WIRE ANGLE(S) 20,24

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN ADU	OXYGEN SATN
1	0	8.15*	32.387	25.22				
1	5	8.64	32.391	25.15				
1	9	8.64	32.402	25.16	6.80	0.607	-0.033	106
1	19	8.68	32.396	25.15				
1	28	8.19*	32.399	25.23	6.79	0.606	-0.026	104
1	47	8.64	32.406	25.17	6.75	0.603	-0.029	105
1	71	8.68	32.406	25.16	6.74	0.602	-0.028	105
1	94	8.08	33.374	26.01	4.01	0.358	0.220	62
1	118	7.76	33.711	26.32	2.96	0.264	0.317	46
1	142	7.60	33.800	26.41	2.52	0.225	0.358	39
2	163	7.53	33.858	26.47	2.27	0.203	0.381	35
2	185	7.42	33.880	26.50	2.13	0.190	0.395	33
2	279	6.91	33.974	26.64	2.16	0.188	0.404	32
2	468	5.66	34.096	26.90	1.41	0.126	0.483	21
2	705	4.25	34.235	27.17	0.36	0.032	0.598	5
2	943*		34.438		0.31	0.028		
2	1420*	2.74	34.548	27.57	0.58	0.052	0.602	8
2	1707	2.32	34.545	27.60	0.90	0.080	0.581	12

CNAV OSHAWA CRUISE OS1 STATION 007 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	8.64*		32.387	0.000	25.15	282.2	0.000	0.00			
10	8.64	0.00	32.402	0.001	25.16	281.3	0.029	0.02	6.80	0.00	1.06
20	8.68	0.00	32.396	0.000	25.15	282.5	0.057	0.06	6.79	0.02	1.38
30	8.67	0.01	32.400	0.000	25.16	282.2	0.086	0.13	6.79	0.00	1.03
50	8.66	0.01	32.378	0.019	25.14	284.0	0.143	0.37	6.83	0.05	0.86
75	8.59	0.02	32.563	0.038	25.30	269.6	0.212	0.81	6.30	0.10	0.78
100	7.98	0.00	33.502	0.014	26.12	191.5	0.271	1.32	3.63	0.04	0.73
150	7.57	0.00	33.825	0.001	26.44	162.6	0.360	2.45	2.41	0.00	0.64
200	7.34	0.00	33.896	0.000	26.52	155.0	0.440	3.88	2.11	0.03	1.29
250	7.07	0.00	33.946	0.001	26.60	148.4	0.516	5.65	2.11	0.05	1.10
300	6.78	0.01	33.990	0.001	26.68	141.8	0.590	7.71	2.11	0.02	0.95
400	6.12	0.02	34.058	0.003	26.81	129.6	0.726	12.60	1.75	0.04	0.75
500	5.45	0.00	34.116	0.000	26.94	118.0	0.851	18.35	1.26	0.01	0.87
600	4.84	0.01	34.176	0.000	27.06	107.2	0.965	24.76	0.80	0.02	0.60
700	4.28	0.00	34.232	0.000	27.17	97.3	1.068	31.64	0.38	0.00	0.95
800	3.75	0.02	34.285	0.001	27.27	88.2	1.162	38.85	0.35*		3.12
1000	2.87	0.09	34.380	0.004	27.42	72.9	1.325	53.78	0.35*		15.46
1200	2.26	0.14	34.455	0.007	27.54	61.8	1.462	69.12	0.45*		31.35
1500	1.98	0.13	34.528	0.007	27.62	54.7	1.639	93.61	0.70*		22.26

SURFACE TEMPERATURE ASSUMED FOR PURPOSES OF INTERPOLATION.

CNAV OSHAWA CRUISE OS1 STATION 008 OBSERVED VALUES

DATE 14/03/63 HR 11.2 LAT 48-14 N LONG 128-32 W SNDG 2560 WEA 01 WIND VEL 30 DIR 27
BAROM 07. TEMP DRY 5.6 WET 4.4 RELHU 83 WTRCLR SECDI SEA 3 DIR 28 SWELL 3 DIR 25
CLOUD TYPE 8 AMT 3 VIS 7 WIRE ANGLE(S) 26,30,43

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN ADU	OXYGEN SATN
1	0		32.390		6.71	0.599		
1	4	8.78	32.451	25.18	6.67	0.596	-0.023	104
1	9	8.79	32.385	25.13	6.67	0.596	-0.023	104
1	18	8.76	32.388	25.13	6.69	0.598	-0.025	104
1	27	8.78	32.448	25.18	6.58	0.588	-0.015	103
1	45	8.84	32.381	25.12	6.62	0.591	-0.019	103
1	67	8.80	32.388	25.13	6.72	0.600	-0.028	105
1	90	8.18	32.828	25.57	5.54	0.495	0.084	85
1	112	8.12	33.406	26.03	4.05	0.362	0.216	63
1	134	7.75	33.705	26.32	3.18	0.284	0.297	49
2	154*	7.80	33.653	26.27	3.39	0.303	0.278	52
2	176	7.58	33.858	26.46	3.18	0.284	0.299	49
2	265	6.50	33.972	26.70	2.16	0.193	0.405	32
2	442	5.16	34.071	26.94	0.99	0.088	0.529	14
2	667	4.19	34.215	27.16	0.40	0.036	0.596	6
2	891	3.69	34.356	27.33	0.32	0.029	0.611	4
2	1345	2.75	34.494	27.53	0.52	0.046	0.608	7
3	1613	2.34	34.539	27.60	0.78	0.070	0.591	11

CNAV OSHAWA CRUISE OS1 STATION 008 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	SAL
0	0.42		4.76	32.506
0			6.94	

MESSENGER TIME 0615 INCOMING SOLAR RADIATION - AM 152 PM 214

THE SECOND PRODUCTIVITY VALUE WAS INCUBATED AT 50 PERCENT LIGHT INTENSITY INSTEAD OF 100 PERCENT

CNAV OSHAWA CRUISE OS1 STATION 008 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	8.78*		32.390	0.000	25.23	284.0	0.000	0.00	5.71	0.00	
10	8.79	0.00	32.380	0.002	25.12	285.0	0.023	0.02	5.57	0.00	0.93
20	8.76	0.00	32.402	0.003	25.14	283.2	0.058	0.06	6.67	0.01	0.75
30	8.79	0.00	32.443	0.007	25.17	280.8	0.083	0.13	6.57	0.01	0.93
50	8.86	0.01	32.361	0.009	25.10	288.2	0.144	0.37	6.59	0.04	0.78
75	8.59	0.04	32.506	0.010	25.25	273.8	0.214	0.62	5.41	0.04	0.68
100	8.14	0.03	33.098	0.018	25.78	223.8	0.277	1.38	4.85	0.04	0.64
150	7.66	0.04	33.799	0.019	26.40	165.8	0.375	2.60	3.07	0.10	0.80
200	7.32	0.04	33.905	0.008	26.53	154.1	0.456	4.04	2.96	0.05	0.90
250	6.71	0.03	33.964	0.006	26.66	142.1	0.530	5.76	2.37	0.04	0.77
300	6.17	0.01	33.998	0.005	26.76	133.4	0.600	7.72	1.86	0.01	0.91
400	5.41	0.02	34.055	0.006	26.90	120.8	0.728	12.30	1.19	0.02	0.76
500	4.85	0.01	34.107	0.001	27.01	111.3	0.845	17.69	0.77	0.02	0.76
600	4.41	0.01	34.171	0.001	27.11	102.4	0.953	23.77	0.50	0.02	0.71
700	4.10	0.01	34.237	0.001	27.19	94.9	1.053	30.42	0.37	0.01	0.82
800	3.86	0.02	34.302	0.002	27.27	88.2	1.145	37.54	0.31	0.02	0.59
1000	3.45	0.01	34.402	0.004	27.39	77.6	1.313	52.98	0.33	0.01	0.92
1200	3.03	0.01	34.465	0.004	27.48	69.5	1.462	69.77	0.41	0.01	0.88
1500	2.49	0.00	34.520	0.002	27.57	61.1	1.661	97.22	0.66	0.00	0.71

SURFACE TEMPERATURE ASSUMED FOR PURPOSES OF INTERPOLATION.

CNAV OSHAWA CRUISE OS1 STATION 009 OBSERVED VALUES

DATE 14/03/63 HR 18.8 LAT 48-14 N LONG 129-18 W SNDG 2834 WEA 02 WIND VEL 30 DIR 32
BAROM 08. TEMP DRY 7.8 WET 5.6 RELHU 72 WTRCLR SECDI SEA 4 DIR 32 SWELL 4 DIR 29
CLOUD TYPE AMT 4 VIS 7 WIRE ANGLE(S) 10,25,43

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN ADU	OXYGEN SATN
1	0		32.435		6.76	0.604		
1	5	8.44	32.434	25.22	6.84	0.611	-0.034	106
1	10	8.44	32.436	25.22	6.70	0.598	-0.021	104
1	20	8.42	32.496	25.27	6.72	0.600	-0.023	104
1	29	8.43	32.427	25.21	6.76	0.604	-0.027	105
1	49	8.47	32.435	25.21	6.72	0.600	-0.024	104
1	74	8.46	32.429	25.21	6.72	0.600	-0.023	104
1	98	7.88	32.722	25.53	6.10	0.545	0.039	93
1	123	7.06	33.312	26.10	4.82	0.430	0.162	73
1	148	7.08	33.644	26.36	4.12	0.368	0.223	62
2	154	7.07	33.702	26.41	4.33	0.387	0.204	65
2	177	6.88	33.829	26.53	4.12	0.368	0.225	62
2	267	5.62	33.912	26.76	3.02	0.270	0.341	44
2	454	4.43	34.004	26.97	1.47	0.131	0.498	21
2	690	4.00	34.244	27.21	0.37	0.033	0.602	5
2	930	3.50	34.362	27.35	0.31	0.028	0.615	4
3	1416	2.58	34.505	27.55	0.63	0.056	0.601	9
3	1662	2.22	34.552	27.62	0.97	0.087	0.576	13

CNAV OSHAWA CRUISE OS1 STATION 009 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	SAL
0	0.39		2.70	32.427
8	0.36		4.64	32.469
27	0.37		0.70	32.427
54	0.38		0.10	32.436
	19.98		90.84	- WATER COLUMN VALUES

MESSENGER TIME 1049 INCOMING SOLAR RADIATION - AM 152 PM 214

CNAV OSHAWA CRUISE OS1 STATION 009 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	8.44*		32.435	0.000	25.22	275.8	0.000	0.00	6.76	0.00	
10	8.44	0.00	32.436	0.000	25.22	275.9	0.028	0.01	6.70	0.00	
20	8.42	0.00	32.496	0.000	25.27	271.3	0.056	0.06	6.72	0.00	
30	8.43	0.00	32.425	0.002	25.21	276.9	0.083	0.13	6.76	0.00	0.99
50	8.48	0.00	32.432	0.002	25.21	277.3	0.139	0.36	6.73	0.00	0.95
75	8.44	0.00	32.436	0.000	25.22	277.0	0.209	0.81	6.71	0.00	0.94
100	7.80	0.01	32.769	0.007	25.57	243.6	0.275	1.39	6.00	0.02	0.89
150	7.08	0.00	33.665	0.001	26.38	167.9	0.378	2.67	4.24	0.10	0.57
200	6.58	0.04	33.883	0.020	26.62	145.7	0.457	4.08	3.85	0.02	1.32
250	5.87	0.03	33.923	0.016	26.74	134.5	0.528	5.70	3.24	0.02	0.89
300	5.31	0.03	33.929	0.005	26.81	127.9	0.594	7.57	2.69	0.01	0.93
400	4.64	0.04	33.979	0.007	26.93	117.4	0.718	12.00	1.84	0.01	0.75
500	4.30	0.03	34.050	0.007	27.02	109.3	0.832	17.27	1.18	0.00	0.81
600	4.10	0.05	34.152	0.010	27.12	100.3	0.938	23.23	0.67	0.00	0.68
700	3.98	0.00	34.250	0.001	27.21	92.5	1.036	29.72	0.36	0.01	0.95
800	3.77	0.00	34.308	0.004	27.28	86.7	1.126	36.70	0.27	0.04	0.61
1000	3.36	0.00	34.389	0.001	27.39	77.5	1.293	52.00	0.32	0.00	0.95
1200	2.96	0.01	34.453	0.003	27.47	69.7	1.442	68.81	0.42	0.01	0.94
1500	2.45	0.00	34.522	0.001	27.57	60.4	1.639	96.11	0.73	0.00	0.81

SURFACE TEMPERATURE ASSUMED FOR PURPOSES OF INTERPOLATION.

CNAV OSHAWA CRUISE OS1 STATION 010 OBSERVED VALUES

DATE 15/03/63 HR 12.0 LAT 47-49 N LONG 130-00 W SNDG WEA 62 WIND VEL 22 DIR 28
BAROM 08. TEMP DRY 5.6 WET 5.6 RELHU 99 WTRCLR SECDI SEA 4 DIR 28 SWELL 4 DIR 27
CLOUD TYPE AMT 8 VIS 7 WIRE ANGLE(S) 0, 0

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN AOU	OXYGEN SATN
1	0		32.469		6.66	0.595		
1	5	8.79	32.466	25.19	6.64	0.593	-0.021	104
1	10	8.82	32.466	25.19	6.64	0.593	-0.021	104
1	20	8.81						
1	30	8.82	32.543	25.25	6.63	0.592	-0.021	104
1	50	8.84	32.473	25.19	6.68	0.597	-0.025	104
1	75	8.84	32.469	25.19	6.68	0.597	-0.025	104
1	100	8.83	32.469	25.19	6.70	0.598	-0.027	105
1	125	8.81	32.465	25.19	6.67	0.596	-0.024	104
1	150	7.16	32.757	25.65	6.07	0.542	0.051	91
2	171	6.80	33.702	26.45	4.64	0.414	0.180	70
2	194	6.92	33.861	26.55	4.10	0.366	0.226	62
2	291	5.54	33.910	26.77	3.25	0.290	0.322	47
2	489	4.19	34.021	27.01	1.34	0.120	0.513	19
2	737	3.77	34.257	27.24	0.43	0.038	0.600	6
2	984	3.37	34.399	27.39	0.32	0.029	0.616	4
2	1482	2.53	34.496	27.55	0.59	0.053	0.605	8
2	1698	2.18	34.546	27.62	1.01	0.090	0.573	14

CNAV OSHAWA CRUISE OS1 STATION 010 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	SAL
0	0.17		2.44	32.464
0			3.52	

MESSENGER TIME 0635 INCOMING SOLAR RADIATION - AM 149 PM 150

THE SECOND PRODUCTIVITY VALUE WAS INCUBATED AT 50 PERCENT LIGHT INTENSITY INSTEAD OF 100 PERCENT

CNAV OSHAWA CRUISE OS1 STATION 010 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	8.79*		32.469	0.000	25.19	278.3	0.000	0.00	6.66	0.00	
10	8.82	0.00	32.466	0.000	25.19	279.1	0.029	0.01	6.64	0.00	
20	8.81	0.00	32.506	0.011	25.22	276.2	0.057	0.06	6.63	0.00	1.32
30	8.82	0.00	32.543	0.000	25.25	273.8	0.084	0.13	6.63	0.00	
50	8.84	0.00	32.473	0.000	25.19	279.6	0.140	0.36	6.68	0.00	
75	8.84	0.00	32.469	0.000	25.19	280.3	0.210	0.81	6.68	0.00	
100	8.83	0.00	32.469	0.000	25.19	280.6	0.281	1.45	6.70	0.00	
150	7.16	0.00	32.757	0.000	25.65	236.5	0.411	3.09	6.07	0.00	
200	6.87	0.03	33.879	0.010	26.57	149.9	0.509	4.79	4.01	0.02	1.12
250	6.28	0.14	33.950	0.041	26.71	137.6	0.581	6.45	3.47	0.10	1.27
300	5.45	0.01	33.914	0.000	26.78	130.6	0.649	8.36	3.15	0.01	0.98
400	4.62	0.04	33.966	0.002	26.92	118.2	0.774	12.84	2.15	0.05	0.77
500	4.16	0.01	34.031	0.001	27.02	109.1	0.889	18.12	1.27	0.01	0.95
600	3.91	0.06	34.126	0.008	27.12	100.2	0.995	24.08	0.78	0.03	0.68
700	3.79	0.03	34.221	0.004	27.21	92.5	1.092	30.57	0.49	0.02	0.81
800	3.67	0.00	34.301	0.001	27.29	86.1	1.182	37.52	0.36	0.02	0.72
1000	3.34	0.00	34.404	0.001	27.40	76.3	1.347	52.63	0.32	0.00	0.98
1200	3.01	0.00	34.455	0.011	27.47	70.0	1.495	69.35	0.34	0.01	1.00
1500	2.50	0.00	34.499	0.001	27.55	62.7	1.697	97.26	0.62	0.00	0.95

SURFACE TEMPERATURE ASSUMED FOR PURPOSES OF INTERPOLATION.

CNAV OSHAWA CRUISE OS1 STATION 011 OBSERVED VALUES

DATE 15/03/63 HR 20.2 LAT 47-02 N LONG 130-00 W SNDG WEA 01 WIND VEL 28 DIR 30
BAROM 97. TEMP DRY 7.8 WET 7.8 RELHU 99 WTRCLR SECDI SEA 4 DIR 30 SWELL 4 DIR 28
CLOUD TYPE 6 AMT 4 VIS 7 WIRE ANGLE(S) 27,45

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN AOU	OXYGEN SATN
1	0		32.506		6.59	0.589		
1	4	9.17	32.547	25.19	6.61	0.590	-0.024	104
1	9	9.28	32.540	25.17	6.62	0.591	-0.026	105
1	18	9.22	32.588	25.22	6.59	0.589	-0.023	104
1	27	9.24	32.577	25.21	6.59	0.589	-0.023	104
1	45	9.23	32.555	25.19	6.57	0.587	-0.020	104
1	67	9.25	32.602	25.23	6.60	0.589	-0.024	104
1	89	9.24	32.516	25.16	6.59	0.589	-0.023	104
1	111	8.58	32.613	25.34	6.30	0.563	0.012	98
1	133	6.32	33.112	26.04	5.74	0.513	0.091	85
2	139	6.22	33.342	26.24	5.43	0.485	0.119	80
2	159	6.42	33.669	26.47	4.75	0.424	0.176	71
2	245	6.02	33.900	26.70	3.47	0.310	0.295	51
2	418	4.58	34.029	26.98	1.30	0.116	0.510	19
2	639	3.94	34.172	27.15	0.54	0.048	0.589	8
2	862	3.37	34.290	27.31	0.43	0.038	0.606	6
2	1312	2.66	34.544	27.57	0.47	0.042	0.613	6
2	1582	2.33	34.587	27.64	0.84	0.075	0.586	11

CNAV OSHAWA CRUISE OS1 STATION G11 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	SAL
0	0.22		2.68	32.501
8	0.23		2.80	32.503
27	0.22		0.84	32.499
54	0.20		0.08	32.502
	11.68		69.12	- WATER COLUMN VALUES

MESSENGER TIME 1216 INCOMING SOLAR RADIATION - AM 149 PM 150

SURFACE TEMPERATURE ASSUMED FOR PURPOSES OF INTERPOLATION.

CNAV OSHAWA CRUISE OS1 STATION 011 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	9.20*		32.506	0.000	25.16	281.6	0.000	0.00	6.59	0.00	
10	9.28	0.01	32.545	0.002	25.18	280.1	0.029	0.01	6.62	0.00	0.93
20	9.22	0.00	32.588	0.002	25.22	276.2	0.057	0.06	6.59	0.00	0.75
30	9.24	0.00	32.571	0.001	25.20	277.9	0.085	0.13	6.59	0.00	0.93
50	9.23	0.00	32.568	0.006	25.20	278.4	0.141	0.36	6.58	0.00	0.78
75	9.29	0.02	32.568	0.012	25.19	279.6	0.211	0.81	6.61	0.01	0.67
100	9.05	0.04	32.528	0.009	25.20	279.4	0.281	1.44	6.48	0.00	0.64
150	6.19	0.10	33.507	0.018	26.37	168.2	0.394	2.82	5.09	0.03	0.59
200	6.37	0.08	33.905	0.075	26.66	141.4	0.472	4.21	3.97	0.11	1.42
250	5.98	0.01	33.907	0.002	26.71	137.0	0.542	5.83	3.39	0.00	0.99
300	5.56	0.06	33.966	0.016	26.81	128.1	0.609	7.71	2.68	0.03	0.86
400	4.73	0.03	34.026	0.007	26.96	114.9	0.732	12.08	1.48	0.01	0.85
500	4.26	0.05	34.085	0.000	27.05	106.2	0.843	17.22	0.85	0.06	0.71
600	4.00	0.03	34.149	0.000	27.13	99.4	0.947	23.08	0.57	0.04	0.79
700	3.77	0.00	34.205	0.001	27.20	93.5	1.045	29.58	0.47	0.02	0.71
800	3.52	0.00	34.258	0.001	27.27	87.5	1.136	36.62	0.42	0.02	0.64
1000	3.11	0.01	34.379	0.009	27.40	75.5	1.301	51.77	0.39	0.01	0.91
1200	2.80	0.01	34.490	0.008	27.52	65.0	1.443	67.78	0.41	0.01	0.88
1500	2.43	0.00	34.571	0.008	27.61	56.6	1.628	93.32	0.69	0.00	7.38

CNAV OSHAWA CRUISE OS1 STATION 012 OBSERVED VALUES

DATE 16/03/63 HR 03.4 LAT 46-06 N LONG 130-00 W SNDG WEA 02 WIND VEL 25 DIR 31
BAROM 96. TEMP DRY 5.6 WET 5.6 RELHU 99 WTRCLR SECDI SEA 3 DIR 34 SWELL 7 DIR 28
CLOUD TYPE AMT 8 VIS 6 WIRE ANGLE(S) 15,12,18

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN AOU	OXYGEN SATN
1	0		32.543		6.65	0.594		
1	5	9.45	32.546	25.15	6.52	0.582	-0.019	103
1	10	9.50	32.584	25.17	6.56	0.586	-0.023	104
1	19	9.47	32.544	25.14	6.49	0.580	-0.017	103
1	29	9.50	32.617	25.20	6.48	0.579	-0.016	103
1	48	9.46	32.546	25.15	6.50	0.581	-0.017	103
1	72	9.48	32.581	25.17	6.54	0.584	-0.021	104
2	98	8.02	32.785	25.56	6.08	0.543	0.038	93
2	122	6.84	33.147	26.00	5.82	0.520	0.076	87
2	147	6.75	33.450	26.25	5.13	0.458	0.138	77
3	168	7.04	33.739	26.44	4.27	0.381	0.209	65
3	191	6.90	33.850	26.55	3.88	0.347	0.246	59
3	288	5.66	33.922	26.77	2.88	0.257	0.353	42
3	482	4.61	34.062	27.00	0.96	0.086	0.540	14
3	725	3.87	34.248	27.22	0.37	0.033	0.604	5

CNAV OSHAWA CRUISE OS1 STATION 012 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I
0	0.21		
8	0.21		
27	0.19		
54	0.19		

10.56 - WATER COLUMN VALUES

MESSENGER TIME 1927 INCOMING SOLAR RADIATION - AM 149 PM 150

CNAV OSHAWA CRUISE OS1 STATION 012 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	9.47*		32.543	0.000	25.14	283.0	0.000	0.00	6.65	0.00	
10	9.50	0.00	32.584	0.000	25.17	280.6	0.029	0.02	6.56	0.00	
20	9.47	0.00	32.550	0.003	25.15	282.8	0.057	0.06	6.49	0.00	0.88
30	9.50	0.00	32.616	0.003	25.20	278.6	0.086	0.13	6.48	0.00	0.97
50	9.49	0.02	32.543	0.000	25.14	284.1	0.142	0.36	6.51	0.01	0.91
75	9.35	0.03	32.595	0.000	25.20	278.5	0.213	0.82	6.50	0.01	0.86
100	7.90	0.01	32.813	0.003	25.60	241.6	0.279	1.40	6.06	0.01	0.88
150	6.79	0.01	33.496	0.004	26.28	176.6	0.384	2.71	5.00	0.02	0.80
200	6.80	0.02	33.870	0.009	26.58	149.5	0.466	4.17	3.76	0.01	1.17
250	6.18	0.06	33.932	0.025	26.71	137.7	0.539	5.84	3.21	0.04	1.22
300	5.56	0.01	33.931	0.000	26.78	130.7	0.606	7.75	2.74	0.01	0.97
400	4.91	0.06	34.003	0.001	26.92	118.8	0.732	12.24	1.69	0.05	0.76
500	4.57	0.01	34.075	0.000	27.01	110.4	0.848	17.57	0.82	0.01	15.11
600	4.34	0.06	34.149	0.000	27.10	103.2	0.956	23.65	0.29	0.05	16.84
700	4.00	0.03	34.228	0.000	27.19	94.4	1.055	30.31	0.27	0.02	27.11

SURFACE TEMPERATURE ASSUMED FOR PURPOSES OF INTERPOLATION.

CNAV OSHAWA CRUISE OS1 STATION 013 OBSERVED VALUES

DATE 16/03/63 HR 11.2 LAT 45-14 N LONG 130-00 W SNDG WEA 90 WIND VEL 37 DIR 34
BAROM 00. TEMP DRY 6.1 WET 5.6 RELHU 93 WTRCLR SECDI SEA 3 DIR 34 SWELL 7 DIR 30
CLOUD TYPE AMT 7 VIS 5 WIRE ANGLE(S) 20

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN ADJ	OXYGEN SATN
1	0	9.74	32.575	25.13	6.44	0.575	-0.016	103
1	5	9.71	32.572	25.13	6.46	0.577	-0.017	103
1	9	9.75	32.583	25.13	6.43	0.574	-0.015	103
1	19	9.75	32.696*	25.22	6.35	0.567	-0.008	101
1	28	9.77	32.575	25.12	6.35	0.567	-0.008	101
1	47	9.74	32.575	25.13	6.39	0.563	-0.003	101
1	71	9.79	32.574	25.12	6.39	0.571	-0.012	102
1	94	9.78	32.578	25.12	6.39	0.571	-0.012	102
1	117	8.20	32.756	25.51	5.97	0.533	0.046	92
1	141	7.02	33.067	25.92	5.64	0.504	0.090	85

CNAV OSHAWA CRUISE OS1 STATION 013 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	ELTI	SAL	ELSI	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	ELOI	VAR RATIO
0	9.74	0.00	32.575	0.000	25.13	284.8	0.000	0.00	6.44	0.00	
10	9.75	0.00	32.584	0.001	25.13	284.5	0.029	0.02	6.42	0.00	1.12
20	9.75	0.00	32.584	0.004	25.13	284.7	0.058	0.06	6.35	0.00	1.47
30	9.77	0.00	32.575	0.000	25.12	285.8	0.087	0.13	6.34	0.00	0.96
50	9.75	0.00	32.575	0.000	25.12	285.8	0.144	0.37	6.31	0.00	0.86
75	9.85	0.04	32.568	0.004	25.10	288.3	0.216	0.83	6.41	0.01	0.78
100	9.42	0.06	32.610	0.002	25.20	279.0	0.288	1.47	6.30	0.02	0.72

CNAV OSHAWA CRUISE OS1 STATION 13A BIOLOGICAL DATA

DATE 16/03/63 LAT 44-40 N LONG 130-02 W

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	SAL
0	0.25		3.84	32.531
0			4.74	

MESSENGER TIME 0645 INCOMING SOLAR RADIATION - AM 200 PM 241

THE SECOND PRODUCTIVITY VALUE WAS INCUBATED AT 50 PERCENT LIGHT INTENSITY INSTEAD OF 100 PERCENT

CNAV OSHAWA CRUISE OS1 STATION 014 OBSERVED VALUES

DATE 16/03/63 HR 17.8 LAT 44-14 N LONG 130-00 W SNDG 2195 WEA 02 WIND VEL 25 DIR 32
BAROM 04. TEMP DRY 8.9 WET 8.9 RELHU 99 WTRCLR SECDI SEA 4 DIR 32 SWELL 4 DIR 30
CLOUD TYPE AMT 3 VIS 7 WIRE ANGLE(S) 13,24

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN AOU	OXYGEN SATN
1	0	9.90	32.556	25.08	6.54	0.584	-0.027	105
1	5	9.98	32.552	25.07	6.48	0.579	-0.022	104
1	10	9.61	32.554	25.13	6.46	0.577	-0.016	103
1	19	9.60	32.574	25.15	6.46	0.577	-0.016	103
1	29	9.61	32.567	25.14	6.47	0.578	-0.017	103
1	49	9.59	32.556	25.13	6.49	0.580	-0.018	103
1	73	9.61	32.556	25.13	6.44	0.575	-0.014	103
1	97	9.52	32.563	25.15	6.43	0.574	-0.012	102
1	122	7.98	32.938	25.68	5.69	0.508	0.073	87
1	146	7.45	33.428	26.14	5.09	0.455	0.132	78
2	165	7.52	33.765	26.40	4.71	0.421	0.163	72
2	188	7.58			4.40	0.393		
2	283	6.28	33.920	26.69	3.12	0.279	0.322	46
2	478	4.78	34.029	26.95	1.19	0.106	0.517	17
2	722	3.95	34.242	27.21	0.41	0.037	0.599	6
2	968	3.40	34.410	27.40	0.26	0.023	0.621	4
2	1462	2.58	34.527	27.57	0.76	0.068	0.589	10
2	1759	2.12	34.556	27.63	1.19	0.106	0.558	16

CNAV OSHAWA CRUISE OS1 STATION 014 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	SAL
0	0.20		12.18	32.561
7	0.20		3.30	32.569
24	0.22		0.94	32.569
51	0.22		0.02	32.567
	10.85		103.16	- WATER COLUMN VALUES

MESSENGER TIME 0948 INCOMING SOLAR RADIATION - AM 200 PM 241

CNAV OSHAWA CRUISE OS1 STATION 014 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	9.90	0.00	32.556	0.000	25.08	288.7	0.000	0.00	6.54	0.00	
10	9.61	0.00	32.554	0.000	25.13	284.5	0.029	0.02	6.46	0.00	
20	9.60	0.00	32.574	0.000	25.15	283.1	0.058	0.06	6.46	0.00	0.88
30	9.61	0.00	32.566	0.000	25.14	283.9	0.087	0.13	6.47	0.00	0.98
50	9.59	0.00	32.556	0.000	25.13	284.8	0.144	0.37	6.49	0.00	0.95
75	9.63	0.02	32.550	0.004	25.12	286.3	0.216	0.83	6.45	0.01	0.89
100	9.35	0.04	32.594	0.004	25.20	279.1	0.287	1.47	6.36	0.02	0.85
150	7.45	0.01	33.504	0.001	26.20	184.8	0.404	2.91	5.00	0.00	0.75
200	7.47	0.05	33.989	0.114	26.58	150.0	0.488	4.40	4.23	0.00	2.11
250	6.85	0.11	34.048	0.110	26.71	137.8	0.561	6.07	3.55	0.01	1.53
300	6.10	0.01	33.932	0.003	26.72	137.4	0.630	8.03	2.91	0.00	0.97
400	5.24	0.03	33.993	0.010	26.87	123.4	0.762	12.73	1.84	0.01	0.76
500	4.68	0.01	34.047	0.002	26.98	113.7	0.881	18.24	1.07	0.02	0.90
600	4.27	0.04	34.133	0.005	27.09	103.7	0.991	24.42	0.65	0.05	0.67
700	4.00	0.01	34.222	0.002	27.19	94.8	1.091	31.11	0.43	0.02	0.88
800	3.75	0.01	34.302	0.001	27.28	87.0	1.183	38.18	0.31	0.01	0.68
1000	3.34	0.00	34.423	0.002	27.42	74.8	1.347	53.21	0.27	0.01	0.97
1200	2.99	0.01	34.489	0.009	27.50	67.3	1.491	69.44	0.41	0.03	0.89
1500	2.52	0.00	34.530	0.001	27.57	60.7	1.686	96.37	0.82	0.01	0.99

CNAV OSHAWA CRUISE OS1 STATION 015 OBSERVED VALUES

DATE 17/03/63 HR 01.5 LAT 43-12 N LONG 130-00 W SNDG 3255 WEA 02 WIND VEL 32 DIR 36
BAROM 07. TEMP DRY 7.8 WET 5.6 RELHU 72 WTRCLR SECDI SEA 4 DIR 36 SWELL 7 DIR 32
CLOUD TYPE AMT 6 VIS 7 WIRE ANGLE(S) 5,10,10,18

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN ADU	OXYGEN SATN
1	0	10.84	32.742	25.07	6.41	0.573	-0.027	105
1	10	10.86	32.747	25.07	6.29	0.562	-0.017	103
2	20	10.87	32.790	25.10	6.37	0.569	-0.024	104
2	29	10.86	32.748	25.07	6.29	0.562	-0.017	103
2	49	10.86	32.768	25.09	6.29	0.562	-0.017	103
2	74	10.78	32.785	25.11	6.08	0.543	0.003	100
2	99	9.36	33.223	25.69	4.84	0.432	0.129	77
3	123	8.54	33.644	26.15	4.01	0.358	0.213	63
3	148	8.14	33.823	26.35	3.35	0.299	0.276	52
3	172	7.70	33.903	26.48	3.25	0.290	0.291	50
4	191	7.50						
4	287	6.32	34.023	26.76	1.80	0.161	0.439	27
4	481	5.06	34.140	27.01	0.73	0.065	0.553	11
4	725	4.32	34.316	27.23	0.30	0.027	0.602	4
4	968	3.56	34.386	27.36	0.29	0.026	0.615	4
4	1456	2.56	34.535	27.58	0.72	0.064	0.593	10
4	1751	2.13	34.624*	27.68	1.26	0.113	0.551	17
4	2045	1.89	34.614	27.69	1.56	0.139	0.529	21
4	2340	1.82	34.630	27.71	1.72	0.154	0.516	23
4	2636	1.75	34.640	27.72	1.83	0.163	0.507	24
4	3127	1.61	34.657	27.75	2.35	0.210	0.463	31

CNAV OSHAWA CRUISE OS1 STATION 015 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I
0	0.59		
7	0.64		
24	0.67		
51	0.71		

34.14 - WATER COLUMN VALUES

MESSENGER TIME 1732 INCOMING SOLAR RADIATION - AM 200 PM 241

CNAV OSHAWA CRUISE OS1 STATION 015 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	10.84	0.00	32.742	0.000	25.07	290.1	0.000	0.00	6.41	0.00	
10	10.86	0.00	32.747	0.000	25.07	290.3	0.030	0.02	6.29	0.00	
20	10.87	0.00	32.790	0.000	25.10	287.5	0.059	0.06	6.37	0.00	
30	10.86	0.00	32.747	0.001	25.07	290.7	0.088	0.14	6.29	0.00	0.99
50	10.87	0.01	32.765	0.003	25.08	290.0	0.146	0.38	6.29	0.01	0.95
75	10.73	0.01	32.798	0.003	25.13	285.7	0.219	0.84	6.04	0.01	0.94
100	9.32	0.00	33.243	0.001	25.71	230.5	0.284	1.42	4.80	0.00	0.94
150	8.10	0.00	33.832	0.001	26.36	169.6	0.385	2.67	3.33	0.01	0.90
200	7.39	0.01	33.954	0.012	26.56	151.3	0.466	4.11	2.94	0.07	1.54
250	6.77	0.03	34.010	0.014	26.69	139.5	0.539	5.80	2.32	0.08	1.47
300	6.20	0.01	34.032	0.001	26.78	131.2	0.607	7.72	1.69	0.01	0.97
400	5.46	0.04	34.096	0.005	26.93	118.3	0.733	12.22	1.03	0.04	0.76
500	4.99	0.01	34.155	0.001	27.03	109.3	0.848	17.51	0.67	0.01	0.91
600	4.64	0.04	34.230	0.006	27.13	100.7	0.954	23.49	0.43	0.02	0.68
700	4.37	0.01	34.300	0.002	27.21	93.4	1.052	30.02	0.31	0.01	0.86
800	4.08	0.01	34.343	0.004	27.28	87.6	1.144	37.07	0.27	0.01	0.68
1000	3.48	0.00	34.397	0.001	27.38	78.3	1.312	52.52	0.30	0.00	0.97
1200	3.02	0.01	34.461	0.003	27.48	69.7	1.461	69.41	0.42	0.00	0.89
1500	2.49	0.00	34.544	0.000	27.59	59.2	1.657	96.43	0.80	0.01	0.91
2000	1.92	0.00	34.611	0.000	27.69	49.8	1.934	145.80	1.53	0.00	0.96
2500	1.78	0.00	34.636	0.000	27.72	48.2	2.184	203.68	1.77	0.01	0.60
3000	1.65	0.00	34.652	0.000	27.74	46.9	2.427	272.66	2.14	0.01	6.73

CNAV OSHAWA CRUISE OS1 STATION 016 OBSERVED VALUES

DATE 17/03/63 HR 07.9 LAT 43-14 N LONG 129-25 W SNDG WEA 03 WIND VEL 20 DIR 36
BAROM 11. TEMP DRY 7.8 WET 6.7 RELHU 86 WTRCLR SECDI SEA 3 DIR 35 SWELL 5 DIR 32
CLOUD TYPE AMT 5 VIS 7 WIRE ANGLE(S) 0.20

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN AOU	OXYGEN SATN
1	0	10.74	32.692	25.05	6.41	0.573	-0.027	105
1	5		32.700		6.29	0.562		
1	10	10.72	32.708	25.06	6.33	0.565	-0.019	103
1	20	10.73	32.715	25.07	6.24	0.557	-0.011	102
1	30	10.74	32.701	25.05	6.29	0.562	-0.015	103
1	50	10.72	32.702	25.06	6.29	0.562	-0.015	103
1	75	10.81	32.765	25.09	6.29	0.562	-0.016	103
1	100	9.32	33.397	25.83	4.36	0.389	0.172	69
1	125	8.65	33.630	26.12	3.80	0.339	0.230	60
1	150	8.01	33.849	26.39	3.27	0.292	0.285	51
2	164	7.95	33.864	26.41	3.24	0.289	0.288	50
2	185	7.74	33.903	26.47	3.23	0.288	0.292	50
2	279	6.41	33.931	26.68	3.23	0.288	0.311	48
2	468	5.25	34.103	26.96	0.97	0.087	0.525	14
2	706	4.40	34.381*	27.27	0.33	0.029	0.598	5
2	945	3.72	34.401	27.36	0.34	0.030	0.608	5
2	1424	2.68	34.511	27.55	0.60	0.054	0.602	8
2	1712	2.25	34.630	27.68	1.07	0.096	0.566	14

CNAV OSHAWA CRUISE OS1 STATION 016 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	10.74	0.00	32.692	0.000	25.05	292.2	0.000	0.00	6.41	0.00	
10	10.72	0.00	32.708	0.000	25.06	290.9	0.030	0.02	6.33	0.00	
20	10.73	0.00	32.715	0.000	25.07	290.7	0.059	0.06	6.24	0.00	
30	10.74	0.00	32.701	0.000	25.05	292.1	0.089	0.14	6.29	0.00	
50	10.72	0.00	32.702	0.000	25.06	292.1	0.147	0.38	6.29	0.00	
75	10.81	0.00	32.765	0.000	25.09	289.5	0.221	0.85	6.29	0.00	
100	9.32	0.00	33.397	0.000	25.83	219.2	0.285	1.41	4.36	0.00	
150	8.01	0.00	33.849	0.000	26.39	167.1	0.382	2.63	3.27	0.00	
200	7.53	0.03	33.914	0.006	26.51	156.3	0.464	4.09	3.25	0.02	1.33
250	6.83	0.04	33.933	0.010	26.62	146.0	0.540	5.84	3.27	0.03	1.15
300	6.22	0.03	33.947	0.003	26.71	137.7	0.611	7.86	3.02	0.08	0.96
400	5.53	0.06	34.034	0.007	26.87	123.8	0.743	12.57	1.87	0.18	0.75
500	5.11	0.01	34.129	0.000	26.99	112.8	0.863	18.07	0.79	0.04	1.00
600	4.73	0.02	34.205	0.000	27.10	103.7	0.972	24.23	0.42	0.07	0.99
700	4.42	0.00	34.272	0.000	27.19	96.0	1.073	30.95	0.33	0.01	0.96
800	4.12	0.00	34.331	0.000	27.26	89.0	1.166	38.15	0.29	0.02	0.83
1000	3.58	0.00	34.416	0.005	27.39	78.1	1.336	53.70	0.35	0.01	0.95
1200	3.11	0.00	34.465	0.012	27.47	70.6	1.486	70.68	0.42	0.01	0.88
1500	2.55	0.00	34.534	0.003	27.57	60.7	1.686	98.23	0.69	0.00	0.94

CNAV OSHAWA CRUISE OS1 STATION 017 OBSERVED VALUES

DATE 17/03/63 HR 12.4 LAT 43-14 N LONG 128-40 W SNDG WEA 01 WIND VEL 23 DIR 36
BAROM 12. TEMP DRY 9.4 WET 7.8 RELHU 81 WTRCLR SECDI SEA 3 DIR 35 SWELL 5 DIR 32
CLOUD TYPE AMT 3 VIS 7 WIRE ANGLE(S) 10,25

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN AOU	OXYGEN SATN
1	0	10.72	32.758	25.10	6.33	0.565	-0.019	103
1	5	10.77	32.750	25.09	6.31	0.564	-0.018	103
1	10	10.78	32.784	25.11	6.32	0.564	-0.019	103
1	20	10.78	32.748	25.08	6.33	0.565	-0.019	104
1	29	10.79	32.776	25.10	6.28	0.561	-0.015	103
1	49	10.80	32.822	25.14	6.31	0.564	-0.018	103
1	74	10.82	32.790	25.11	6.27	0.560	-0.015	103
1	99	9.50	33.101	25.57	5.14	0.459	0.101	82
1	123	8.82	33.450	25.95	4.36	0.389	0.178	69
1	148	8.42	33.714	26.22	3.55	0.317	0.255	55
2	158	8.28	33.800	26.31	3.31	0.296	0.278	52
2	181	7.96	33.929	26.46	2.84	0.254	0.324	44
2	271	7.08	34.033	26.67	2.01	0.180	0.410	30
2	457	5.62	34.112	26.92	1.09	0.097	0.513	16
2	693	4.52	34.250	27.16	0.45	0.040	0.586	6
2	929	3.88	34.375	27.32	0.31	0.028	0.608	4
2	1404	2.78	34.497	27.53	0.56	0.050	0.604	8
2	1691	2.34	34.560	27.61	1.00	0.089	0.572	14

CNAV OSHAWA CRUISE OS1 STATION 017 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	SAL
0	0.59		8.42	32.745
0			12.22	

MESSENGER TIME 0620 INCOMING SOLAR RADIATION - AM 214 PM 166

THE SECOND PRODUCTIVITY VALUE WAS INCUBATED AT 50 PERCENT LIGHT INTENSITY INSTEAD OF 100 PERCENT

CNAV OSHAWA CRUISE OS1 STATION 017 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	10.72	0.00	32.758	0.000	25.10	287.0	0.000	0.00	6.33	0.00	
10	10.78	0.00	32.784	0.000	25.11	286.3	0.029	0.02	6.32	0.00	
20	10.78	0.00	32.748	0.000	25.08	289.1	0.058	0.06	6.33	0.00	
30	10.79	0.00	32.779	0.000	25.11	287.2	0.087	0.13	6.28	0.00	0.99
50	10.81	0.01	32.818	0.003	25.13	285.1	0.145	0.37	6.32	0.01	0.95
75	10.77	0.01	32.799	0.002	25.12	286.4	0.217	0.83	6.23	0.01	0.94
100	9.46	0.00	33.116	0.001	25.59	242.3	0.284	1.42	5.10	0.00	0.94
150	8.39	0.00	33.734	0.002	26.24	181.2	0.390	2.76	3.50	0.01	0.62
200	7.74	0.01	33.979	0.017	26.53	154.5	0.475	4.26	2.59	0.04	1.28
250	7.25	0.01	34.039	0.018	26.65	143.9	0.550	5.99	2.12	0.04	0.93
300	6.82	0.00	34.050	0.005	26.72	137.9	0.621	8.00	1.82	0.02	0.94
400	6.01	0.00	34.096	0.007	26.86	125.3	0.754	12.74	1.30	0.02	0.75
500	5.37	0.01	34.136	0.001	26.97	115.5	0.876	18.34	0.93	0.00	0.82
600	4.88	0.02	34.194	0.002	27.07	106.3	0.988	24.65	0.64	0.00	0.68
700	4.50	0.00	34.254	0.000	27.16	98.3	1.091	31.54	0.44	0.00	0.96
800	4.20	0.02	34.310	0.001	27.24	91.5	1.187	38.92	0.34	0.01	0.61
1000	3.69	0.00	34.399	0.003	27.36	80.6	1.361	54.94	0.31	0.00	0.94
1200	3.21	0.01	34.457	0.006	27.45	72.3	1.516	72.39	0.37	0.00	0.88
1500	2.61	0.00	34.515	0.002	27.56	62.8	1.721	100.74	0.69	0.00	0.90

CNAV OSHAWA CRUISE OS1 STATION 018 OBSERVED VALUES

DATE 17/03/63 HR 17.8 LAT 43-14 N LONG 128-06 W SNDG 3109 WEA 02 WIND VEL 12 DIR 32
BAROM 16. TEMP DRY 10.0 WET 9.4 RELHU 93 WTRCLR SECDI SEA 2 DIR 32 SWELL 3 DIR 34
CLOUD TYPE AMT 4 VIS 7 WIRE ANGLE(S) 15,20

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN ADU	OXYGEN SATN
1	0	10.40	32.652	25.07	6.47	0.578	-0.027	105
1	5	10.35	32.627	25.06	6.40	0.572	-0.020	104
1	10	10.35	32.644	25.08	6.50	0.581	-0.029	105
1	19	10.41	32.668	25.09	6.40	0.572	-0.021	104
1	29	10.36	32.635	25.07	6.42	0.573	-0.022	104
1	48	10.37	32.625	25.06	6.48	0.579	-0.027	105
1	73	10.40	32.629	25.06	6.41	0.573	-0.022	104
1	96	9.16	32.977	25.53	5.52	0.493	0.072	87
1	121	8.73	33.508	26.01	4.11	0.367	0.202	65
1	145	8.34	33.746	26.26	3.47	0.310	0.263	54
2	165	8.18	33.836	26.35	3.17	0.283	0.292	49
2	189	7.92	33.897	26.44	2.97	0.265	0.313	46
2	283	6.94	34.010	26.67	2.16	0.193	0.398	33
2	472	5.47	34.101	26.93	0.94	0.084	0.528	14
2	709	4.32	34.239	27.17	0.36	0.032	0.597	5
2	946	3.75	34.398	27.35	0.28	0.025	0.613	4
2	1423	2.78	34.515	27.54	0.71	0.063	0.590	10
2	1710	2.32	34.572	27.62	1.09	0.097	0.565	15

CNAV OSHAWA CRUISE OS1 STATION 018 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	SAL
0	0.78		12.52	32.625
4	0.87		13.92	32.627
20	0.88		2.96	32.624
44	0.96		0.00	32.631
	39.42		223.44	- WATER COLUMN VALUES

MESSENGER TIME 0950 INCOMING SOLAR RADIATION - AM 214 PM 166

CNAV OSHAWA CRUISE OS1 STATION 018 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	10.40	0.00	32.652	0.000	25.07	289.6	0.000	0.00	6.47	0.00	
10	10.35	0.00	32.644	0.000	25.08	289.5	0.030	0.02	6.50	0.00	
20	10.41	0.00	32.666	0.001	25.08	289.0	0.059	0.06	6.40	0.00	0.88
30	10.36	0.00	32.633	0.000	25.07	290.8	0.088	0.14	6.42	0.00	0.97
50	10.40	0.02	32.618	0.005	25.05	293.0	0.147	0.38	6.49	0.01	0.91
75	10.30	0.03	32.650	0.003	25.09	289.5	0.220	0.85	6.36	0.01	0.88
100	9.06	0.02	33.066	0.010	25.62	239.7	0.287	1.44	5.28	0.03	0.81
150	8.30	0.01	33.775	0.002	26.29	176.7	0.392	2.74	3.38	0.00	0.70
200	7.80	0.00	33.917	0.003	26.47	159.9	0.477	4.26	2.87	0.00	1.18
250	7.27	0.00	33.984	0.006	26.60	148.2	0.554	6.05	2.44	0.01	1.08
300	6.78	0.00	34.022	0.003	26.70	139.6	0.627	8.09	2.03	0.00	0.96
400	5.96	0.01	34.076	0.008	26.85	126.1	0.761	12.88	1.33	0.00	0.75
500	5.30	0.00	34.116	0.000	26.96	116.0	0.883	18.51	0.83	0.01	0.87
600	4.76	0.01	34.173	0.000	27.07	106.5	0.995	24.84	0.53	0.02	0.67
700	4.35	0.00	34.233	0.000	27.16	98.0	1.099	31.72	0.37	0.00	0.94
800	4.06	0.02	34.303	0.003	27.25	90.4	1.194	39.05	0.29	0.01	0.63
1000	3.63	0.00	34.419	0.004	27.38	78.4	1.365	54.75	0.30	0.01	0.95
1200	3.20	0.00	34.479	0.010	27.47	70.5	1.516	71.75	0.44	0.02	0.89
1500	2.65	0.00	34.526	0.002	27.56	62.4	1.718	99.67	0.81	0.00	10.08

CNAV OSHAWA CRUISE OS1 STATION 019 OBSERVED VALUES

DATE 17/03/63 HR 21.7 LAT 43-14 N LONG 127-42 W SNDG WEA 02 WIND VEL 13 DIR 29
BAROM 18. TEMP DRY 12.8 WET 11.7 RELHU 88 WTRCLR SECDI SEA 2 DIR 35 SWELL 3 DIR 20
CLOUD TYPE 8 AMT 4 VIS 7 WIRE ANGLE(S) 5,16

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN AOU	OXYGEN SATN
1	0	10.45	32.644	25.06	6.51	0 581	-0.031	106
1	5	10.42	32.605	25.03	6.54	0.584	-0.033	106
1	10	10.33	32.610	25.05	6.44	0.575	-0.023	104
1	20	10.30	32.618	25.07	6.54	0.584	-0.032	106
1	30	10.30	32.627	25.07	6.39	0.571	-0.019	103
1	50	10.22	32.622	25.08	6.46	0.577	-0.024	104
1	75	10.33	32.620	25.06	6.39	0.571	-0.019	103
1	100	9.19	32.883	25.45	5.52	0.493	0.072	87
1	124	8.59	33.353	25.91	4.56	0.407	0.164	71
1	149	8.16	33.633	26.20	3.91	0.349	0.227	61
2	168	7.86	33.764	26.35	3.56	0.318	0.261	55
2	191	7.42	33.869	26.49	3.42	0.305	0.280	52
2	286	6.35	33.958	26.71	2.68	0.239	0.360	40
2	480	5.09	34.109	26.98	0.87	0.078	0.540	13
2	729	4.20	34.294	27.23	0.63	0.056	0.575	9
2	971	3.66	34.456	27.41	0.29	0.026	0.613	4
2	1466	2.58	34.520	27.56	0.69	0.062	0.595	9
2	1764	2.11	34.582	27.65	1.25	0.112	0.553	17

CNAV OSHAWA CRUISE OS1 STATION 019 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I
0	0.92		
4	0.95		
20	1.18		
44	0.88		

45.45 - WATER COLUMN VALUES

MESSENGER TIME 1342 INCOMING SOLAR RADIATION - AM 214 PM 166

CNAV OSHAWA CRUISE OS1 STATION 019 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	10.45	0.00	32.644	0.000	25.06	291.0	0.000	0.00	6.51	0.00	
10	10.33	0.00	32.610	0.000	25.05	291.7	0.030	0.02	6.44	0.00	
20	10.30	0.00	32.618	0.000	25.07	290.9	0.059	0.06	6.54	0.00	
30	10.30	0.00	32.627	0.000	25.07	290.4	0.088	0.14	6.39	0.00	
50	10.22	0.00	32.622	0.000	25.08	289.9	0.147	0.38	6.46	0.00	
75	10.33	0.00	32.620	0.000	25.06	292.3	0.220	0.85	6.39	0.00	
100	9.19	0.00	32.883	0.000	25.45	255.3	0.289	1.46	5.52	0.00	
150	8.14	0.00	33.641	0.000	26.21	184.4	0.400	2.84	3.89	0.00	0.92
200	7.29	0.01	33.890	0.008	26.53	154.7	0.485	4.35	3.36	0.00	1.17
250	6.67	0.04	33.958	0.021	26.66	142.1	0.560	6.08	2.98	0.01	1.18
300	6.23	0.01	33.970	0.000	26.73	136.2	0.630	8.06	2.53	0.02	0.97
400	5.50	0.03	34.050	0.001	26.88	122.4	0.761	12.71	1.55	0.07	0.76
500	5.00	0.01	34.124	0.000	27.00	111.8	0.879	18.15	0.81	0.03	0.91
600	4.59	0.02	34.200	0.000	27.11	102.4	0.987	24.25	0.62	0.10	0.68
700	4.27	0.01	34.273	0.000	27.20	94.2	1.087	30.87	0.60	0.04	0.85
800	4.02	0.01	34.347	0.002	27.29	86.7	1.178	37.90	0.52	0.02	0.69
1000	3.59	0.00	34.464	0.004	27.42	74.7	1.341	52.91	0.28	0.01	0.97
1200	3.14	0.01	34.505	0.017	27.50	67.8	1.486	69.19	0.34	0.03	0.90
1500	2.52	0.00	34.522	0.003	27.57	61.2	1.682	96.33	0.75	0.01	0.99

CNAV OSHAWA CRUISE OS1 STATION 020 OBSERVED VALUES

DATE 18/03/63 HR 01.7 LAT 43-12 N LONG 127-06 W SNDG WEA 02 WIND VEL 15 DIR 30
BAROM 18. TEMP DRY 10.6 WET 10.0 RELHU 93 WTRCLR SECDI SEA 2 DIR 30 SWELL 6 DIR 30
CLOUD TYPE AMT 8 VIS 7 WIRE ANGLE(S) 5,21

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN ADU	OXYGEN SATN
1	0	10.42	32.678	25.09	6.56	0.586	-0.035	106
1	5	10.42	32.675	25.09	6.55	0.585	-0.034	106
1	10	10.42	32.664	25.08	6.60	0.589	-0.039	107
2	14	10.28	32.690	25.12	6.51	0.581	-0.029	105
1	20	10.27	32.648	25.09	6.54	0.584	-0.032	106
1	30	10.26	32.709	25.14	6.51	0.581	-0.029	105
2	38	10.24	32.655	25.10	6.36	0.568	-0.015	103
1	50	10.28	32.662	25.10	6.52	0.582	-0.030	105
1	75	9.53	33.040	25.52	5.19	0.464	0.097	83
1	100	8.73	33.406	25.93	4.21	0.376	0.193	66
1	124	8.41	33.695	26.21	3.60	0.322	0.251	56
2	133	8.04	33.797	26.34	3.27	0.292	0.285	51
1	149	7.91	33.853	26.41	3.11	0.278	0.301	48
2	325	5.81	34.002	26.81	2.65	0.237	0.371	39
2	569	4.68	34.190	27.09	0.58	0.052	0.572	8
2	812	4.01	34.341	27.28	0.47	0.042	0.592	7
2	1301	2.91	34.493	27.51	0.69	0.062	0.590	9
2	1597	2.35	34.582	27.63	0.99	0.088	0.572	13

CNAV OSHAWA CRUISE OS1 STATION 020 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I
0	0.79		
4	0.79		
20	1.14		
44	1.03		

44.70 - WATER COLUMN VALUES

MESSENGER TIME 1747 INCOMING SOLAR RADIATION - AM 214 PM 166

CNAV OSHAWA CRUISE OS1 STATION 020 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	10.42	0.00	32.678	0.000	25.09	288.0	0.000	0.00	6.56	0.00	
10	10.42	0.00	32.664	0.000	25.08	289.2	0.030	0.02	6.60	0.00	
20	10.27	0.00	32.648	0.000	25.09	288.1	0.059	0.06	6.54	0.00	
30	10.26	0.00	32.709	0.000	25.14	283.7	0.087	0.13	6.51	0.00	
50	10.28	0.00	32.662	0.000	25.10	287.9	0.145	0.37	6.52	0.00	
75	9.53	0.00	33.040	0.000	25.52	248.5	0.213	0.80	5.19	0.00	
100	8.73	0.00	33.406	0.000	25.93	209.6	0.270	1.31	4.21	0.00	
150	7.90	0.00	33.855	0.001	26.41	165.0	0.365	2.49	3.11	0.00	1.05
200	7.31	0.08	33.941	0.029	26.56	151.2	0.444	3.92	2.90	0.11	4.39
250	6.71	0.09	33.992	0.034	26.69	140.2	0.518	5.61	2.75	0.13	4.78
300	6.11	0.05	34.007	0.017	26.78	131.9	0.586	7.54	2.67	0.07	1.71
400	5.33	0.06	34.063	0.001	26.92	119.3	0.713	12.07	2.00	0.13	0.75
500	4.87	0.05	34.140	0.001	27.03	109.2	0.828	17.37	1.15	0.12	0.73
600	4.58	0.01	34.212	0.000	27.12	101.4	0.935	23.37	0.51	0.03	0.84
700	4.29	0.02	34.277	0.001	27.20	94.1	1.034	29.95	0.39	0.07	0.59
800	4.04	0.00	34.335	0.000	27.28	87.8	1.125	37.03	0.45	0.01	0.91
1000	3.55	0.00	34.412	0.008	27.39	78.1	1.293	52.48	0.50	0.01	0.90
1200	3.11	0.00	34.470	0.005	27.47	70.2	1.444	69.41	0.61	0.01	0.89
1500	2.53	0.00	34.548	0.004	27.59	59.4	1.641	96.58	0.88	0.00	0.67

CNAV OSHAWA CRUISE OS1 STATION 021 OBSERVED VALUES

DATE 18/03/63 HR 06.0 LAT 43-14 N LONG 126-32 W SNDG 2880 WEA 02 WIND VEL 8 DIR 25
BAROM 20. TEMP DRY 10.0 WET 10.0 RELHU 99 WTRCLR SECDI SEA 1 DIR 25 SWELL 2 DIR 27
CLOUD TYPE AMT 8 VIS 7 WIRE ANGLE(S) 8,24, 9

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN AOU	OXYGEN SATN
1	0	10.48	32.697	25.10	6.44	0.575	-0.025	105
1	5	10.47	32.700	25.10	6.47	0.578	-0.028	105
1	10	10.49	32.690	25.09	6.42	0.573	-0.024	104
1	20	10.41	32.726	25.13	6.48	0.579	-0.028	105
1	30	10.40	32.707	25.12	6.39	0.571	-0.020	104
1	49	10.40	32.717	25.13	6.37	0.569	-0.018	103
1	74	9.62	33.109	25.56	5.21	0.465	0.093	83
1	99	8.58	33.438	25.98	4.15	0.371	0.200	65
1	124	8.11	33.662	26.23	3.63	0.324	0.252	56
3	148	7.87	33.834	26.40	3.21	0.287	0.292	50
2	161	7.74	33.891	26.46	2.91	0.260	0.321	45
2	185	7.46	33.951	26.55	2.80	0.250	0.334	43
2	276	6.58	33.965	26.68	2.32	0.207	0.389	35
2	460	5.34	34.135	26.97	0.87	0.078	0.536	13
2	692	4.27	34.264	27.19	0.61	0.054	0.576	9
2	925	3.69	34.420	27.38	0.30	0.027	0.612	4
2	1392	2.74	34.527	27.55	0.65	0.058	0.596	9
2	1671	2.28	34.564	27.62	1.04	0.093	0.569	14
2	1952	1.98	34.601	27.68	1.43	0.128	0.539	19
2	2326	1.83	34.624	27.71	1.74	0.155	0.514	23
2	2607	1.79	34.631	27.71	1.91	0.171	0.500	25

CNAV OSHAWA CRUISE OS1 STATION 021 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	10.48	0.00	32.697	0.000	25.10	287.5	0.000	0.00	6.44	0.00	
10	10.49	0.00	32.690	0.000	25.09	288.4	0.030	0.02	6.42	0.00	
20	10.41	0.00	32.726	0.000	25.13	284.6	0.058	0.06	6.48	0.00	
30	10.40	0.00	32.707	0.000	25.12	286.1	0.087	0.13	6.39	0.00	
50	10.38	0.00	32.729	0.003	25.14	284.5	0.145	0.37	6.34	0.01	0.95
75	9.58	0.01	33.124	0.000	25.58	243.0	0.211	0.79	5.16	0.00	0.94
100	8.55	0.00	33.448	0.000	25.99	203.8	0.267	1.29	4.12	0.00	0.94
150	7.85	0.00	33.844	0.000	26.41	165.2	0.360	2.46	3.16	0.00	0.77
200	7.30	0.00	33.963	0.009	26.58	149.4	0.440	3.87	2.73	0.00	1.22
250	6.81	0.00	33.976	0.013	26.66	142.6	0.513	5.57	2.47	0.00	0.97
300	6.39	0.01	33.983	0.005	26.72	137.2	0.584	7.56	2.12	0.03	0.95
400	5.69	0.01	34.072	0.009	26.88	122.9	0.715	12.24	1.32	0.06	0.75
500	5.12	0.00	34.160	0.003	27.02	110.6	0.833	17.67	0.76	0.04	0.82
600	4.63	0.00	34.217	0.005	27.12	101.6	0.940	23.71	0.61	0.07	0.68
700	4.25	0.00	34.270	0.001	27.20	94.1	1.039	30.30	0.60	0.00	0.96
800	3.97	0.02	34.339	0.004	27.29	86.7	1.130	37.33	0.45	0.02	0.60
1000	3.52	0.00	34.448	0.005	27.42	75.0	1.294	52.36	0.30	0.02	0.93
1200	3.10	0.00	34.503	0.009	27.50	67.6	1.438	68.64	0.40	0.04	0.88
1500	2.55	0.00	34.543	0.001	27.58	60.1	1.633	95.47	0.79	0.01	0.61
2000	1.95	0.00	34.605	0.000	27.68	50.7	1.914	145.63	1.48	0.00	0.87
2500	1.80	0.00	34.629	0.000	27.71	49.0	2.168	204.53	1.85	0.00	0.76

CNAV OSHAWA CRUISE OS1 STATION 022 OBSERVED VALUES

DATE 18/03/63 HR 11.0 LAT 43-14 N LONG 125-57 W SNDG 2926 WEA 62 WIND VEL 18 DIR 27
BAROM 20. TEMP DRY 9.4 WET 9.4 RELHU 99 WTRCLR SECDI SEA 2 DIR 25 SWELL 4 DIR 27
CLOUD TYPE AMT 8 VIS 6 WIRE ANGLE(S) 0,22

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN AOU	OXYGEN SATN
1	0	10.74	32.750	25.09	6.34	0.566	-0.020	104
1	5	10.75	32.752	25.09	6.34	0.566	-0.020	104
1	10	10.78	32.769	25.10	6.40	0.572	-0.026	105
1	20	10.78	32.769	25.10	6.32	0.564	-0.019	103
1	30	10.80	32.770	25.10	6.35	0.567	-0.022	104
1	50	10.46	32.740	25.13	6.35	0.567	-0.017	103
1	75	9.66	33.203	25.63	4.88	0.436	0.122	78
1	100	8.78	33.500	26.00	3.79	0.338	0.230	60
1	125	8.44	33.698	26.31				
1	150	8.12	33.833	26.26	3.21	0.287	0.291	50
2	160	8.08	33.833	26.37	3.02	0.270	0.306	47
2	183	7.94	33.960	26.49	2.63	0.235	0.343	41
2	275	6.80	34.034	26.71	1.86	0.166	0.427	28
2	460	5.41	34.138	26.97	0.78	0.070	0.543	11
2	697	4.50	34.326	27.22	0.32	0.029	0.598	5
2	936	3.71	34.419	27.38	0.27	0.024	0.614	4
2	1419	2.67	34.530	27.56	0.71	0.063	0.592	10
2	1711	2.17	34.600	27.66	1.12	0.100	0.564	15

CNAV OSHAWA CRUISE OS1 STATION 022 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	10.74	0.00	32.750	0.000	25.09	287.9	0.000	0.00	6.34	0.00	
10	10.78	0.00	32.769	0.000	25.10	287.4	0.029	0.02	6.40	0.00	
20	10.78	0.00	32.769	0.000	25.10	287.6	0.058	0.06	6.32	0.00	
30	10.80	0.00	32.770	0.000	25.10	288.0	0.087	0.13	6.35	0.00	
50	10.46	0.00	32.740	0.000	25.13	285.0	0.145	0.37	6.35	0.00	
75	9.66	0.00	33.203	0.000	25.63	238.4	0.211	0.79	4.88	0.00	
100	8.78	0.00	33.500	0.000	26.00	203.4	0.267	1.28	3.79	0.00	
150	8.12	0.00	33.833	0.000	26.36	169.9	0.361	2.47	3.21	0.00	
200	7.75	0.03	34.000	0.017	26.55	153.0	0.442	3.92	2.43	0.03	1.28
250	7.14	0.04	34.049	0.022	26.67	141.7	0.516	5.63	2.00	0.04	0.99
300	6.56	0.01	34.049	0.002	26.75	134.6	0.586	7.59	1.68	0.00	0.94
400	5.76	0.02	34.105	0.004	26.90	121.4	0.715	12.21	1.06	0.00	0.74
500	5.22	0.02	34.171	0.004	27.01	111.0	0.833	17.61	0.65	0.01	0.83
600	4.81	0.03	34.251	0.006	27.13	101.2	0.940	23.64	0.42	0.03	0.68
700	4.49	0.00	34.328	0.000	27.22	92.7	1.038	30.17	0.32	0.00	0.98
800	4.14	0.00	34.374	0.003	27.30	86.1	1.128	37.13	0.26	0.01	0.61
1000	3.54	0.01	34.436	0.002	27.41	76.2	1.292	52.23	0.30	0.01	0.94
1200	3.08	0.02	34.486	0.004	27.49	68.6	1.439	68.76	0.45	0.02	0.88
1500	2.53	0.01	34.547	0.001	27.59	59.5	1.634	95.66	0.82	0.01	0.93

CNAV OSHAWA CRUISE OS1 STATION 023 OBSERVED VALUES

DATE 18/03/63 HR 14.2 LAT 43-12 N LONG 125-36 W SNDG 2980 WEA 02 WIND VEL 10 DIR 32
BAROM 20. TEMP DRY 9.4 WET 9.4 RELHU 99 WTRCLR SECDI SEA 2 DIR 32 SWELL 3 DIR 32
CLOUD TYPE AMT 8 VIS 7 WIRE ANGLE(S) 18,11

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN AOU	OXYGEN SATN
1	0	10.85	32.768	25.09	6.39	0.571	-0.026	105
1	5	10.88	32.773	25.09	6.40	0.572	-0.027	105
1	10	10.90	32.786	25.09	6.43	0.574	-0.030	106
1	19	10.77	32.760	25.09	5.86	0.523	0.023	96
1	29	10.81	32.791	25.11	5.35	0.478	0.068	88
1	48	10.58	32.838	25.19	6.04	0.539	0.008	98
1	72	9.78	33.259	25.65	5.26	0.470	0.086	84
1	95	9.07	33.519	25.97	4.28	0.382	0.182	68
1	119	8.62	33.673	26.16	3.62	0.323	0.246	57
1	143	8.02	33.861	26.40	3.24	0.289	0.287	50
2	172	7.76	33.922	26.48	2.92	0.261	0.319	45
2	197	7.40	33.976	26.58	2.59	0.231	0.353	40
2	293	6.52	34.052	26.76	1.67	0.149	0.448	25
2	489	5.42	34.165	26.99	0.78	0.070	0.543	11
2	734	4.46	34.324	27.22	0.34	0.030	0.597	5
2	980	3.75	34.455	27.40	0.32	0.029	0.609	4
2	1472	2.63	34.518	27.56	0.76	0.068	0.588	10
2	1767	2.12	34.597	27.66	1.17	0.104	0.560	16

CNAV OSHAWA CRUISE OS1 STATION 023 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	SAL
0			13.60	32.773

MESSENGER TIME 0625

CNAV OSHAWA CRUISE OS1 STATION 023 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	10.85	0.00	32.768	0.000	25.09	288.4	0.000	0.00	6.39	0.00	
10	10.90	0.00	32.786	0.000	25.09	288.1	0.030	0.02	6.43	0.00	
20	10.77	0.00	32.762	0.001	25.10	288.0	0.059	0.06	5.79	0.01	0.88
30	10.81	0.00	32.791	0.002	25.11	286.6	0.087	0.13	5.37	0.03	0.97
50	10.52	0.01	32.868	0.007	25.22	276.6	0.144	0.37	6.01	0.02	0.91
75	9.68	0.00	33.300	0.001	25.70	231.5	0.208	0.77	5.13	0.01	0.83
100	8.97	0.01	33.555	0.004	26.01	202.2	0.263	1.26	4.12	0.00	0.77
150	7.94	0.02	33.884	0.006	26.43	163.5	0.355	2.41	3.16	0.01	0.77
200	7.36	0.00	33.980	0.001	26.59	149.1	0.434	3.82	2.55	0.00	1.05
250	6.85	0.02	34.032	0.008	26.70	139.0	0.506	5.49	2.03	0.01	1.19
300	6.47	0.00	34.056	0.000	26.77	132.9	0.575	7.43	1.62	0.00	0.99
400	5.84	0.03	34.116	0.003	26.90	121.7	0.703	12.02	1.07	0.04	0.77
500	5.37	0.00	34.172	0.000	27.00	112.8	0.822	17.47	0.75	0.00	0.95
600	4.94	0.01	34.238	0.002	27.10	103.8	0.931	23.63	0.51	0.01	0.68
700	4.57	0.00	34.302	0.001	27.19	95.6	1.032	30.34	0.37	0.01	0.82
800	4.25	0.01	34.364	0.001	27.28	88.2	1.125	37.49	0.31	0.01	0.71
1000	3.70	0.00	34.459	0.002	27.41	76.3	1.291	52.78	0.33	0.00	0.98
1200	3.20	0.00	34.494	0.014	27.48	69.4	1.439	69.42	0.46	0.01	0.89
1500	2.58	0.00	34.521	0.002	27.56	61.9	1.638	97.04	0.80	0.00	0.99

CNAV OSHAWA CRUISE OS1 STATION 024 OBSERVED VALUES

DATE 18/03/63 HR 17.7 LAT 43-14 N LONG 125-13 W SNDG 2057 WEA 01 WIND VEL 3 DIR 32
BAROM 25. TEMP DRY 11.1 WET 10.6 RELHU 94 WTRCLR SECDI SEA 1 DIR 32 SWELL 2 DIR 30
CLOUD TYPE AMT 2 VIS 7 WIRE ANGLE(S) 0,18

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN AOU	OXYGEN SATN
1	0	10.39	32.685	25.10	6.65	0.594	-0.043	108
1	5	10.35	32.690	25.11	6.65	0.594	-0.043	108
1	10	10.29	32.686	25.12	6.52	0.582	-0.030	105
1	20	10.26	32.704	25.14	6.60	0.589	-0.037	107
1	30	10.29	32.714	25.14	6.61	0.590	-0.038	107
1	50	9.91	33.045	25.46	5.57	0.497	0.058	90
1	75	9.40	33.387	25.81	4.02	0.359	0.201	64
1	100	8.94	33.679	26.11	3.51	0.313	0.252	55
1	125	8.65	33.830	26.28	2.61	0.233	0.335	41
1	150	8.21	33.928	26.42	1.98	0.177	0.397	31
2	167	8.09	33.953	26.46	2.42	0.216	0.359	38
2	191	7.87	33.977	26.51	2.33	0.208	0.370	36
2	287	6.90	34.058	26.71	1.38	0.123	0.468	21
2	482	5.45	34.141	26.96	0.73	0.065	0.547	11
2	728	4.39	34.310	27.22	0.34	0.030	0.598	5
2	976	3.85	34.414	27.36	0.32	0.029	0.608	4
2	1273	3.03	34.526	27.53	0.55	0.049	0.600	8
2	1672	2.40	34.559	27.61	0.93	0.083	0.577	13

CNAV OSHAWA CRUISE OS1 STATION 024 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	SAL
0	1.36		30.86	32.661
6	1.40		27.38	32.665
16	1.66		3.74	32.669
31	1.28		0.18	32.660
	45.68		359.66	- WATER COLUMN VALUES

MESSENGER TIME 0946 INCOMING SOLAR RADIATION - AM 235 PM 193

CNAV OSHAWA CRUISE OS1 STATION 024 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	10.39	0.00	32.685	0.000	25.10	287.0	0.000	0.00	6.65	0.00	
10	10.29	0.00	32.686	0.000	25.12	285.5	0.029	0.02	6.52	0.00	
20	10.26	0.00	32.704	0.000	25.14	283.8	0.058	0.06	6.60	0.00	
30	10.29	0.00	32.714	0.000	25.14	283.8	0.087	0.13	6.61	0.00	
50	9.91	0.00	33.045	0.000	25.46	253.6	0.141	0.35	5.57	0.00	
75	9.40	0.00	33.387	0.000	25.81	220.7	0.200	0.73	4.02	0.00	
100	8.94	0.00	33.679	0.000	26.11	192.5	0.253	1.19	3.51	0.00	
150	8.21	0.00	33.928	0.000	26.42	164.1	0.342	2.33	1.98	0.00	
200	7.78	0.00	33.986	0.000	26.53	154.5	0.423	3.77	2.25	0.02	1.15
250	7.27	0.01	34.030	0.000	26.64	144.9	0.498	5.50	1.78	0.05	1.15
300	6.78	0.00	34.065	0.002	26.73	136.4	0.569	7.50	1.31	0.01	0.97
400	5.98	0.01	34.110	0.006	26.87	123.9	0.700	12.20	0.88	0.06	0.76
500	5.35	0.00	34.153	0.002	26.99	113.9	0.820	17.72	0.69	0.00	0.92
600	4.86	0.01	34.222	0.006	27.10	103.9	0.931	23.92	0.49	0.00	0.68
700	4.48	0.01	34.291	0.002	27.19	95.3	1.031	30.63	0.36	0.00	0.85
800	4.21	0.02	34.344	0.002	27.26	89.2	1.124	37.81	0.30	0.01	0.70
1000	3.78	0.01	34.425	0.001	27.37	79.8	1.295	53.55	0.33	0.00	0.91
1200	3.23	0.02	34.503	0.002	27.49	69.1	1.446	70.52	0.48	0.01	0.70
1500	2.55	0.04	34.569	0.005	27.60	58.1	1.640	97.17	0.78	0.02	1.65

CNAV OSHAWA CRUISE OS1 STATION 025 OBSERVED VALUES

DATE 18/03/63 HR 21.0 LAT 43-14 N LONG 124-53 W SNDG 384 WEA 03 WIND VEL 0 DIR 99
BAROM 26. TEMP DRY 11.7 WET 11.7 RELHU 99 WTRCLR SECDI SEA 1 DIR 32 SWELL 2 DIR 30
CLOUD TYPE 8 AMT 6 VIS 7 WIRE ANGLE(S) 0, 0

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN AOU	OXYGEN SATN
1	0	10.31	32.677	25.11	6.69	0.598	-0.046	108
1	5	10.27	32.691	25.13	6.65	0.594	-0.042	108
1	10	10.18	32.717	25.16	6.66	0.595	-0.042	108
1	20	10.12	32.699	25.16	6.66	0.595	-0.041	107
1	30	10.12	32.715	25.17	6.50	0.581	-0.026	105
1	50	9.55	33.186	25.63	5.01	0.447	0.112	80
1	75	9.12	33.585	26.01	3.89	0.347	0.216	62
1	100	8.72	33.773	26.22	3.21	0.287	0.281	50
1	125	8.33	33.895	26.38	2.74	0.245	0.328	43
1	150	8.20	33.914	26.41	2.57	0.230	0.345	40
2	169	7.99	33.953	26.47	2.46	0.220	0.357	38
2	193	7.32	34.015	26.62	2.08	0.186	0.400	32
2	289	6.20	34.088	26.83	1.24	0.111	0.491	18
2	361	5.86	34.122	26.90	1.00	0.089	0.517	15

CNAV OSHAWA CRUISE OS1 STATION 025 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I
0	1.48		
6	1.55		
16	1.67		
31	1.19		

46.73 - WATER COLUMN VALUES

MESSENGER TIME 1302 INCOMING SOLAR RADIATION - AM 235 PM 193

CNAV OSHAWA CRUISE OS1 STATION 025 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	10.31	0.00	32.677	0.000	25.11	286.3	0.000	0.00	6.69	0.00	
10	10.18	0.00	32.717	0.000	25.16	281.4	0.029	0.02	6.66	0.00	
20	10.12	0.00	32.699	0.000	25.16	282.0	0.057	0.06	6.66	0.00	
30	10.12	0.00	32.715	0.000	25.17	281.0	0.086	0.13	6.50	0.00	
50	9.55	0.00	33.186	0.000	25.63	237.5	0.138	0.34	5.01	0.00	
75	9.12	0.00	33.585	0.000	26.01	201.8	0.193	0.69	3.89	0.00	
100	8.72	0.00	33.773	0.000	26.22	182.2	0.242	1.12	3.21	0.00	
150	8.20	0.00	33.914	0.000	26.41	165.0	0.329	2.23	2.57	0.00	
200	7.18	0.02	34.026	0.003	26.65	143.2	0.407	3.62	1.99	0.01	1.11
250	6.46	0.07	34.077	0.010	26.79	130.5	0.476	5.20	1.48	0.02	1.26
300	6.16	0.02	34.089	0.003	26.84	126.3	0.541	7.03	1.19	0.01	1.14

CNAV OSHAWA CRUISE OS1 STATION 026 OBSERVED VALUES

FIVE MILE POINT

DATE 18/03/63 HR 23.0 LAT 43-14 N LONG 124-39 W SNDG 137 WEA 01 WIND VEL 0 DIR 99
BAROM 26. TEMP DRY 12.2 WET 11.7 RELHU 94 WTRCLR SECDI SEA DIR SWELL 2 DIR 28
CLOUD TYPE 8 AMT 3 VIS 7 WIRE ANGLE(S) 0

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN AOU	OXYGEN SATN
1	0	10.27	32.582	25.04	6.82	0.609	-0.056	110
1	5	10.26	32.588	25.05	6.78	0.606	-0.053	110
1	10	10.26	32.588	25.05	6.84	0.611	-0.058	111
1	20	10.18	32.589	25.06	6.80	0.607	-0.054	110
1	30	10.13	32.644	25.11	6.65	0.594	-0.040	107
1	50	9.61	33.303	25.71	4.93	0.440	0.118	79
1	75	8.48	33.765	26.25	3.02	0.270	0.301	47
1	100	7.88	33.932	26.47	2.42	0.216	0.362	37
1	135	7.37	34.002	26.60	1.92	0.171	0.414	29

CNAV OSHAWA CRUISE OS1 STATION 026 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I
0	1.12		
6	1.21		
16	1.32		
31	1.08		

37.62 - WATER COLUMN VALUES

MESSENGER TIME 1500 INCOMING SOLAR RADIATION - AM 235 PM 193

CNAV OSHAWA CRUISE OS1 STATION 026 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	10.27	0.00	32.582	0.000	25.04	292.6	0.000	0.00	6.82	0.00	
10	10.26	0.00	32.588	0.000	25.05	292.2	0.030	0.02	6.84	0.00	
20	10.18	0.00	32.589	0.000	25.06	291.1	0.059	0.06	6.80	0.00	
30	10.13	0.00	32.644	0.000	25.11	286.4	0.088	0.14	6.65	0.00	
50	9.61	0.00	33.303	0.000	25.71	229.8	0.140	0.34	4.93	0.00	
75	8.48	0.00	33.765	0.000	26.25	178.8	0.192	0.67	3.02	0.00	
100	7.88	0.00	33.932	0.000	26.47	158.2	0.234	1.04	2.42	0.00	

CNAV OSHAWA CRUISE OS1 STATION 027 OBSERVED VALUES

CAPE FOULWEATHER

DATE 19/03/63 HR 06.2 LAT 44-44 N LONG 124-09 W SNDG 64 WEA 02 WIND VEL 12 DIR 18
BAROM 26. TEMP DRY 10.0 WET 9.4 RELHU 93 WTRCLR SECDI SEA 2 DIR 18 SWELL 2 DIR 30
CLOUD TYPE AMT 3 VIS 7 WIRE ANGLE(S) 8

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN AOU	OXYGEN SATN
1	0	9.68	32.073	24.74	6.77	0.605	-0.043	108
1	5	9.69	32.081	24.75	5.62	0.502	0.060	89
1	10	9.65	32.122	24.79	5.01	0.447	0.115	80
1	19	9.34	32.941	25.48	4.36	0.389	0.174	69
1	29	9.39	33.055	25.56	3.73	0.333	0.229	59
1	49	9.07	33.444	25.91	3.38	0.302	0.263	53

CNAV OSHAWA CRUISE OS1 STATION 027 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	9.68	0.00	32.073	0.000	24.74	321.1	0.000	0.00	6.77	0.00	
10	9.65	0.00	32.122	0.000	24.79	317.1	0.033	0.02	5.01	0.00	
20	9.34	0.01	32.970	0.013	25.50	249.7	0.061	0.06	4.29	0.00	0.88
30	9.40	0.01	33.045	0.016	25.55	245.2	0.086	0.12	3.68	0.00	1.23

CNAV OSHAWA CRUISE OS1 STATION 028 OBSERVED VALUES

DATE 19/03/63 HR 08.5 LAT 44-44 N LONG 124-35 W SNDG 238 WEA 03 WIND VEL 20 DIR 18
BAROM 24. TEMP DRY 10.0 WET 10.0 RELHU 99 WTRCLR SECDI SEA 3 DIR 18 SWELL 4 DIR 22
CLOUD TYPE AMT 8 VIS 7 WIRE ANGLE(S) 0

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN AOU	OXYGEN SATN
1	0	9.84	31.368*	24.17	7.03*	0.628	-0.064	111
1	5	9.77	31.350	24.17	6.99	0.624	-0.059	110
1	10	9.76			6.97	0.623		
1	20	9.80	32.001	24.67	6.56	0.586	-0.025	104
1	30	9.92	32.423	24.98	6.46	0.577	-0.019	103
1	50	9.96	32.750	25.23	5.92	0.529	0.027	95
1	75	9.55	33.067	25.54	5.09	0.455	0.105	81
1	100	9.10	33.439	25.90	4.27	0.381	0.183	68
1	125	8.69	33.745	26.21	3.20	0.286	0.282	50
1	150	8.12	33.857	26.38	2.80	0.250	0.325	43
1	175	7.81	33.923	26.48	2.61	0.233	0.346	40

CNAV OSHAWA CRUISE OS1 STATION 028 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	9.84	0.00									
10	9.76	0.00	31.569	0.000	24.34	359.8			6.97	0.00	
20	9.80	0.00	32.001	0.000	24.67	328.6			6.56	0.00	
30	9.92	0.00	32.423	0.000	24.98	299.4			6.46	0.00	
50	9.96	0.00	32.750	0.000	25.23	276.2			5.92	0.00	
75	9.55	0.00	33.067	0.000	25.54	246.7			5.09	0.00	
100	9.10	0.00	33.439	0.000	25.90	212.7			4.27	0.00	
150	8.12	0.00	33.857	0.000	26.38	168.0			2.80	0.00	

CNAV OSHAWA CRUISE OS1 STATION 029 OBSERVED VALUES

DATE 19/03/63 HR 10.5 LAT 44-44 N LONG 124-56 W SNDG 640 WEA 02 WIND VEL 18 DIR 21
BAROM 25. TEMP DRY 10.0 WET 10.0 RELHU 99 WTRCLR SECDI SEA 3 DIR 18 SWELL 4 DIR 22
CLOUD TYPE AMT 8 VIS 6 WIRE ANGLE(S) 10,29

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN AOU	OXYGEN SATN
1	0	9.84	31.844	24.54	6.96	0.622	-0.061	111
1	5	9.84	31.844	24.54	6.99	0.624	-0.063	111
1	10	9.85	31.851	24.54	6.98	0.623	-0.063	111
1	20	9.73	32.011	24.69	6.78	0.606	-0.044	108
1	29	9.78	32.308	24.91	6.43	0.574	-0.014	103
1	49	9.90	33.042	25.46	5.58	0.498	0.057	90
1	74	9.81	33.256	25.64	5.22	0.466	0.090	84
1	99	9.28	33.515	25.93	4.14	0.370	0.192	66
1	123	8.78	33.653	26.12	3.38	0.302	0.266	53
2	146	8.67	33.774	26.23	3.02	0.270	0.299	47
1	148	8.43	33.825	26.31	2.92	0.261	0.311	46
2	169	8.12	33.883	26.40	2.79	0.249	0.326	43
2	256	6.94	33.997	26.66	2.14	0.191	0.400	32
2	436	5.22	34.109	26.97	0.93	0.083	0.533	13

CNAV OSHAWA CRUISE OS1 STATION 029 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	9.84	0.00	31.844	0.000	24.54	340.5	0.000	0.00	6.96	0.00	
10	9.85	0.00	31.851	0.000	24.54	340.3	0.035	0.02	6.98	0.00	
20	9.73	0.00	32.011	0.000	24.69	326.8	0.068	0.07	6.78	0.00	
30	9.79	0.00	32.349	0.005	24.94	302.8	0.100	0.15	6.38	0.00	0.99
50	9.90	0.00	33.058	0.005	25.47	252.5	0.156	0.37	5.57	0.01	0.95
75	9.79	0.00	33.267	0.001	25.66	235.8	0.218	0.77	5.18	0.01	0.94
100	9.26	0.00	33.522	0.001	25.94	209.0	0.274	1.27	4.10	0.00	0.94
150	8.50	0.07	33.812	0.012	26.29	177.0	0.371	2.49	2.94	0.02	0.88
200	7.68	0.00	33.938	0.006	26.51	156.6	0.455	3.99	2.57	0.01	1.42
250	7.02	0.00	33.993	0.002	26.65	144.1	0.531	5.74	2.19	0.00	0.90
300	6.42	0.01	34.010	0.020	26.74	135.6	0.601	7.72	1.79	0.03	7.48
400	5.47	0.01	34.055	0.030	26.89	121.6	0.731	12.36	1.10	0.04	12.44

CNAV OSHAWA CRUISE OS1 STATION 030 OBSERVED VALUES

DATE 19/03/63 HR 13.3 LAT 44-42 N LONG 125-18 W SNDG 2304 WEA 02 WIND VEL 20 DIR 22
BAROM 22. TEMP DRY 10.0 WET 8.9 RELHU 87 WTRCLR SECDI SEA 3 DIR 22 SWELL 4 DIR 27
CLOUD TYPE AMT 8 VIS 6 WIRE ANGLE(S) 20

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN AOU	OXYGEN SATN
1	0	10.44	32.784	25.18	6.48	0.579	-0.029	105
1	5	10.35	32.802	25.21	6.48	0.579	-0.027	105
1	9	10.35	32.788	25.19	6.49	0.580	-0.029	105
1	19	10.37	32.794	25.19	6.49	0.580	-0.029	105
1	28	10.37	32.784	25.18	6.40	0.572	-0.021	104
1	47	10.36	32.786	25.19	6.27	0.560	-0.009	102
1	70	9.20	33.188	25.69	5.29	0.472	0.091	84
1	94	8.80	33.536	26.03	3.96	0.354	0.214	62
1	117	8.53	33.770	26.25	3.24	0.289	0.281	51
1	141	8.00	33.871	26.41	2.90	0.259	0.318	45
1	164	7.46	33.918	26.52	2.81	0.251	0.333	43

CNAV OSHAWA CRUISE OS1 STATION 030 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	10.44	0.00	32.784	0.000	25.17	280.4	0.000	0.00	6.48	0.00	
10	10.35	0.00	32.788	0.001	25.19	278.9	0.029	0.01	6.49	0.00	1.00
20	10.37	0.00	32.793	0.000	25.19	279.0	0.057	0.06	6.48	0.00	0.85
30	10.39	0.01	32.776	0.004	25.17	280.8	0.085	0.13	6.40	0.01	0.96
50	10.22	0.04	32.828	0.009	25.24	274.6	0.141	0.36	6.18	0.01	0.85
75	9.08	0.02	33.268	0.001	25.77	224.6	0.204	0.76	5.00	0.02	0.77
100	8.74	0.01	33.608	0.001	26.09	194.7	0.257	1.23	3.73	0.01	0.71
150	7.78	0.00	33.890	0.001	26.46	160.7	0.346	2.35	2.85	0.00	4.70

CNAV OSHAWA CRUISE OS1 STATION 30A BIOLOGICAL DATA

DATE 19/03/63 LAT 44-44 N LONG 125-29 W

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	SAL
0	1.60		32.06	32.536
0			32.16	

MESSENGER TIME 0625 INCOMING SOLAR RADIATION - AM 190 PM 166

THE SECOND PRODUCTIVITY VALUE WAS INCUBATED AT 50 PERCENT LIGHT INTENSITY INSTEAD OF 100 PERCENT

CNAV OSHAWA CRUISE OS1 STATION 031 OBSERVED VALUES

DATE 19/03/63 HR 15.6 LAT 44-42 N LONG 125-42 W SNDG 2834 WEA 50 WIND VEL 25 DIR 20
BAROM 21. TEMP DRY 10.0 WET 10.0 RELHU 99 WTRCLR SECDI SEA 3 DIR 22 SWELL 3 DIR 27
CLOUD TYPE AMT 7 VIS 7 WIRE ANGLE(S) 10,22

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN ADU	OXYGEN SATN
1	0	10.01	32.598	25.10	6.56	0.586	-0.030	105
1	5	9.99	32.605	25.11	6.49	0.580	-0.024	104
1	10	10.01	32.610	25.11	6.49	0.580	-0.024	104
1	20	10.00	32.606	25.11	6.50	0.581	-0.025	104
1	29	10.01	32.601	25.10	6.57	0.587	-0.031	106
1	49	9.94	32.609	25.12	6.50	0.581	-0.024	104
1	74	10.03	33.095	25.48	5.69	0.508	0.046	92
1	99	9.38	33.505	25.91	4.41	0.394	0.166	70
1	123	8.78	33.758	26.20	3.29	0.294	0.273	52
1	148	8.30	33.836	26.34	2.99	0.267	0.306	47
2	164	8.09	33.839*	26.37	2.72	0.243	0.333	42
2	187	7.60	33.897	26.49	2.12	0.189	0.393	33
2	282	6.39	33.980	26.72	2.14	0.191	0.408	32
2	472	5.22	34.124	26.98	0.84	0.075	0.541	12
2	712	4.34	34.279	27.20	0.26	0.023	0.606	4
2	952	3.74	34.370	27.33	0.26	0.023	0.615	4
2	1434	2.72	34.502	27.53	0.64	0.057	0.597	9
2	1723	2.25	34.554	27.62	1.04	0.093	0.570	14

CNAV OSHAWA CRUISE OS1 STATION 031 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	10.01	0.00	32.598	0.000	25.10	287.3	0.000	0.00	6.56	0.00	
10	10.01	0.00	32.610	0.000	25.11	286.6	0.029	0.02	6.49	0.00	
20	10.00	0.00	32.606	0.000	25.11	286.9	0.058	0.06	6.50	0.00	
30	10.01	0.00	32.597	0.002	25.10	287.9	0.087	0.13	6.58	0.00	0.99
50	9.95	0.01	32.624	0.004	25.13	285.4	0.145	0.37	6.48	0.00	0.95
75	10.01	0.00	33.114	0.000	25.50	250.6	0.212	0.80	5.64	0.00	0.94
100	9.35	0.00	33.519	0.000	25.92	210.7	0.271	1.31	4.35	0.00	0.94
150	8.27	0.00	33.840	0.000	26.34	171.6	0.367	2.53	2.96	0.00	0.96
200	7.38	0.02	33.911	0.002	26.53	154.4	0.449	3.99	2.02	0.09	1.24
250	6.70	0.03	33.958	0.003	26.66	142.5	0.524	5.72	1.93	0.17	1.11
300	6.23	0.02	33.995	0.000	26.75	134.4	0.594	7.68	2.04	0.04	0.96
400	5.54	0.05	34.072	0.000	26.90	121.2	0.723	12.29	1.39	0.10	0.75
500	5.09	0.01	34.145	0.001	27.01	111.5	0.840	17.69	0.73	0.01	0.87
600	4.69	0.02	34.213	0.001	27.11	102.7	0.948	23.79	0.42	0.03	0.67
700	4.37	0.00	34.272	0.000	27.19	95.4	1.048	30.46	0.27	0.00	0.93
800	4.10	0.01	34.317	0.002	27.25	89.8	1.142	37.67	0.22	0.02	0.64
1000	3.63	0.00	34.386	0.000	27.36	80.9	1.315	53.58	0.28	0.00	0.95
1200	3.18	0.00	34.446	0.000	27.45	72.7	1.470	71.11	0.40	0.01	0.89
1500	2.60	0.00	34.515	0.000	27.56	62.7	1.676	99.53	0.72	0.00	0.95

CNAV OSHAWA CRUISE OS1 STATION 032 OBSERVED VALUES

DATE 19/03/63 HR 19.3 LAT 44-45 N LONG 126-01 W SNDG 2834 WEA 01 WIND VEL 20 DIR 22
BAROM 22. TEMP DRY 11.1 WET 11.1 RELHU 99 WTRCLR SECDI SEA 3 DIR 22 SWELL 3 DIR 27
CLOUD TYPE AMT 7 VIS 7 WIRE ANGLE(S) 0

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN AOU	OXYGEN SATN
1	0	10.30	32.626	25.07	6.52	0.582	-0.029	105
1	5	10.20	32.640	25.10	6.58	0.588	-0.034	106
1	10	10.21	32.616	25.08				
1	20	10.21	32.638	25.10	6.49	0.580	-0.026	105
1	30	10.19	32.704	25.15	6.37	0.569	-0.016	103
1	50	10.20	32.721	25.16	6.24	0.557	-0.004	101
1	75	9.82	33.055	25.49	5.45	0.487	0.070	87
1	100	9.00	33.553	26.01	3.93	0.351	0.214	62
1	125	8.61	33.798	26.26	3.08	0.275	0.294	48
1	150	8.34	33.877	26.36	2.80	0.250	0.322	44
1	175	7.85	33.964	26.50	2.63	0.235	0.344	41

CNAV OSHAWA CRUISE OS1 STATION 032 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	SAL
0	1.23		27.32	32.631
4	1.16		27.60	32.666
20	1.33		6.80	32.650
44	0.74		0.00	32.712
	49.49		466.58	- WATER COLUMN VALUES

MESSENGER TIME 1119 INCOMING SOLAR RADIATION - AM 190 PM 166

CNAV OSHAWA CRUISE OS1 STATION 032 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	10.30	0.00	32.626	0.000	25.07	289.9	0.000	0.00	6.52	0.00	
10	10.21	0.00	32.616	0.000	25.08	289.3	0.030	0.02	6.58	0.01	1.12
20	10.21	0.00	32.638	0.000	25.10	287.9	0.059	0.06	6.49	0.00	
30	10.19	0.00	32.704	0.000	25.15	282.9	0.087	0.13	6.37	0.00	
50	10.20	0.00	32.721	0.000	25.16	282.2	0.144	0.37	6.24	0.00	
75	9.82	0.00	33.055	0.000	25.49	251.9	0.212	0.79	5.45	0.00	
100	9.00	0.00	33.553	0.000	26.01	202.7	0.269	1.30	3.93	0.00	
150	8.34	0.00	33.877	0.000	26.36	169.8	0.363	2.48	2.80	0.00	

CNAV OSHAWA CRUISE OS1 STATION 033 OBSERVED VALUES

DATE 19/03/63 HR 22.7 LAT 44-44 N LONG 126-35 W SNDG 2743 WEA 03 WIND VEL 25 DIR 22
BAROM 20. TEMP DRY 11.1 WET 11.1 RELHU 99 WTRCLR SECDI SEA 2 DIR 22 SWELL 3 DIR 25
CLOUD TYPE 6 AMT 8 VIS 7 WIRE ANGLE(S) 0.27

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN AOU	OXYGEN SATN
1	0	10.35	32.650	25.08	6.61	0.590	-0.039	107
1	5	10.34	32.648	25.08	6.64	0.593	-0.041	108
1	10	10.31	32.653	25.09	6.64	0.593	-0.041	107
1	20	10.33	32.644	25.08	6.59	0.589	-0.037	107
1	30	10.31	32.664	25.10	6.62	0.591	-0.039	107
1	50	10.21	32.676	25.13	6.47	0.578	-0.025	104
1	75	10.02	32.741	25.21	6.45	0.576	-0.021	104
1	100	9.12	33.240	25.74	5.08	0.454	0.111	80
1	125	8.78	33.545	26.04	3.91	0.349	0.219	61
1	150	8.54	33.752	26.23	3.28	0.293	0.277	51
2	155	7.91	33.878	26.43	2.97	0.265	0.313	46
2	177	7.71	33.921	26.49	2.78	0.248	0.332	43
2	265	6.67	33.998	26.70	2.09	0.187	0.408	31
2	442	5.56	34.090	26.91	1.05	0.094	0.517	15
2	662	4.41	34.269	27.18	0.30	0.027	0.601	4
2	897	3.77	34.374	27.33	0.24	0.021	0.616	3
2	1380	2.69	34.514	27.55	0.61	0.054	0.601	8
2	1674	2.25	34.560	27.62	0.99	0.088	0.574	13
2	1969	1.95	34.590	27.67	1.44	0.129	0.539	19
2	2266	1.80	34.624	27.71	1.70	0.152	0.518	23

CNAV OSHAWA CRUISE OS1 STATION 033 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	10.35	0.00	32.650	0.000	25.08	288.9	0.000	0.00	6.61	0.00	
10	10.31	0.00	32.653	0.000	25.09	288.2	0.030	0.02	6.64	0.00	
20	10.33	0.00	32.644	0.000	25.08	289.4	0.059	0.06	6.59	0.00	
30	10.31	0.00	32.664	0.000	25.10	287.8	0.088	0.13	6.62	0.00	
50	10.21	0.00	32.676	0.000	25.13	285.7	0.146	0.37	6.47	0.00	
75	10.02	0.00	32.741	0.000	25.21	278.3	0.217	0.83	6.45	0.00	
100	9.12	0.00	33.240	0.000	25.74	227.8	0.280	1.39	5.08	0.00	
150	8.54	0.00	33.752	0.000	26.23	182.0	0.384	2.69	3.26	0.00	
200	7.44	0.02	33.949	0.004	26.55	152.4	0.468	4.18	2.59	0.00	1.34
250	6.85	0.02	33.991	0.003	26.67	142.0	0.542	5.89	2.20	0.00	0.89
300	6.39	0.03	34.018	0.003	26.75	134.7	0.612	7.86	1.85	0.00	0.91
400	5.76	0.03	34.070	0.004	26.87	124.0	0.742	12.53	1.26	0.00	0.76
500	5.22	0.01	34.137	0.005	26.99	113.5	0.862	18.05	0.79	0.00	0.75
600	4.69	0.01	34.219	0.005	27.11	102.2	0.971	24.18	0.45	0.00	0.71
700	4.28	0.01	34.290	0.001	27.21	93.1	1.070	30.75	0.26	0.01	0.82
800	3.99	0.02	34.338	0.003	27.28	87.1	1.161	37.76	0.21	0.02	0.60
1000	3.51	0.00	34.411	0.001	27.39	77.6	1.328	53.10	0.28	0.01	0.93
1200	3.05	0.00	34.472	0.001	27.48	69.2	1.476	69.86	0.41	0.01	0.88
1500	2.49	0.00	34.536	0.001	27.58	59.9	1.673	96.96	0.75	0.00	0.60
2000	1.93	0.00	34.593	0.000	27.67	51.3	1.955	147.40	1.48	0.00	1.10

CNAV OSHAWA CRUISE OS1 STATION 034 OBSERVED VALUES

DATE 20/03/63 HR 03.2 LAT 44-42 N LONG 127-12 W SNDG 2871 WEA 50 WIND VEL 25 DIR 20
BAROM 16. TEMP DRY 10.0 WET 10.0 RELHU 99 WTRCLR SECDI SEA 3 DIR 20 SWELL 4 DIR 30
CLOUD TYPE AMT 9 VIS 6 WIRE ANGLE(S) 13

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN AOU	OXYGEN SATN
1	0	10.00	32.590	25.09	6.71	0.599	-0.043	108
1	5	9.91	32.590	25.11	5.54	0.495	0.062	89
1	10	9.92	32.638	25.14	5.90	0.527	0.030	95
1	19	9.94	32.579	25.10	6.34	0.566	-0.009	102
1	29	9.84	32.614	25.14	6.16	0.550	0.008	99
1	49	9.83	32.649	25.17	6.30	0.563	-0.005	101
1	73	9.78	32.617	25.15	5.67	0.506	0.052	91
1	97	8.37	33.378	25.97	3.87	0.346	0.228	60
1	121	8.86	33.805	26.23	3.03	0.271	0.295	48
1	146	8.46	33.845	26.32	2.93	0.228	0.343	60
1	170	7.75	33.864	26.44	2.55	0.262	0.318	55

CNAV OSHAWA CRUISE OS1 STATION 034 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	10.00	0.00	32.590	0.000	25.09	287.7	0.000	0.00	6.71	0.00	
10	9.92	0.00	32.638	0.000	25.14	283.1	0.029	0.02	5.90	0.00	
20	9.93	0.00	32.580	0.002	25.10	287.7	0.058	0.06	6.33	0.01	0.88
30	9.84	0.00	32.617	0.000	25.14	283.7	0.087	0.13	6.17	0.01	0.98
50	9.84	0.01	32.641	0.006	25.16	282.4	0.144	0.37	6.29	0.00	0.95
75	9.65	0.04	32.672	0.014	25.21	277.8	0.214	0.82	5.52	0.03	0.89
100	8.40	0.05	33.451	0.001	26.02	201.4	0.275	1.35	3.72	0.00	0.84
150	8.35	0.00	33.840	0.003	26.33	172.7	0.369	2.54	2.91	0.01	5.52

CNAV OSHAWA CRUISE OS1 STATION 035 OBSERVED VALUES

DATE 20/03/63 HR 06.6 LAT 44-44 N LONG 127-25 W SNDG 2852 WEA 81 WIND VEL 24 DIR 20
BAROM 15. TEMP DRY 10.0 WET 10.0 RELHU 99 WTRCLR SECDI SEA 3 DIR 20 SWELL 3 DIR 27
CLOUD TYPE AMT 8 VIS 6 WIRE ANGLE(S) 13,27

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN ADU	OXYGEN SATN
1	0	10.19	32.593	25.06	6.49	0.580	-0.026	105
1	5	10.15	32.615	25.09	6.50	0.581	-0.026	105
1	10	10.17	32.623	25.09	6.58	0.588	-0.034	106
1	19	10.16	32.595	25.07	6.47	0.578	-0.024	104
1	29	10.14	32.593	25.07	6.45	0.576	-0.022	104
1	49	10.05	32.612	25.10	6.37	0.569	-0.014	102
1	73	10.06	32.598	25.09	6.37	0.569	-0.014	102
1	97	8.64	32.734	25.42	6.02	0.538	0.035	94
1	121	7.99	33.310	25.97	4.62	0.413	0.167	71
1	146	7.80	33.592	26.22	3.83	0.342	0.239	59
2	161	7.65	33.724	26.34	3.73	0.333	0.249	57
2	183	7.64	33.830	26.43	3.36	0.300	0.282	52
2	277	6.20	33.936	26.71	2.68	0.239	0.363	40
2	463	4.22	34.041	27.02	1.09	0.097	0.535	15
2	697	4.05	34.212	27.18	0.40	0.036	0.598	6
2	932	3.65	34.377	27.35	0.24	0.021	0.618	3
2	1402	2.69	34.507	27.54	0.61	0.054	0.601	8
2	1685	2.21	34.564	27.63	1.00	0.089	0.574	13

CNAV OSHAWA CRUISE OS1 STATION 035 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	10.19	0.00	32.593	0.000	25.06	290.5	0.000	0.00	6.49	0.00	
10	10.17	0.00	32.623	0.000	25.09	288.2	0.030	0.02	6.58	0.00	
20	10.16	0.00	32.594	0.000	25.07	290.4	0.059	0.06	6.47	0.00	0.88
30	10.14	0.00	32.594	0.000	25.07	290.2	0.088	0.14	6.45	0.00	0.98
50	10.06	0.01	32.610	0.001	25.10	288.2	0.146	0.37	6.37	0.00	0.95
75	9.95	0.03	32.598	0.004	25.11	287.8	0.219	0.84	6.37	0.01	0.89
100	8.53	0.01	32.802	0.013	25.49	251.4	0.287	1.44	5.86	0.03	0.84
150	7.76	0.00	33.631	0.001	26.26	179.7	0.395	2.79	3.80	0.01	0.66
200	7.45	0.06	33.871	0.013	26.49	158.4	0.481	4.31	3.19	0.04	1.32
250	6.71	0.09	33.936	0.018	26.64	144.3	0.557	6.07	2.80	0.05	1.07
300	5.88	0.01	33.952	0.003	26.76	133.1	0.627	8.03	2.47	0.02	0.94
400	4.73	0.02	34.012	0.006	26.94	116.1	0.752	12.51	1.60	0.05	0.74
500	4.11	0.06	34.067	0.001	27.05	105.9	0.865	17.67	0.91	0.02	0.83
600	3.98	0.11	34.139	0.002	27.13	99.9	0.969	23.53	0.57	0.04	0.68
700	4.05	0.00	34.214	0.000	27.18	95.9	1.067	30.14	0.40	0.00	0.98
800	3.89	0.01	34.289	0.002	27.25	89.5	1.161	37.36	0.28	0.01	0.61
1000	3.51	0.01	34.405	0.005	27.38	78.1	1.331	52.95	0.25	0.01	0.94
1200	3.10	0.02	34.470	0.009	27.47	70.0	1.481	69.86	0.37	0.02	0.88
1500	2.51	0.01	34.523	0.004	27.57	61.0	1.680	97.36	0.74	0.01	0.89

CNAV OSHAWA CRUISE OS1 STATION 036 OBSERVED VALUES

DATE 20/03/63 HR 14.4 LAT 44-42 N LONG 128-54 W SNDG 2779 WEA 02 WIND VEL 42 DIR 19
BAROM 04. TEMP DRY . WET . RELHU WTRCLR SECDI SEA 4 DIR 19 SWELL 5 DIR 21
CLOUD TYPE AMT VIS WIRE ANGLE(S) 23

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN AOU	OXYGEN SATN
1	0	10.27	32.636	25.08	6.34	0.566	-0.014	102
1	5	10.27	32.639	25.09	6.34	0.566	-0.014	102
1	9	10.29	32.635	25.08	6.40	0.572	-0.019	103
1	18	10.28	32.635	25.08	6.35	0.567	-0.015	103
1	28	10.28	32.641	25.09				
1	46	10.28	32.678	25.12	6.34	0.566	-0.014	103
1	69	10.22	32.634	25.09	6.29	0.562	-0.009	102
1	92	10.19	32.634	25.10	6.28	0.561	-0.007	101
1	115	8.19	33.040	25.73	5.42	0.484	0.094	84
1	138	7.85	33.420	26.08	4.55	0.406	0.175	70

CNAV OSHAWA CRUISE OS1 STATION 036 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	SAL
0	0.30		4.42	32.630
0			3.36	

MESSENGER TIME 0635 INCOMING SOLAR RADIATION - AM 48 PM 40

THE SECOND PRODUCTIVITY VALUE WAS INCUBATED AT 50 PERCENT LIGHT INTENSITY INSTEAD OF 100 PERCENT

CNAV OSHAWA CRUISE OS1 STATION 036

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	INTERPOLATED AND COMPUTED VALUES SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	10.27	0.00	32.636	0.000	25.08	288.6	0.000	0.00	6.34	0.00	
10	10.29	0.00	32.635	0.000	25.08	289.3	0.030	0.02	6.40	0.00	0.99
20	10.28	0.00	32.636	0.000	25.08	289.2	0.059	0.06	6.35	0.00	1.04
30	10.28	0.00	32.646	0.002	25.09	288.7	0.088	0.14	6.34	0.01	1.11
50	10.27	0.00	32.672	0.004	25.11	286.9	0.146	0.37	6.33	0.00	0.82
75	10.31	0.06	32.612	0.012	25.06	292.4	0.219	0.84	6.33	0.03	0.72
100	9.51	0.14	32.754	0.016	25.30	269.8	0.290	1.48	6.03	0.03	0.67

CNAV OSHAWA CRUISE OS1 STATION 037 OBSERVED VALUES

DATE 20/03/63 HR 20.0 LAT 45-11 N LONG 129-34 W SNDG 2697 WEA 18 WIND VEL 15 DIR 33
BAROM 06. TEMP DRY 7.8 WET . RELHU WTRCLR SECDI SEA 2 DIR 32 SWELL 4 DIR
CLOUD TYPE AMT 8 VIS 5 WIRE ANGLE(S) 10,13

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN AOU	OXYGEN SATN
1	0	10.16	32.592	25.07	6.42	0.573	-0.019	103
1	5	10.17	32.601	25.07	6.36	0.568	-0.014	103
1	10	10.17	32.610	25.08				
1	20	10.18	32.628	25.09	6.38	0.570	-0.016	103
1	29	10.17	32.629	25.10	6.37	0.569	-0.015	103
1	49	10.18	32.632	25.10	6.32	0.564	-0.011	102
1	74	10.25	32.655	25.10	6.28	0.561	-0.008	101
1	99	8.89	32.751	25.40	6.01	0.537	0.033	94
1	123	7.24	33.076	25.89	5.62	0.502	0.089	85
1	148	7.54	33.606	26.27	4.22	0.377	0.207	64
2	169	7.44	33.728	26.38	3.96	0.354	0.232	60
2	193	7.15	33.875	26.53	3.59	0.321	0.268	54
2	290	6.02	33.939	26.73	2.69	0.240	0.364	40
2	486	4.52	34.100	27.04	1.04	0.093	0.534	15
2	730	3.99	34.279	27.24	0.26	0.023	0.611	4
2	978	3.45	34.401	27.39	0.26	0.023	0.620	4
2	1476	2.48	34.530	27.58	0.76	0.068	0.591	10
2	1776	2.07	34.582	27.65	1.17	0.104	0.561	16
2	2177	1.84	34.612	27.70	1.63	0.146	0.524	22
2	2576	1.79						

CNAV OSHAWA CRUISE OS1 STATION 037 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	SAL
0	0.18		3.06	32.588
7	0.18		1.78	32.604
24	0.15		0.30	32.595
51	0.20		0.00	32.632
	8.82		38.68	- WATER COLUMN VALUES

MESSENGER TIME 1202 INCOMING SOLAR RADIATION - AM 48 PM 40

CNAV OSHAWA CRUISE OS1 STATION 037 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	10.16	0.00	32.592	0.000	25.07	290.1	0.000	0.00	6.42	0.00	
10	10.17	0.00	32.610	0.000	25.08	289.2	0.030	0.02	6.35	0.01	1.13
20	10.18	0.00	32.628	0.000	25.09	288.2	0.059	0.06	6.38	0.00	
30	10.17	0.00	32.629	0.000	25.10	288.1	0.088	0.13	6.37	0.00	0.99
50	10.20	0.01	32.632	0.000	25.09	288.7	0.146	0.37	6.32	0.00	0.95
75	10.21	0.01	32.656	0.001	25.11	287.7	0.218	0.84	6.27	0.00	0.94
100	8.81	0.01	32.760	0.000	25.42	258.6	0.287	1.45	6.00	0.01	0.94
150	7.54	0.00	33.624	0.004	26.28	177.2	0.397	2.81	4.18	0.01	0.86
200	7.06	0.00	33.894	0.010	26.56	151.4	0.480	4.28	3.51	0.01	1.12
250	6.47	0.01	33.963	0.035	26.70	139.0	0.553	5.97	3.00	0.04	1.20
300	5.92	0.00	33.947	0.000	26.75	133.9	0.622	7.91	2.59	0.01	0.98
400	5.05	0.00	34.028	0.002	26.92	118.6	0.749	12.45	1.69	0.03	0.76
500	4.47	0.01	34.111	0.000	27.05	106.6	0.863	17.67	0.97	0.01	0.93
600	4.18	0.06	34.189	0.001	27.14	98.4	0.966	23.51	0.54	0.03	0.67
700	4.02	0.03	34.259	0.001	27.22	92.2	1.063	29.93	0.30	0.01	0.84
800	3.84	0.00	34.318	0.001	27.28	86.6	1.153	36.90	0.21	0.02	0.70
1000	3.40	0.00	34.409	0.001	27.40	76.5	1.318	52.08	0.27	0.00	0.98
1200	2.99	0.01	34.471	0.004	27.49	68.5	1.465	68.64	0.43	0.02	0.89
1500	2.44	0.00	34.535	0.000	27.59	59.3	1.660	95.48	0.79	0.00	0.87
2000	1.91	0.01	34.605	0.000	27.68	50.2	1.938	145.09	1.45	0.00	2.87
2500	1.79	0.00									7.54

CNAV OSHAWA CRUISE OS1 STATION 038 OBSERVED VALUES

DATE 21/03/63 HR 05.4 LAT 46-14 N LONG 128-46 W SNDG 2560 WEA 62 WIND VEL 28 DIR 03
BAROM 05. TEMP DRY 7.8 WET 7.8 RELHU 99 WTRCLR SECDI SEA 4 DIR 02 SWELL 2 DIR 36
CLOUD TYPE AMT 8 VIS 6 WIRE ANGLE(S) 21,32

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN AOU	OXYGEN SATN
1	0	9.61	32.521	25.10	6.49	0.580	-0.018	103
1	5	9.60	32.514	25.10	6.49	0.580	-0.018	103
1	9	9.63	32.530	25.11	6.47	0.578	-0.017	103
1	19	9.67	32.538	25.11	6.51	0.581	-0.021	104
1	28	9.66	32.566	25.13	6.49	0.580	-0.019	103
1	47	9.53	32.544	25.14	6.52	0.582	-0.020	104
1	70	9.45	32.533	25.14	6.49	0.580	-0.017	103
1	93	9.36	32.555	25.17	6.42	0.573	-0.009	102
1	117	7.35	32.955	25.78	5.84	0.522	0.068	88
1	140	6.71	33.279	26.13	5.41	0.483	0.114	81
2	152	6.80	33.286	26.12	5.34	0.477	0.119	80
2	173	6.80	33.504	26.29	4.91	0.439	0.157	74
2	259	6.71	33.938	26.64	2.77	0.247	0.347	42
2	439	5.86	34.060	26.85	1.04	0.093	0.514	15
2	665	4.26	34.214	27.16	0.34	0.030	0.600	5
2	894	3.67	34.340	27.32	0.24	0.021	0.618	3
2	1352	2.66	34.483	27.52	0.58	0.052	0.604	8
2	1633	2.26	34.564	27.62	0.90	0.080	0.582	12

CNAV OSHAWA CRUISE OS1 STATION 038 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	9.61	0.00	32.521	0.000	25.10	286.8	0.000	0.00	6.49	0.00	
10	9.64	0.00	32.531	0.001	25.11	286.6	0.029	0.02	6.47	0.00	1.00
20	9.67	0.00	32.541	0.001	25.11	286.6	0.058	0.06	6.51	0.00	0.85
30	9.65	0.00	32.566	0.002	25.13	284.6	0.087	0.13	6.49	0.00	0.96
50	9.52	0.00	32.541	0.000	25.13	284.8	0.144	0.37	6.52	0.00	0.85
75	9.52	0.05	32.521	0.009	25.12	286.6	0.216	0.83	6.50	0.01	0.75
100	8.80	0.11	32.655	0.015	25.34	266.4	0.286	1.45	6.27	0.02	0.71
150	6.78	0.01	33.286	0.005	26.12	192.1	0.402	2.89	5.35	0.01	0.75
200	6.79	0.00	33.693	0.018	26.44	162.7	0.491	4.48	4.23	0.05	1.40
250	6.73	0.00	33.916	0.008	26.62	146.0	0.569	6.27	2.99	0.02	0.88
300	6.57	0.02	34.013	0.031	26.72	137.5	0.640	8.28	2.17	0.08	0.91
400	6.10	0.01	34.079	0.030	26.83	127.7	0.774	13.07	1.21	0.08	0.77
500	5.41	0.05	34.103	0.001	26.94	118.4	0.898	18.79	0.74	0.03	0.75
600	4.70	0.05	34.171	0.001	27.07	105.8	1.011	25.16	0.43	0.04	0.71
700	4.13	0.02	34.235	0.000	27.19	95.4	1.113	31.93	0.30	0.01	0.82
800	3.85	0.04	34.292	0.000	27.26	88.7	1.206	39.10	0.23	0.02	0.59
1000	3.41	0.01	34.380	0.004	27.37	78.8	1.376	54.69	0.28	0.01	0.92
1200	2.96	0.01	34.444	0.005	27.47	70.3	1.527	71.70	0.41	0.02	0.87
1500	2.42	0.00	34.522	0.003	27.58	60.1	1.725	99.04	0.75	0.01	0.77

CNAV OSHAWA CRUISE OS1 STATION 039 OBSERVED VALUES

DATE 21/03/63 HR 12.3 LAT 46-14 N LONG 127-37 W SNDG 2743 WEA 62 WIND VEL 35 DIR 12
BAROM 97. TEMP DRY . WET . RELHU WTRCLR SECDI SEA 4 DIR 12 SWELL 4 DIR 14
CLOUD TYPE AMT 8 VIS 6 WIRE ANGLE(S) 23.50

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN AOU	OXYGEN SATN
1	0	9.47	32.532	25.14	6.53	0.583	-0.020	104
1	5	9.49	32.515	25.12	6.54	0.584	-0.021	104
1	9	9.47	32.510	25.12	6.65	0.594	-0.031	105
1	18	9.51	32.532	25.13	6.51	0.581	-0.019	103
1	28	9.51	32.538	25.13	6.56	0.586	-0.023	104
1	46	9.42	32.529	25.14	6.51	0.581	-0.018	103
1	69	9.28	32.522	25.16	6.51	0.581	-0.016	103
1	92	9.07	32.483	25.32	6.09	0.544	0.024	96
1	115	8.12	33.301	25.94	4.46	0.398	0.179	69
1	138	7.63	33.670	26.30	3.75	0.335	0.248	57
2	402	5.56	33.992	26.83	1.78	0.159	0.452	26
2	617	4.59	34.145	27.07	0.56	0.050	0.576	8
2	834	4.09	34.294	27.24	0.26	0.023	0.610	4
2	1270	3.07	34.477	27.48	0.47	0.042	0.607	6
2	1533	2.51	34.533	27.58	0.74	0.066	0.592	10

CNAV OSHAWA CRUISE OS1 STATION 039 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	9.47	0.00	32.532	0.000	25.14	283.8	0.000	0.00	6.53	0.00	
10	9.47	0.00	32.512	0.001	25.12	285.5	0.029	0.02	6.64	0.01	0.97
20	9.51	0.00	32.534	0.000	25.13	284.6	0.058	0.06	6.51	0.01	0.78
30	9.50	0.00	32.538	0.000	25.13	284.4	0.087	0.13	6.56	0.00	0.93
50	9.40	0.00	32.522	0.004	25.14	284.4	0.144	0.37	6.52	0.01	0.82
75	9.26	0.02	32.534	0.009	25.17	281.8	0.215	0.83	6.48	0.03	0.72
100	8.76	0.05	32.886	0.027	25.52	248.5	0.282	1.42	5.54	0.08	0.67
150	7.45	0.04	33.764	0.051	26.40	165.5	0.386	2.71	3.53	0.08	1.48
200	6.81	0.17	33.785*		26.51	153.2	0.466	4.12	3.20*		
250	6.29	0.23	33.840*		26.62	142.7	0.541	5.81	2.82*		
300	5.91	0.22	33.890*		26.71	134.2	0.612	7.75	2.46*		
400	5.56	0.01	34.003	0.009	26.84	126.5	0.744	12.39	1.77	0.01	0.99
500	5.05	0.01	34.068	0.004	26.95	116.6	0.866	18.04	1.15	0.02	0.62
600	4.65	0.00	34.135	0.001	27.05	107.8	0.980	24.43	0.63	0.01	0.89
700	4.37	0.02	34.205	0.001	27.14	100.4	1.085	31.44	0.37	0.03	0.64
800	4.15	0.01	34.272	0.001	27.21	93.7	1.183	38.99	0.27	0.01	0.75
1000	3.70	0.01	34.379	0.002	27.35	82.1	1.361	55.35	0.26	0.03	0.90
1200	3.23	0.00	34.457	0.001	27.45	72.5	1.518	72.99	0.39	0.02	0.90
1500	2.58	0.00	34.528	0.000	27.57	61.4	1.721	101.06	0.71	0.00	15.15

MACHINE-INTERPOLATED VALUES OF SALINITY AND OXYGEN AT 200, 250, AND 300 METERS WERE UNREASONABLE BECAUSE OF POOR OBSERVED SPACING.

CNAV OSHAWA CRUISE OS1 STATION 040 OBSERVED VALUES

DATE 22/03/63 HR 06.3 LAT 46-14 N LONG 126-28 W SNDG WEA 01 WIND VEL 10 DIR 27
BAROM 12. TEMP DRY 7.8 WET 7.8 RELHU 99 WTRCLR SECDI SEA 2 DIR 27 SWELL 3 DIR 27
CLOUD TYPE AMT 1 VIS 7 WIRE ANGLE(S) 10

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN AOU	OXYGEN SATN
1	0	9.37	32.482	25.11	6.49	0.580	-0.015	103
1	5	9.35	32.480	25.11	6.61	0.590	-0.026	105
1	10	9.32	32.482	25.12	6.60	0.589	-0.024	104
1	20	9.35	32.487	25.12	6.56	0.586	-0.021	104
1	30	9.35	32.486	25.12	6.56	0.586	-0.021	104
1	49	9.36	32.486	25.12	6.54	0.584	-0.020	103
1	74	9.23	32.531	25.17	6.42	0.573	-0.007	101
1	99	8.56	33.321	25.89	4.24	0.379	0.193	66
1	124	8.09	33.651	26.22	3.62	0.323	0.253	56
1	149	7.91	33.798	26.36	3.21	0.287	0.292	50
1	174	7.54	33.882	26.48	2.93	0.262	0.322	45

CNAV OSHAWA CRUISE OS1 STATION 040 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	9.37	0.00	32.482	0.000	25.11	286.0	0.000	0.00	6.49	0.00	
10	9.32	0.00	32.482	0.000	25.12	285.4	0.029	0.02	6.60	0.00	
20	9.35	0.00	32.487	0.000	25.12	285.7	0.058	0.06	6.56	0.00	
30	9.35	0.00	32.486	0.000	25.12	285.9	0.087	0.13	6.56	0.00	
50	9.36	0.00	32.480	0.004	25.11	286.9	0.145	0.37	6.56	0.01	0.95
75	9.21	0.00	32.560	0.008	25.20	279.0	0.216	0.83	6.34	0.02	0.94
100	8.54	0.00	33.340	0.002	25.91	211.6	0.278	1.37	4.20	0.01	0.94
150	7.90	0.00	33.802	0.001	26.37	169.0	0.374	2.58	3.20	0.00	1.04

CNAV OSHAWA CRUISE OS1 STATION 041 OBSERVED VALUES

DATE 22/03/63 HR 09.3 LAT 46-14 N LONG 125-54 W SNDG 2743 WEA 02 WIND VEL 3 DIR 36
BAROM 13. TEMP DRY 8.9 WET 8.9 RELHU 99 WTRCLR SECDI SEA 2 DIR 27 SWELL 3 DIR 27
CLOUD TYPE AMT 1 VIS 7 WIRE ANGLE(S) 0,15,15

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN AOU	OXYGEN SATN
1	0	9.44	32.428	25.06	6.53	0.583	-0.019	103
1	5	9.46	32.407	25.04	6.48	0.579	-0.015	103
1	10	9.47	32.402	25.03	6.56	0.586	-0.022	104
1	20	9.50	32.406	25.03	6.53	0.583	-0.020	104
1	30	9.49	32.408	25.04	6.50	0.581	-0.017	103
1	50	9.46	32.422	25.05	6.53	0.583	-0.020	103
1	75	9.52	32.536	25.13	6.42	0.573	-0.011	102
1	100	8.60	33.032	25.66	5.01	0.447	0.125	78
1	125	8.22	33.334	25.96	4.11	0.367	0.209	64
1	150	8.07	33.546	26.14	3.54	0.316	0.261	55
2	170	7.91	33.784	26.35	2.72	0.243	0.336	42
2	194	7.35	33.924	26.54	2.12	0.189	0.396	32
2	290	6.14	34.023	26.79	1.58	0.141	0.461	23
2	483	4.91	34.135	27.02	0.70	0.063	0.558	10
4	725	4.13	34.292	27.23	0.28	0.025	0.607	4
4	967	3.57	34.443	27.41	0.30	0.027	0.614	4
4	1450	2.58	34.509	27.55	0.67	0.060	0.597	9
4	1741	2.16	34.610	27.67	1.08	0.096	0.567	15

CNAV OSHAWA CRUISE OS1 STATION 041 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	9.44	0.00	32.428	0.000	25.06	291.0	0.000	0.00	6.53	0.00	
10	9.47	0.00	32.402	0.000	25.03	293.6	0.030	0.02	6.56	0.00	
20	9.50	0.00	32.406	0.000	25.03	294.0	0.060	0.06	6.53	0.00	
30	9.49	0.00	32.408	0.000	25.04	293.8	0.089	0.14	6.50	0.00	
50	9.46	0.00	32.422	0.000	25.05	292.7	0.148	0.38	6.53	0.00	
75	9.52	0.00	32.536	0.000	25.13	285.6	0.221	0.85	6.42	0.00	
100	8.60	0.00	33.032	0.000	25.66	235.4	0.287	1.43	5.01	0.00	
150	8.07	0.00	33.546	0.000	26.14	190.4	0.394	2.78	3.54	0.00	
200	7.24	0.01	33.941	0.007	26.57	150.3	0.480	4.29	2.04	0.03	1.10
250	6.52	0.05	34.028	0.029	26.74	134.9	0.552	5.95	1.62	0.12	1.19
300	6.05	0.01	34.030	0.001	26.80	129.4	0.618	7.83	1.53	0.00	0.98
400	5.31	0.04	34.093	0.005	26.94	116.7	0.743	12.26	1.03	0.01	0.76
500	4.84	0.01	34.146	0.000	27.04	108.3	0.856	17.49	0.65	0.00	0.92
600	4.47	0.03	34.210	0.001	27.13	100.2	0.961	23.43	0.42	0.01	0.67
700	4.19	0.01	34.275	0.000	27.21	93.0	1.059	29.94	0.30	0.00	0.86
800	3.94	0.01	34.343	0.003	27.29	86.1	1.150	36.90	0.26	0.01	0.68
1000	3.49	0.00	34.450	0.005	27.42	74.6	1.312	51.84	0.31	0.00	0.96
1200	3.06	0.01	34.486	0.018	27.49	68.3	1.457	68.16	0.43	0.00	0.89
1500	2.50	0.00	34.517	0.004	27.57	61.3	1.654	95.43	0.73	0.00	0.97

CNAV OSHAWA CRUISE OS1 STATION 042 OBSERVED VALUES

DATE 22/03/63 HR 13.6 LAT 46-12 N LONG 125-30 W SNDG 2195 WEA 02 WIND VEL 0 DIR 99
BAROM 12. TEMP DRY 6.7 WET 4.4 RELHU 69 WTRCLR SECDI SEA 2 DIR 25 SWELL 2 DIR 27
CLOUD TYPE AMT 3 VIS 7 WIRE ANGLE(S) 0

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN AOU	OXYGEN SATN
1	0	9.52	32.381	25.01	6.48	0.579	-0.016	103
1	5	9.42	32.360	25.01	6.53	0.583	-0.019	103
1	10	9.48	32.365	25.00	6.50	0.581	-0.017	103
1	20	9.50	32.360	25.00	6.51	0.581	-0.018	103
1	30	9.53	32.359	24.99	6.53	0.583	-0.020	104
1	50	9.57	32.390	25.01	6.53	0.583	-0.021	104
1	75	9.42	32.545	25.15	6.23	0.556	0.007	99
1	100	8.53	33.319	25.90	4.71	0.421	0.151	74
1	125	8.20	33.660	26.21	3.35	0.299	0.276	52
1	150	7.88	33.803	26.37	2.93	0.262	0.317	45
1	175	7.55	33.900	26.50	2.74	0.245	0.338	42

CNAV OSHAWA CRUISE OS1 STATION 042 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	9.52	0.00	32.381	0.000	25.01	295.8	0.000	0.00	6.48	0.00	
10	9.48	0.00	32.365	0.000	25.00	296.5	0.030	0.02	6.50	0.00	
20	9.50	0.00	32.360	0.000	25.00	297.4	0.060	0.06	6.51	0.00	
30	9.53	0.00	32.359	0.000	24.99	298.1	0.090	0.14	6.53	0.00	
50	9.57	0.00	32.390	0.000	25.01	296.8	0.150	0.38	6.53	0.00	
75	9.42	0.00	32.545	0.000	25.15	283.4	0.223	0.85	6.23	0.00	
100	8.53	0.00	33.319	0.000	25.90	213.1	0.286	1.40	4.71	0.00	
150	7.88	0.00	33.803	0.000	26.37	168.6	0.382	2.61	2.93	0.00	

CNAV OSHAWA CRUISE OS1 STATION 42A BIOLOGICAL DATA

DATE 22/03/63 LAT 45-14 N LONG 125-24 W

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	SAL
0	1.07		19.12	32.295
0			19.62	

MESSENGER TIME 0630 INCOMING SOLAR RADIATION - AM 155 PM 163

THE SECOND PRODUCTIVITY VALUE WAS INCUBATED AT 50 PERCENT LIGHT INTENSITY INSTEAD OF 100 PERCENT

CNAV OSHAWA CRUISE OS1 STATION 043 OBSERVED VALUES

DATE 22/03/63 HR 15.8 LAT 46-12 N LONG 125-06 W SNDG 1518 WEA 03 WIND VEL 10 DIR 06
BAROM 11. TEMP DRY 7.8 WET 6.1 RELHU 78 WTRCLR SECDI SEA 1 DIR 06 SWELL 2 DIR 27
CLOUD TYPE AMT 7 VIS 7 WIRE ANGLE(S) 0, 4

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN ADU	OXYGEN SATN
1	0	9.46	32.174	24.86	6.57	0.587	-0.022	104
1	5	9.49	32.172	24.85	6.63	0.592	-0.028	105
1	10	9.56	32.164	24.83	6.61	0.590	-0.027	105
1	20	9.55	32.165	24.84	6.58	0.588	-0.024	104
1	30	9.54	32.172	24.84	6.61	0.590	-0.027	105
1	50	9.56	32.189	24.85	6.60	0.589	-0.026	105
1	75	8.96	32.776	25.41	5.58	0.498	0.070	88
1	100	8.08	33.336	25.98	4.30	0.384	0.194	66
1	125	7.88	33.561	26.18	3.82	0.341	0.239	59
1	150	7.49	33.814	26.44	3.28	0.293	0.291	50
2	173	7.41	33.880	26.50	3.06	0.273	0.312	47
2	197	7.03	33.929	26.59	2.85	0.255	0.336	43
2	296	6.11	33.998	26.77	1.90	0.170	0.433	28
2	495	5.00	34.131	27.01	0.73	0.065	0.554	11
2	744	4.24	34.307	27.23	0.31	0.028	0.603	4
2	994	3.55	34.438	27.41	0.30	0.027	0.614	4
2	1394	2.82	34.504	27.53	0.65	0.058	0.595	9

CNAV OSHAWA CRUISE OS1 STATION 043 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	9.46	0.00	32.174	0.000	24.86	310.2	0.000	0.00	6.57	0.00	
10	9.56	0.00	32.164	0.000	24.83	312.6	0.032	0.02	6.61	0.00	
20	9.55	0.00	32.165	0.000	24.84	312.6	0.063	0.07	6.58	0.00	
30	9.54	0.00	32.172	0.000	24.84	312.1	0.095	0.15	6.61	0.00	
50	9.56	0.00	32.189	0.000	24.85	311.5	0.158	0.40	6.60	0.00	
75	8.96	0.00	32.776	0.000	25.41	259.3	0.230	0.86	5.58	0.00	
100	8.08	0.00	33.336	0.000	25.98	205.3	0.288	1.37	4.30	0.00	
150	7.49	0.00	33.814	0.000	26.44	162.4	0.381	2.54	3.28	0.00	
200	6.99	0.00	33.933	0.001	26.60	147.5	0.459	3.93	2.82	0.00	1.05
250	6.46	0.03	33.979	0.009	26.71	137.7	0.531	5.59	2.33	0.02	1.29
300	6.08	0.00	34.001	0.000	26.78	132.0	0.599	7.50	1.87	0.00	0.99
400	5.44	0.02	34.068	0.001	26.91	120.3	0.726	12.05	1.18	0.01	0.77
500	4.98	0.00	34.135	0.000	27.01	110.8	0.843	17.42	0.71	0.00	0.98
600	4.63	0.03	34.207	0.002	27.11	102.3	0.950	23.49	0.46	0.03	0.69
700	4.35	0.02	34.277	0.001	27.20	94.8	1.050	30.13	0.33	0.02	0.79
800	4.07	0.00	34.341	0.001	27.28	87.7	1.142	37.23	0.28	0.01	0.75
1000	3.54	0.00	34.440	0.000	27.41	75.8	1.308	52.43	0.30	0.00	1.04
1200	3.10	0.01	34.498	0.003	27.50	67.9	1.453	68.84	0.46	0.03	2.15

CNAV OSHAWA CRUISE OS1 STATION 044 OBSERVED VALUES

DATE 22/03/63 HR 19.1 LAT 46-14 N LONG 124-45 W SNDG 969 WEA 02 WIND VEL 17 DIR 36
BAROM 11. TEMP DRY 9.4 WET 7.8 RELHU 81 WTRCLR SECDI SEA 2 DIR 36 SWELL 2 DIR 27
CLOUD TYPE AMT 7 VIS 7 WIRE ANGLE(S) 11,31

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN ACU	OXYGEN SATN
1	0	9.55	32.005	24.71	6.66	0.595	-0.031	105
1	5	9.55	32.007	24.71	6.73	0.601	-0.037	107
1	10	9.56	32.013	24.72	6.69	0.598	-0.034	106
1	20	9.57	32.076	24.76	6.66	0.595	-0.031	106
1	29	9.59	32.048	24.74	6.74	0.602	-0.039	107
1	49	9.57	32.466	25.07	6.18	0.552	0.010	98
1	74	9.17	33.021	25.56	4.93	0.440	0.125	78
1	98	8.58	33.613	26.12	3.52	0.314	0.256	55
1	123	8.26	33.738	26.27	3.14	0.280	0.294	49
1	147	7.69	33.886*	26.47	3.14	0.280	0.302	48
2	154	7.64	33.822	26.42	3.18	0.284	0.298	49
2	175	7.42	33.882	26.50	3.03	0.271	0.314	46
2	263	6.49	33.989	26.71	2.20	0.196	0.401	33
2	440	5.43	34.089	26.93	1.04	0.093	0.520	15
2	663	4.46	34.150*	27.08	0.39	0.035	0.593	6
2	841	4.02	34.404	27.33	0.26	0.023	0.610	4

CNAV OSHAWA CRUISE OS1 STATION 044 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	SAL
0	1.27		30.06	31.990
6	1.36		27.40	31.993
16	1.46		5.56	32.000
31	1.64		0.20	32.044
	45.24		380.50	- WATER COLUMN VALUES

MESSENGER TIME 1109 INCOMING SOLAR RADIATION - AM 155 PM 163

CNAV OSHAWA CRUISE OS1 STATION 044 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	9.55	0.00	32.005	0.000	24.71	324.1	0.000	0.00	6.66	0.00	
10	9.56	0.00	32.013	0.000	24.72	323.8	0.033	0.02	6.69	0.00	
20	9.57	0.00	32.076	0.000	24.76	319.5	0.066	0.07	6.66	0.00	
30	9.59	0.00	32.061	0.005	24.75	321.2	0.098	0.15	6.73	0.00	0.99
50	9.56	0.00	32.487	0.000	25.09	289.4	0.159	0.40	6.14	0.00	0.95
75	9.14	0.00	33.050	0.003	25.59	241.8	0.226	0.82	4.86	0.01	0.94
100	8.55	0.01	33.633	0.006	26.14	190.1	0.281	1.30	3.46	0.01	0.90
150	7.67	0.02	33.813	0.002	26.41	164.9	0.370	2.43	3.16	0.02	0.88
200	7.14	0.01	33.926	0.007	26.58	150.0	0.449	3.85	2.80	0.02	1.41
250	6.62	0.01	33.982	0.004	26.69	139.7	0.522	5.53	2.33	0.01	0.89
300	6.21	0.02	34.015	0.005	26.77	132.6	0.591	7.47	1.91	0.00	0.92
400	5.61	0.02	34.072	0.005	26.89	122.0	0.720	12.06	1.25	0.00	0.76
500	5.13	0.00	34.108	0.014	26.98	114.6	0.839	17.57	0.79	0.01	2.59
600	4.69	0.00	34.145	0.037	27.05	107.7	0.951	23.90	0.50	0.01	7.40
700	4.34	0.00	34.211	0.046	27.14	99.6	1.056	30.88	0.34	0.01	8.74
800	4.09	0.00	34.332	0.023	27.27	88.6	1.151	38.19	0.27	0.01	2.46

CNAV OSHAWA CRUISE OS1 STATION 045 OBSERVED VALUES

COLUMBIA RIVER ENTRANCE

DATE 22/03/63 HR 22.0 LAT 46-14 N LONG 124-24 W SNDG 137 WEA 02 WIND VEL 25 DIR 35
BAROM 08. TEMP DRY 10.6 WET 8.3 RELHU 73 WTRCLR SECDI SEA 2 DIR 36 SWELL 2 DIR 27
CLOUD TYPE 6 AMT 7 VIS 7 WIRE ANGLE(S) 26

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN ADU	OXYGEN SATN
1	0	9.38	31.730	24.52	6.66	0.595	-0.027	105
1	5	9.38	31.729	24.52	6.66	0.595	-0.027	105
1	9	9.40	31.726	24.52	6.67	0.596	-0.029	105
1	18	9.38	31.747	24.54	6.69	0.598	-0.030	105
1	27	9.35	31.834	24.61	6.65	0.594	-0.027	105
1	45	8.53	32.181	25.01	6.14	0.548	0.028	95
1	68	8.99	32.739	25.37	4.98	0.445	0.124	78
1	90	8.57	33.358	25.92	3.85	0.344	0.228	60
1	135	7.38	33.926	26.54	2.26	0.202	0.383	34

CNAV OSHAWA CRUISE OS1 STATION 045 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	9.38	0.00	31.730	0.000	24.52	341.9	0.000	0.00	6.66	0.00	
10	9.40	0.00	31.726	0.000	24.52	342.7	0.035	0.02	6.67	0.00	0.97
20	9.38	0.01	31.761	0.000	24.55	340.1	0.069	0.07	6.69	0.00	0.75
30	9.21	0.05	31.881	0.004	24.67	328.7	0.103	0.16	6.60	0.01	0.93
50	8.60	0.07	32.293	0.001	25.08	289.4	0.165	0.41	5.91	0.02	0.79
75	8.91	0.03	32.944	0.011	25.55	246.1	0.233	0.83	4.61	0.01	0.67
100	8.25	0.06	33.605	0.026	26.16	187.8	0.287	1.32	3.38	0.02	2.25

CNAV OSHAWA CRUISE OS1 STATION 046 OBSERVED VALUES

NORTH HEAD

DATE 22/03/63 HR 23.6 LAT 46-22 N LONG 124-18 W SNDG 64 WEA 01 WIND VEL 25 DIR 36
BAROM 06. TEMP DRY 8.9 WET 6.7 RELHU 73 WTRCLR SECDI SEA 2 DIR 00 SWELL 2 DIR 28
CLOUD TYPE 6 AMT 5 VIS 7 WIRE ANGLE(S) 35

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN ADU	OXYGEN SATN
1	0	9.59	28.795	22.21	6.87	0.614	-0.037	106
1	4	9.47	29.834	23.03	6.76	0.604	-0.030	105
1	8	9.32	31.771	24.57	6.74	0.602	-0.034	106
1	16	9.31	31.780	24.57	6.74	0.602	-0.034	106
1	25	9.31	31.784	24.58	6.68	0.597	-0.029	105
1	41	8.99	31.912	24.73	6.54	0.584	-0.012	102
1	57	9.11	32.830	25.43	5.04	0.450	0.116	79

CNAV OSHAWA CRUISE OS1 STATION 046 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I
0	1.40		
3	1.43		
6	1.28		
12	1.18		

15.71 - WATER COLUMN VALUES

MESSENGER TIME 1337 INCOMING SOLAR RADIATION - AM 155 PM 163

CNAV OSHAWA CRUISE OS1 STATION 046 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	9.59	0.00	28.795	0.000	22.21	563.2	0.000	0.00	6.87	0.00	
10	9.30	0.01	32.015	0.161	24.76	319.7	0.045	0.02	6.74	0.00	0.89
20	9.32	0.01	31.779	0.002	24.57	337.7	0.078	0.07	6.72	0.00	0.63
30	9.21	0.03	31.773	0.023	24.59	336.7	0.112	0.16	6.71	0.05	0.82
50	8.94	0.04	32.284	0.032	25.03	295.1	0.176	0.41	5.96	0.07	1.24

CNAV OSHAWA CRUISE OS1 STATION 047 OBSERVED VALUES

DATE 23/03/63 HR 01.1 LAT 46-26 N LONG 124-30 W SNDG 124 WEA 02 WIND VEL 25 DIR 35
BAROM 06. TEMP DRY 8.3 WET 6.1 RELHU 72 WTRCLR SECDI SEA 3 DIR 35 SWELL 2 DIR 29
CLOUD TYPE AMT 7 VIS 7 WIRE ANGLE(S) 28.27

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN AOU	OXYGEN SATN
1	0	9.11	31.894	24.69	6.68	0.597	-0.026	105
1	4	9.17	31.891	24.68	6.61	0.590	-0.021	104
1	9	9.19	31.895	24.68	6.75	0.603	-0.034	106
1	18	9.21	31.895	24.68	6.66	0.595	-0.026	105
1	27	9.21	32.000	24.76	6.32	0.564	0.004	99
2	44	9.39	32.475	25.10	5.84	0.522	0.043	92
2	66	8.98	33.155	25.70	4.11	0.367	0.200	65
2	88	8.24	33.635	26.19	3.25	0.290	0.284	51
2	106	7.74	33.864	26.44	2.59	0.231	0.349	40

CNAV OSHAWA CRUISE OS1 STATION 047 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	9.11	0.00	31.894	0.000	24.69	325.7	0.000	0.00	6.68	0.00	
10	9.19	0.00	31.893	0.002	24.68	327.2	0.033	0.02	6.76	0.00	0.93
20	9.21	0.00	31.909	0.000	24.69	326.4	0.066	0.07	6.59	0.01	0.75
30	9.25	0.02	32.069	0.008	24.81	315.3	0.099	0.15	6.25	0.02	0.91
50	9.33	0.01	32.667	0.009	25.26	272.6	0.158	0.39	5.39	0.07	0.76
75	8.69	0.02	33.377	0.001	25.92	210.7	0.219	0.77	3.70	0.03	0.67
100	7.88	0.01	33.805	0.001	26.38	167.6	0.266	1.19	2.84	0.02	0.74

CNAV OSHAWA CRUISE OS1 STATION 048 OBSERVED VALUES

DATE 23/03/63 HR 03.5 LAT 46-36 N LONG 124-42 W SNDG 1006 WEA 02 WIND VEL 25 DIR 34
BAROM 05. TEMP DRY 7.2 WET 5.6 RELHU 79 WTRCLR SECDI SEA 2 DIR 32 SWELL 3 DIR 27
CLOUD TYPE AMT 7 VIS 7 WIRE ANGLE(S) 0.41

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN AOU	OXYGEN SATN
1	0	9.20	32.143	24.87	6.54	0.584	-0.016	103
1	5	9.21	32.142	24.87	6.63	0.592	-0.024	104
1	10	9.24	32.146	24.87	6.65	0.594	-0.026	105
1	19	9.27	32.173	24.89	6.64	0.593	-0.026	105
1	29	9.25	32.195	24.91	6.53	0.583	-0.016	103
1	48	9.37	32.468	25.10	6.39	0.571	-0.006	101
1	71	8.23	33.193	25.84	4.67	0.417	0.160	72
1	97	7.90	33.548	26.17	3.89	0.347	0.232	60
1	120	7.89	33.775	26.35	3.15	0.281	0.298	49
2	141	7.75	33.875	26.45	2.65	0.237	0.344	41
1	144	7.64	33.902	26.49	2.78	0.248	0.333	43
2	161	7.51	33.931	26.53	2.68	0.239	0.344	41
2	247	6.57	33.974	26.69	2.24	0.200	0.396	34
2	420	5.47	34.076	26.91	1.13	0.101	0.511	16
2	639	4.48			0.41	0.037		
2	843	3.91	34.341	27.29	0.26	0.023	0.612	4

CNAV OSHAWA CRUISE OS1 STATION 048 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	9.20	0.00	32.143	0.000	24.87	308.6	0.000	0.00	6.54	0.00	
10	9.24	0.00	32.146	0.000	24.87	309.1	0.032	0.02	6.65	0.00	
20	9.27	0.00	32.174	0.001	24.89	307.7	0.063	0.06	6.63	0.00	0.88
30	9.27	0.01	32.202	0.000	24.91	305.7	0.094	0.14	6.54	0.01	0.97
50	9.28	0.03	32.530	0.011	25.16	282.0	0.153	0.38	6.25	0.04	0.90
75	8.14	0.01	33.267	0.008	25.92	210.8	0.215	0.77	4.51	0.03	0.82
100	7.90	0.01	33.583	0.001	26.20	184.3	0.265	1.21	3.79	0.00	0.82
150	7.63	0.02	33.909	0.003	26.49	157.2	0.351	2.30	2.67	0.05	0.62
200	7.10	0.03	33.961	0.007	26.61	146.8	0.427	3.67	2.48	0.01	1.73
250	6.55	0.00	33.976	0.000	26.70	139.1	0.499	5.33	2.22	0.00	1.00
300	6.16	0.03	34.004	0.001	26.77	132.8	0.568	7.27	1.89	0.03	0.87
400	5.56	0.01	34.064	0.000	26.89	122.1	0.697	11.86	1.25	0.01	0.84
500	5.06	0.00	34.127	0.002	27.00	112.3	0.815	17.31	0.79	0.01	3.72
600	4.63	0.00	34.192	0.004	27.10	103.4	0.924	23.45	0.49	0.00	9.70
700	4.28	0.00	34.256	0.005	27.19	95.5	1.024	30.15	0.32	0.01	10.90
800	4.00	0.00	34.317	0.003	27.26	88.7	1.117	37.31	0.26	0.01	2.99

CNAV OSHAWA CRUISE OS1 STATION 049 OBSERVED VALUES

WILLAPA BAY ENTRANCE

DATE 23/03/63 HR 06.7 LAT 46-40 N LONG 124-21 W SNDG 77 WEA 02 WIND VEL 18 DIR 34
BAROM 05. TEMP DRY 7.2 WET 5.6 RELHU 79 WTRCLR SECDI SEA 3 DIR 34 SWELL 2 DIR 29
CLOUD TYPE AMT 8 VIS 7 WIRE ANGLE(S) 7

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN AOU	OXYGEN SATN
1	0	9.36	29.494	22.79	6.74	0.602	-0.026	104
1	5	9.26	29.585	22.87	6.79	0.606	-0.029	105
1	10	9.23	31.178	24.12	6.66	0.595	-0.023	104
1	20	9.19	31.713	24.54	6.54	0.584	-0.014	102
1	30	9.29	32.023	24.77	5.93	0.530	0.038	93
1	59	8.94	33.070	25.64	4.33	0.387	0.181	68

CNAV OSHAWA CRUISE OS1 STATION 049 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	9.36	0.00	29.494	0.000	22.79	507.9	0.000	0.00	6.74	0.00	
10	9.23	0.00	31.178	0.000	24.12	380.9	0.045	0.02	6.66	0.00	
20	9.19	0.00	31.713	0.000	24.54	340.7	0.082	0.08	6.54	0.00	
30	9.29	0.00	32.023	0.000	24.77	319.3	0.115	0.16	5.93	0.00	
50	9.29	0.09	32.583	0.092	25.20	278.1	0.175	0.40	4.51	0.19	7.37

CNAV OSHAWA CRUISE OS1 STATION 050 OBSERVED VALUES

MOCLIPS RIVER

DATE 23/03/63 HR 10.6 LAT 47-14 N LONG 124-28 W SNDG 51 WEA 02 WIND VEL 25 DIR 34
BAROM 03. TEMP DRY 7.8 WET 6.7 RELHU 86 WTRCLR SECDI SEA 2 DIR 34 SWELL 2 DIR 29
CLOUD TYPE AMT 3 VIS 7 WIRE ANGLE(S) 0

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN AOU	OXYGEN SATN
1	0	9.02	28.757	22.26	6.75	0.603	-0.019	103
1	5	8.68	31.302	24.30	6.58	0.588	-0.009	102
1	10	8.68	31.548	24.49	6.63	0.592	-0.015	103
1	20	8.68	31.519	24.47	6.65	0.594	-0.017	103
1	30	8.68	31.658	24.58	6.54	0.584	-0.007	101
1	45	8.72	32.349	25.11	5.84	0.522	0.052	91

CNAV OSHAWA CRUISE OS1 STATION 050 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	9.02	0.00	28.757	0.000	22.26	557.9	0.000	0.00	6.75	0.00	
10	8.68	0.00	31.548	0.000	24.49	345.4	0.046	0.02	6.63	0.00	
20	8.68	0.00	31.519	0.000	24.47	347.7	0.081	0.07	6.65	0.00	
30	8.68	0.00	31.658	0.000	24.58	337.5	0.115	0.16	6.54	0.00	

CNAV OSHAWA CRUISE OS1 STATION 051 OBSERVED VALUES

DATE 23/03/63 HR 12.0 LAT 47-14 N LONG 124-42 W SNDG 113 WEA 02 WIND VEL 22 DIR 34
BAROM 03. TEMP DRY 7.8 WET 6.7 RELHU 86 WTRCLR SECDI SEA 2 DIR 34 SWELL 2 DIR 29
CLOUD TYPE AMT 3 VIS 7 WIRE ANGLE(S) 23

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN AOU	OXYGEN SATN
1	0	8.60	31.830	24.72	6.66	0.595	-0.018	103
1	5	8.63	31.834	24.72	6.61	0.590	-0.014	102
1	9	8.67	31.856	24.73	6.65	0.594	-0.018	103
1	18	8.66	31.829	24.71	6.60	0.589	-0.013	102
1	27	8.68	31.862	24.74	6.61	0.590	-0.014	102
1	46	8.27	32.208	25.07	5.64	0.504	0.076	87
1	69	8.24	33.318	25.94	3.94	0.352	0.224	61
1	92	8.03	33.672	26.25	3.31	0.296	0.282	51

CNAV OSHAWA CRUISE OS1 STATION 051 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	8.60	0.00	31.830	0.000	24.72	323.1	0.000	0.00	6.66	0.00	
10	8.67	0.00	31.854	0.003	24.73	322.5	0.033	0.02	6.65	0.00	0.97
20	8.67	0.00	31.830	0.001	24.71	324.4	0.066	0.07	6.61	0.01	0.75
30	8.62	0.02	31.887	0.003	24.76	319.7	0.098	0.15	6.51	0.02	0.94
50	8.25	0.02	32.401	0.036	25.22	276.5	0.158	0.39	5.33	0.04	0.82
75	8.23	0.02	33.548	0.043	26.12	191.3	0.217	0.76	3.60	0.05	1.21

CNAV OSHAWA CRUISE OS1 STATION 052 OBSERVED VALUES

DATE 23/03/63 HR 14.4 LAT 47-14 N LONG 125-05 W SNDG 622 WEA 02 WIND VEL 20 DIR 32
BAROM 02. TEMP DRY 7.2 WET 6.1 RELHU 85 WTRCLR SECDI SEA 3 DIR 32 SWELL 3 DIR 27
CLOUD TYPE AMT 8 VIS 7 WIRE ANGLE(S) 23,26,20

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN AOU	OXYGEN SATN
1	0	8.88	32.000	24.81	6.57	0.587	-0.014	102
1	5	8.88	32.047	24.85	6.57	0.587	-0.014	102
1	9	8.90	32.037	24.84	6.29	0.562	0.011	98
1	18	9.18	32.190	24.91	6.27	0.560	0.008	99
1	27	9.15	32.204	24.93	6.12	0.547	0.022	96
2	45	9.15	32.232	24.95	6.18	0.552	0.016	97
2	68	9.04	32.688	25.33	5.48	0.489	0.079	86
2	92	8.56	33.132	25.75	4.46	0.398	0.174	70
2	112	7.94	33.471	26.10	3.61	0.322	0.257	56
2	135	7.76	33.805	26.39	3.10	0.277	0.304	48
3	166	7.21	33.912	26.55	2.85	0.255	0.333	43
3	189	7.08	33.973	26.62	2.60	0.232	0.357	39
3	284	6.13	34.092	26.84	1.82	0.163	0.440	27
3	474	5.13	34.144	27.00	0.84	0.075	0.542	12
3	569	4.66	34.189	27.09	0.54	0.048	0.576	8

CNAV OSHAWA CRUISE OS1 STATION 052 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	SAL
0	0.45		13.46	32.021
0			14.00	

MESSENGER TIME 0625 INCOMING SOLAR RADIATION - AM 142 PM 208

THE SECOND PRODUCTIVITY VALUE WAS INCUBATED AT 50 PERCENT LIGHT INTENSITY INSTEAD OF 100 PERCENT

CNAV OSHAWA CRUISE OS1 STATION 052 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	8.88	0.00	32.000	0.000	24.81	314.5	0.000	0.00	6.57	0.00	
10	8.93	0.01	32.051	0.006	24.85	311.6	0.032	0.02	6.27	0.02	0.97
20	9.19	0.01	32.199	0.004	24.92	304.5	0.063	0.06	6.24	0.01	0.75
30	9.15	0.00	32.199	0.007	24.93	304.2	0.094	0.14	6.13	0.02	0.93
50	9.15	0.01	32.312	0.014	25.02	296.1	0.154	0.39	6.08	0.02	0.79
75	8.93	0.00	32.821	0.000	25.45	255.6	0.224	0.83	5.20	0.01	0.72
100	8.30	0.03	33.272	0.001	25.90	213.2	0.283	1.35	4.10	0.02	0.62
150	7.49	0.03	33.883	0.015	26.49	157.2	0.376	2.52	2.95	0.03	0.73
200	6.98	0.02	33.994	0.003	26.65	142.8	0.452	3.87	2.49	0.00	1.20
250	6.49	0.04	34.065	0.006	26.77	131.8	0.521	5.46	2.06	0.01	1.15
300	6.02	0.01	34.100	0.004	26.86	123.8	0.585	7.27	1.71	0.00	0.96
400	5.44	0.04	34.135	0.012	26.96	115.3	0.706	11.59	1.15	0.01	0.94
500	5.02	0.01	34.151	0.003	27.02	110.1	0.820	16.84	0.75	0.00	0.85

CNAV OSHAWA CRUISE OS1 STATION 053 OBSERVED VALUES

DATE 23/03/63 HR 18.3 LAT 47-14 N LONG 125-28 W SNDG 1737 WEA 02 WIND VEL 15 DIR 31
BAROM 07. TEMP DRY 7.8 WET 5.6 RELHU 72 WTRCLR SECDI SEA 2 DIR 31 SWELL 2 DIR 30
CLOUD TYPE AMT 8 VIS 7 WIRE ANGLE(S) 16,26

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN AOU	OXYGEN SATN
1	0	8.89	32.102	24.89	6.61	0.590	-0.018	103
1	5	8.91	32.097	24.88	6.65	0.594	-0.022	104
1	10	8.95	32.095	24.88	6.66	0.595	-0.023	104
1	19	8.97	32.097	24.87	6.66	0.595	-0.024	104
1	29	9.00	32.187	24.94	6.59	0.589	-0.018	103
1	48	8.99	32.199	24.95	6.58	0.588	-0.017	103
1	72	9.08	32.722	25.35	5.78	0.516	0.051	91
1	96	8.11	33.482	26.09	4.36	0.389	0.188	67
1	120	7.92	33.684	26.27	3.50	0.313	0.266	54
1	144	7.70	33.835	26.42	3.03	0.271	0.311	47
2	157	7.62	33.857	26.45	2.98	0.266	0.316	46
2	181	7.38	33.946	26.56	2.77	0.247	0.338	42
2	271	6.51	33.986	26.71	2.16	0.193	0.404	32
2	454	5.16	34.116	26.98	0.87	0.078	0.539	13
2	683	4.34	34.264	27.19	0.34	0.030	0.599	5
2	914	3.73	34.377	27.34	0.26	0.023	0.615	4
2	1376	2.77	34.499	27.53	0.56	0.050	0.604	8

CNAV OSHAWA CRUISE OS1 STATION 053 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	SAL
0	0.99		23.20	32.067
4	0.86		18.32	32.061
20	0.95		2.80	32.062
44	0.84		0.06	32.149
	39.70		286.08	- WATER COLUMN VALUES

MESSENGER TIME 1021 INCOMING SOLAR RADIATION - AM 142 PM 208

CNAV OSHAWA CRUISE OS1 STATION 053 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	8.89	0.00	32.102	0.000	24.89	307.0	0.000	0.00	6.61	0.00	
10	8.95	0.00	32.095	0.000	24.88	308.6	0.032	0.02	6.66	0.00	
20	8.97	0.00	32.105	0.002	24.88	308.4	0.063	0.06	6.65	0.00	0.88
30	9.00	0.00	32.186	0.005	24.94	302.9	0.093	0.14	6.59	0.01	0.97
50	9.02	0.01	32.227	0.004	24.97	300.4	0.154	0.39	6.54	0.00	0.91
75	8.97	0.03	32.826	0.014	25.44	255.7	0.224	0.83	5.60	0.02	0.84
100	8.05	0.02	33.537	0.012	26.14	190.0	0.280	1.33	4.18	0.00	0.80
150	7.66	0.00	33.847	0.003	26.44	162.3	0.369	2.45	3.00	0.01	0.55
200	7.19	0.00	33.973	0.013	26.61	147.2	0.447	3.84	2.63	0.01	1.25
250	6.70	0.00	33.997	0.014	26.69	139.7	0.519	5.51	2.29	0.01	0.91
300	6.26	0.00	34.005	0.002	26.76	133.9	0.588	7.46	1.93	0.02	0.93
400	5.50	0.00	34.075	0.003	26.91	120.4	0.717	12.04	1.21	0.03	0.75
500	4.95	0.02	34.148	0.001	27.03	109.5	0.833	17.38	0.70	0.02	0.80
600	4.57	0.03	34.213	0.001	27.12	101.1	0.939	23.37	0.44	0.03	0.68
700	4.29	0.00	34.274	0.000	27.20	94.4	1.038	29.96	0.32	0.00	0.91
800	4.01	0.01	34.326	0.000	27.27	88.2	1.130	37.06	0.26	0.01	0.59
1000	3.54	0.01	34.410	0.000	27.39	78.1	1.298	52.54	0.30	0.02	2.00
1200	3.13	0.02	34.468	0.000	27.47	70.5	1.449	69.50	0.45	0.05	3.17

CNAV OSHAWA CRUISE OS1 STATION 054 OBSERVED VALUES

DATE 23/03/63 HR 21.6 LAT 47-14 N LONG 125-50 W SNDG 1682 WEA 02 WIND VEL 8 DIR 32
BAROM 08. TEMP DRY 10.0 WET 6.7 RELHU 62 WTRCLR SECDI SEA 1 DIR 31 SWELL 2 DIR 30
CLOUD TYPE 6 AMT 8 VIS 7 WIRE ANGLE(S) 0, 0

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN AOU	OXYGEN SATN
1	0	9.22	32.369	25.05	6.53	0.583	-0.016	103
1	5	9.25	32.367	25.04	6.58	0.588	-0.021	104
1	10	9.24	32.366	25.04	6.59	0.589	-0.022	104
1	20	9.25	32.368	25.04	6.54	0.584	-0.018	103
1	30	9.22	32.369	25.05	6.54	0.584	-0.017	[illegible]
1	50	9.22	32.379	25.06	6.59	0.589	-0.022	[illegible]
1	75	9.11	32.610	25.25	6.18	0.552	0.015	97
1	100	8.70	33.463	25.98	3.81	0.340	0.229	60
1	125	8.26	33.638	26.19	3.03	0.271	0.304	47
1	150	8.05	33.804	26.35	2.88	0.257	0.319	45
2	170	7.91	33.855	26.41	2.79	0.249	0.329	43
2	194	7.79	33.883	26.45	2.85	0.255	0.325	44
2	292	6.74	33.983	26.67	2.19	0.196	0.398	33
2	488	5.12	34.126	26.99	0.90	0.080	0.537	13
2	735	4.19	34.279	27.22	0.34	0.030	0.601	5
2	984	3.63	34.399	27.37	0.27	0.024	0.616	4
2	1484	2.55	34.531	27.57	0.75	0.067	0.590	10
2	1684	2.28	34.561	27.62	1.00	0.089	0.573	13

CNAV OSHAWA CRUISE OS1 STATION 054 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I
0	0.66		
4	0.72		
20	0.79		
44	0.77		

33.62 - WATER COLUMN VALUES

MESSENGER TIME 1333 INCOMING SOLAR RADIATION - AM 142 PM 208

CNAV OSHAWA CRUISE OS1 STATION 054 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	9.22	0.00	32.369	0.000	25.05	292.1	0.000	0.00	6.53	0.00	
10	9.24	0.00	32.366	0.000	25.04	292.8	0.030	0.02	6.59	0.00	
20	9.25	0.00	32.368	0.000	25.04	293.0	0.059	0.06	6.54	0.00	
30	9.22	0.00	32.369	0.000	25.05	292.6	0.089	0.14	6.54	0.00	
50	9.22	0.00	32.379	0.000	25.06	292.2	0.148	0.38	6.59	0.00	
75	9.11	0.00	32.610	0.000	25.25	273.9	0.219	0.83	6.18	0.00	
100	8.70	0.00	33.463	0.000	25.98	204.9	0.279	1.36	3.81	0.00	
150	8.05	0.00	33.804	0.000	26.35	171.0	0.374	2.56	2.88	0.00	
200	7.74	0.01	33.890	0.000	26.46	161.0	0.458	4.06	2.83	0.01	1.11
250	7.24	0.04	33.943	0.000	26.58	150.8	0.536	5.87	2.56	0.06	1.24
300	6.66	0.00	33.990	0.000	26.69	140.3	0.610	7.93	2.13	0.00	0.98
400	5.76	0.01	34.068	0.002	26.87	124.2	0.743	12.69	1.43	0.03	0.76
500	5.06	0.01	34.134	0.000	27.00	111.8	0.862	18.17	0.85	0.01	0.94
600	4.60	0.04	34.199	0.000	27.11	102.5	0.971	24.27	0.54	0.03	0.68
700	4.27	0.02	34.259	0.000	27.19	95.2	1.071	30.93	0.37	0.01	0.82
800	4.02	0.01	34.314	0.000	27.26	89.2	1.164	38.11	0.29	0.01	0.72
1000	3.59	0.00	34.405	0.000	27.38	79.0	1.334	53.77	0.28	0.00	0.98
1200	3.12	0.02	34.470	0.003	27.47	70.3	1.485	70.81	0.41	0.03	1.03
1500	2.52	0.00	34.534	0.000	27.58	60.4	1.684	98.24	0.77	0.00	0.94

CNAV OSHAWA CRUISE OS1 STATION 055 OBSERVED VALUES

DATE 24/03/63 HR 01.5 LAT 47-14 N LONG 126-25 W SNDG 2560 WEA 02 WIND VEL 5 DIR 27
BAROM 12. TEMP DRY 8.3 WET 6.1 RELHU 72 WTRCLR SECDI SEA 0 DIR SWELL 1 DIR 30
CLOUD TYPE AMT 4 VIS 7 WIRE ANGLE(S) 5.20

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN AOU	OXYGEN SATN
1	0	9.38	32.396	25.04	6.56	0.586	-0.021	104
1	5	9.43	32.396	25.04	6.54	0.584	-0.020	104
1	10	9.38	32.396	25.04	6.64	0.593	-0.028	105
1	20	9.32	32.393	25.05	6.58	0.588	-0.022	104
1	30	9.29	32.397	25.06	6.53	0.583	-0.017	103
1	50	9.28	32.401	25.06	6.58	0.588	-0.022	104
1	75	9.24	32.680	25.29	5.80	0.518	0.047	92
1	100	8.78	33.340	25.87	4.11	0.367	0.202	65
1	124	8.05	33.426	26.05	3.98	0.355	0.223	61
1	149	7.86	33.657	26.26	3.55	0.317	0.263	55
2	165	7.71	33.757	26.36	3.34	0.298	0.283	51
2	188	7.56	33.859	26.46	2.92	0.261	0.322	45
2	282	6.58	33.993	26.70	2.08	0.186	0.411	31
2	473	5.08	34.128	27.00	0.78	0.070	0.548	11
2	959	3.53	34.382	27.36	0.30	0.027	0.615	4
2	1453	2.63	34.561	27.59	0.65	0.058	0.598	9
2	1751	2.23	34.577	27.64	1.12	0.100	0.563	15
2	2048	1.89	34.524*	27.62	1.44	0.129	0.540	19
2	2347	1.78	34.660	27.74	1.73	0.155	0.516	23

CNAV OSHAWA CRUISE OS1 STATION 055 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	9.38	0.00	32.396	0.000	25.04	292.5	0.000	0.00	6.56	0.00	
10	9.38	0.00	32.396	0.000	25.04	292.7	0.030	0.02	6.64	0.00	
20	9.32	0.00	32.393	0.000	25.05	292.2	0.059	0.06	6.58	0.00	
30	9.29	0.00	32.397	0.000	25.06	291.6	0.089	0.14	6.53	0.00	
50	9.28	0.00	32.401	0.000	25.06	291.5	0.148	0.38	6.58	0.00	
75	9.24	0.00	32.680	0.000	25.29	270.6	0.218	0.83	5.80	0.00	
100	8.78	0.00	33.340	0.000	25.87	215.2	0.280	1.37	4.11	0.[illegible]	
150	7.85	0.00	33.664	0.000	26.27	178.5	0.379	2.62	3.54	0.00	0.90
200	7.45	0.01	33.890	0.008	26.50	156.9	0.463	4.13	2.77	0.02	1.22
250	6.94	0.03	33.975	0.015	26.64	144.4	0.539	5.87	2.28	0.05	1.11
300	6.41	0.00	34.010	0.002	26.74	135.6	0.610	7.86	1.93	0.00	0.97
400	5.58	0.01	34.088	0.006	26.91	120.5	0.739	12.47	1.21	0.00	0.71
500	4.94	0.02	34.145	0.000	27.03	109.6	0.855	17.82	0.69	0.03	1.00
600	4.49	0.08	34.204	0.002	27.12	100.9	0.961	23.80	0.42	0.10	0.99
700	4.11	0.11	34.259	0.002	27.21	93.4	1.060	30.35	0.25	0.13	0.93
800	3.82	0.10	34.310	0.002	27.28	87.1	1.151	37.37	0.19	0.12	0.84
1000	3.44	0.00	34.402	0.001	27.39	77.5	1.317	52.70	0.30	0.00	0.89
1200	3.03	0.02	34.486	0.005	27.49	68.0	1.465	69.29	0.38	0.01	0.74
1500	2.56	0.00	34.565	0.002	27.60	58.5	1.657	95.84	0.72	0.01	0.77
2000	1.94	0.00	34.587	0.011	27.67	51.8	1.938	146.02	1.39	0.00	2.48

CNAV OSHAWA CRUISE OS1 STATION 056 OBSERVED VALUES

DATE 24/03/63 HR 06.3 LAT 47-14 N LONG 126-59 W SNDG 2560 WEA 01 WIND VEL 20 DIR 14
BAROM 14. TEMP DRY 8.3 WET 6.7 RELHU 80 WTRCLR SECDI SEA 2 DIR 14 SWELL 2 DIR 27
CLOUD TYPE AMT 3 VIS 7 WIRE ANGLE(S) 11, 0

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN AOU	OXYGEN SATN
2	0	8.91	32.425	25.14	6.60	0.589	-0.019	103
1	5	8.88	32.427	25.15	6.63	0.592	-0.021	104
1	10	8.93	32.435	25.14	6.66	0.595	-0.024	104
1	20	8.86	32.475	25.19	6.62	0.591	-0.020	104
1	29	8.84	32.422	25.15	6.61	0.590	-0.019	103
1	49	8.81	32.430	25.16	6.59	0.589	-0.017	103
1	74	8.80	32.429	25.16	6.66	0.595	-0.023	104
1	98	7.56	32.972	25.77	5.54	0.495	0.092	84
1	123	7.20	33.421	26.17	4.68	0.418	0.172	71
1	147	7.39	33.738	26.39	3.76	0.336	0.250	57

CNAV OSHAWA CRUISE OS1 STATION 056 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	8.91	0.00	32.425	0.000	25.14	283.3	0.000	0.00	6.60	0.00	
10	8.93	0.00	32.435	0.000	25.14	283.1	0.029	0.02	6.66	0.00	
20	8.86	0.00	32.475	0.000	25.19	279.2	0.057	0.06	6.62	0.00	
30	8.84	0.00	32.420	0.001	25.15	283.1	0.086	0.13	6.61	0.00	0.99
50	8.82	0.01	32.425	0.004	25.15	282.9	0.143	0.37	6.60	0.01	0.95
75	8.75	0.01	32.447	0.004	25.18	280.6	0.214	0.82	6.62	0.01	0.94
100	7.50	0.00	33.012	0.000	25.81	221.4	0.277	1.38	5.47	0.01	0.89

CNAV OSHAWA CRUISE OS1 STATION 057 OBSERVED VALUES

DATE 24/03/63 HR 09.1 LAT 47-14 N LONG 127-23 W SNDG 2560 WEA 01 WIND VEL 15 DIR 16
BAROM 13. TEMP DRY 7.8 WET 6.7 RELHU 86 WIRCLR SECDI SEA 1 DIR 14 SWELL 1 DIR 27
CLOUD TYPE AMT 2 VIS 7 WIRE ANGLE(S) 17,20

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN AOU	OXYGEN SATN
1	0	8.80	32.405	25.14	6.62	0.591	-0.019	103
1	5	8.86	32.404	25.13	6.60	0.589	-0.018	103
1	10	8.87	32.402	25.13	6.66	0.595	-0.023	104
1	19	8.90	32.436	25.15	6.60	0.589	-0.019	103
1	29	8.84	32.402	25.13	6.83	0.610	-0.038	107
1	48	8.81	32.414	25.15	6.67	0.596	-0.024	104
1	72	8.86	32.430	25.15	6.60	0.589	-0.018	103
1	96	8.82	32.421	25.15	6.59	0.589	-0.017	103
1	119	8.83	32.431	25.16	6.54	0.584	-0.012	102
1	143	7.72	32.819	25.63	5.86	0.523	0.062	89
2	156	7.28	33.777	26.44	3.72	0.332	0.255	57
2	180	7.13	33.876	26.54	3.32	0.297	0.292	50
2	271	6.03	33.969	26.76	2.18	0.195	0.410	32
2	460	4.89	34.100	27.00	0.95	0.085	0.536	14
2	698	3.98	34.241	27.21	0.36	0.032	0.603	5
2	938	3.43	34.366	27.36	0.31	0.028	0.616	4
2	1422	2.58	34.507	27.55	0.74	0.066	0.591	10
2	1714	2.17	34.559	27.63	1.20	0.107	0.557	16

CNAV OSHAWA CRUISE OS1 STATION 057 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	8.80	0.00	32.405	0.000	25.14	283.2	0.000	0.00	6.62	0.00	
10	8.87	0.00	32.402	0.000	25.13	284.6	0.029	0.02	6.66	0.00	
20	8.90	0.00	32.434	0.002	25.15	282.8	0.058	0.06	6.62	0.01	0.88
30	8.84	0.00	32.401	0.001	25.13	284.5	0.086	0.13	6.83	0.01	0.97
50	8.81	0.00	32.416	0.000	25.15	283.4	0.143	0.37	6.66	0.00	0.91
75	8.86	0.00	32.429	0.001	25.15	283.5	0.215	0.83	6.60	0.00	0.84
100	8.86	0.03	32.409	0.008	25.14	285.4	0.287	1.47	6.60	0.01	0.78
150	7.46	0.01	33.342	0.048	26.07	197.0	0.408	2.97	4.70	0.11	0.55
200	6.91	0.03	33.916	0.012	26.60	147.6	0.495	4.50	3.03	0.01	1.26
250	6.31	0.04	33.968	0.013	26.72	136.6	0.567	6.15	2.40	0.01	0.91
300	5.79	0.03	33.992	0.001	26.80	129.0	0.634	8.04	1.92	0.02	0.94
400	5.15	0.04	34.064	0.002	26.94	117.0	0.758	12.47	1.22	0.03	0.75
500	4.70	0.01	34.125	0.000	27.04	108.3	0.871	17.71	0.79	0.01	0.83
600	4.30	0.01	34.186	0.000	27.13	100.1	0.977	23.64	0.51	0.02	0.68
700	3.97	0.00	34.242	0.000	27.21	93.1	1.074	30.15	0.36	0.00	0.99
800	3.72	0.01	34.297	0.001	27.28	86.9	1.165	37.15	0.29	0.02	0.62
1000	3.31	0.00	34.390	0.001	27.39	76.9	1.331	52.39	0.33	0.01	0.94
1200	2.94	0.01	34.456	0.003	27.48	69.2	1.479	69.07	0.47	0.01	0.88
1500	2.47	0.00	34.522	0.001	27.57	60.6	1.676	96.33	0.85	0.00	0.94

CNAV OSHAWA CRUISE OS1 STATION 058 OBSERVED VALUES

DATE 24/03/63 HR 12.9 LAT 47-12 N LONG 128-06 W SNDG 2651 WEA 02 WIND VEL 28 DIR 13
BAROM 12. TEMP DRY 7.2 WET 6.1 RELHU 85 WTRCLR SECDI SEA 3 DIR 12 SWELL 3 DIR 27
CLOUD TYPE AMT 8 VIS 7 WIRE ANGLE(S) 23,34

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	MGA/L	AOU	SATN
1	0	8.73	32.389	25.14	6.62	0.591	-0.018	103
1	5	8.75	32.390	25.14	6.62	0.591	-0.018	103
1	9	8.78	32.389	25.13	6.67	0.596	-0.023	104
1	18	8.79	32.398	25.14	6.62	0.591	-0.019	103
1	28	8.79	32.390	25.13	6.60	0.589	-0.017	103
1	46	8.77	32.392	25.14	6.60	0.589	-0.017	103
1	69	8.76	32.395	25.14	6.54	0.584	-0.011	102
1	92	8.49	32.661	25.39	5.90	0.527	0.048	92
1	115	7.46	33.354	26.08	4.24	0.379	0.208	65
1	138	7.46	33.705	26.36	3.24	0.289	0.296	49
2	170	7.28	33.818	26.47	2.42	0.216	0.371	37
2	257	5.82	33.990	26.80	1.74	0.155	0.452	26
2	434	4.86	34.097	27.00	0.83	0.074	0.548	12
2	658	4.15	34.236	27.19	0.36	0.032	0.600	5
2	884	3.66	34.355	27.33	0.27	0.024	0.615	4
2	1340	2.71	34.486	27.52	0.54	0.048	0.607	7
2	1614	2.26	34.552	27.61	0.96	0.086	0.577	13

CNAV OSHAWA CRUISE OS1 STATION 058 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	SAL
0	0.46		6.90	32.411
0			8.68	

MESSENGER TIME 0630 INCOMING SOLAR RADIATION - AM 139 PM 257

THE SECOND PRODUCTIVITY VALUE WAS INCUBATED AT 50 PERCENT LIGHT INTENSITY INSTEAD OF 100 PERCENT

CNAV OSHAWA CRUISE OS1 STATION 058 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	8.73	0.00	32.389	0.000	25.14	283.4	0.000	0.00	6.62	0.00	
10	8.78	0.00	32.390	0.001	25.13	284.3	0.029	0.02	6.67	0.00	0.97
20	8.79	0.00	32.397	0.001	25.14	284.0	0.058	0.06	6.61	0.00	0.78
30	8.79	0.00	32.390	0.000	25.13	284.7	0.086	0.13	6.60	0.00	0.93
50	8.78	0.01	32.383	0.006	25.13	285.3	0.144	0.37	6.61	0.01	0.82
75	8.74	0.02	32.431	0.005	25.17	281.6	0.215	0.83	6.45	0.01	0.72
100	8.12	0.07	32.897	0.029	25.63	238.4	0.281	1.41	5.34	0.06	0.67
150	7.42	0.00	33.775	0.016	26.42	164.3	0.382	2.66	2.88	0.01	0.70
200	6.82	0.08	33.893	0.004	26.59	148.2	0.461	4.07	2.05	0.08	1.01
250	5.95	0.03	33.981	0.001	26.78	131.2	0.531	5.69	1.75	0.03	0.86
300	5.45	0.07	34.031	0.010	26.88	121.9	0.595	7.48	1.47	0.00	0.90
400	4.93	0.06	34.089	0.008	26.98	112.5	0.713	11.71	0.96	0.00	0.78
500	4.61	0.01	34.139	0.001	27.06	106.2	0.824	16.80	0.63	0.01	0.74
600	4.30	0.01	34.201	0.001	27.14	98.9	0.927	22.64	0.43	0.01	0.73
700	4.05	0.01	34.260	0.000	27.21	92.6	1.024	29.09	0.32	0.01	0.78
800	3.83	0.01	34.314	0.001	27.28	86.9	1.115	36.08	0.27	0.01	0.60
1000	3.40	0.01	34.396	0.004	27.39	77.5	1.281	51.39	0.28	0.00	0.92
1200	2.99	0.01	34.455	0.004	27.47	69.8	1.430	68.21	0.40	0.00	0.88
1500	2.43	0.00	34.522	0.002	27.58	60.2	1.628	95.49	0.76	0.00	0.72

CNAV OSHAWA CRUISE OS1 STATION 059 OBSERVED VALUES

DATE 24/03/63 HR 19.0 LAT 47-17 N LONG 129-05 W SNDG 2651 WEA 01 WIND VEL 22 DIR 14
BAROM 08. TEMP DRY 8.9 WET 8.9 RELHU 99 WTRCLR SECDI SEA 3 DIR 14 SWELL 3 DIR 13
CLOUD TYPE AMT 5 VIS 7 WIRE ANGLE(S) 6, 0,--

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN AOU	OXYGEN SATN
1	0	8.79	32.406	25.14	6.62	0.591	-0.019	103
1	5	8.81	32.405	25.14	6.64	0.593	-0.021	104
1	10	8.82	32.405	25.14	6.62	0.591	-0.019	103
1	20	8.84	32.408	25.14	6.66	0.595	-0.023	104
1	30	8.81	32.506*	25.22	6.56	0.586	-0.014	102
1	50	8.80	32.405	25.14	6.57	0.587	-0.015	103
1	75	8.77	32.433	25.17	6.55	0.585	-0.012	102
1	100	7.89	33.080	25.81	4.92	0.439	0.142	76
1	124	7.01	33.386	26.17	4.65	0.415	0.177	70
1	149	7.32	33.734	26.40	3.58	0.320	0.267	54
2	175	7.32	33.832	26.48	3.22	0.288	0.299	49
2	200	7.16	33.886	26.54	2.90	0.259	0.330	44
3	294	6.03	33.992	26.77	1.92	0.171	0.433	28

CNAV OSHAWA CRUISE OS1 STATION 059 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	SAL
0	0.56		9.88	32.399
7	0.55		10.68	32.394
24	0.58		1.10	32.394
51	0.62		0.14	32.409
	29.85		185.10	- WATER COLUMN VALUES

MESSENGER TIME 1206 INCOMING SOLAR RADIATION - AM 139 PM 257

CNAV OSHAWA CRUISE OS1 STATION 059 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	8.79	0.00	32.406	0.000	25.14	283.0	0.000	0.00	6.62	0.00	
10	8.82	0.00	32.405	0.000	25.14	283.7	0.029	0.02	6.62	0.00	
20	8.84	0.00	32.408	0.000	25.14	283.9	0.058	0.06	6.66	0.00	
30	8.81	0.00	32.406	0.002	25.14	283.8	0.086	0.13	6.56	0.00	1.10
50	8.80	0.00	32.405	0.000	25.14	284.0	0.143	0.37	6.57	0.00	
75	8.77	0.00	32.433	0.000	25.17	281.9	0.215	0.82	6.55	0.00	
100	7.89	0.00	33.080	0.000	25.81	221.6	0.278	1.38	4.92	0.00	
150	7.32	0.00	33.741	0.001	26.40	165.5	0.376	2.60	3.56	0.00	0.95
200	7.16	0.00	33.886	0.000	26.54	153.2	0.456	4.04	2.90	0.00	
250	6.57	0.03	33.935	0.009	26.66	142.5	0.531	5.75	2.34	0.00	52.44

CNAV OSHAWA CRUISE OS1 STATION 060 OBSERVED VALUES

DATE 25/03/63 HR 03.5 LAT 48-12 N LONG 130-00 W SNDG 2834 WEA WIND VEL 8 DIR 13
BAROM 11. TEMP DRY 9.4 WET 8.9 RELHU 94 WTRCLR SECDI SEA 2 DIR 13 SWELL 4 DIR 13
CLOUD TYPE AMT 2 VIS 7 WIRE ANGLE(S) 5,25

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN AOU	OXYGEN SATN
1	0	8.38	32.406	25.21	6.59	0.589	-0.011	102
1	5	8.36	32.408	25.21	6.65	0.594	-0.016	103
1	10	8.40	32.412	25.21	6.66	0.595	-0.017	103
1	20	8.38	32.401	25.20	6.63	0.592	-0.014	102
1	30	8.32	32.414	25.22	6.52	0.582	-0.004	101
1	50	8.30	32.409	25.22	6.62	0.591	-0.012	102
1	75	8.24	32.445	25.26	6.46	0.577	0.003	100
1	100	7.56	32.866	25.68	5.37	0.480	0.108	82
1	124	6.58	33.352	26.20	4.97	0.444	0.155	74
1	149	6.70	33.692	26.45	4.40	0.393	0.203	66
2	163*	6.64	33.718	26.48	4.31	0.385	0.212	65
2	187	6.74	33.886	26.60	3.92	0.350	0.244	59
2	279	5.84	33.922	26.74	3.15	0.281	0.326	46
2	1421	2.82	34.514	27.54	0.53	0.047	0.606	7
2	1708	2.17	34.568	27.63	1.03	0.092	0.572	14
2	2092	1.88	34.567*	27.66	1.39	0.124	0.545	19
2	2380	1.76	34.630	27.72	1.72	0.154	0.517	23

CNAV OSHAWA CRUISE OS1 STATION 060 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	8.38	0.00	32.406	0.000	25.21	277.1	0.000	0.00	6.59	0.00	
10	8.40	0.00	32.412	0.000	25.21	277.1	0.028	0.01	6.66	0.00	
20	8.38	0.00	32.401	0.000	25.20	277.8	0.056	0.06	6.63	0.00	
30	8.32	0.00	32.414	0.000	25.22	276.1	0.084	0.13	6.52	0.00	
50	8.30	0.00	32.409	0.000	25.22	276.5	0.140	0.36	6.62	0.00	
75	8.24	0.00	32.445	0.000	25.26	273.4	0.209	0.80	6.46	0.00	
100	7.56	0.00	32.866	0.000	25.68	233.0	0.273	1.37	5.37	0.00	
150	6.70	0.00	33.700	0.001	26.46	160.3	0.372	2.59	4.38	0.00	0.98
200	6.65	0.03	33.910	0.012	26.63	144.7	0.449	3.97	3.79	0.01	1.02
250	6.19	0.05	33.944	0.022	26.72	137.0	0.520	5.60	3.36	0.02	0.74
300	5.71	0.04	33.934	0.002	26.77	132.3	0.588	7.52	3.01	0.02	1.19
400	5.15	0.23	33.993	0.014	26.88	122.3	0.716	12.11	2.39	0.09	2.47
500	4.64	0.37	34.050	0.023	26.98	113.1	0.835	17.58	1.85	0.14	3.99
600	4.19	0.48	34.105	0.029	27.08	104.8	0.945	23.79	1.39	0.18	5.38
700	3.81	0.56	34.160	0.034	27.16	97.3	1.047	30.59	1.01	0.21	6.38
800	3.48	0.60	34.213	0.036	27.23	90.5	1.142	37.90	0.70	0.23	6.82
1000	3.02	0.56	34.315	0.034	27.36	79.1	1.314	53.68	0.32	0.21	5.86
1200	2.79	0.37	34.412	0.023	27.46	70.7	1.466	70.78	0.25	0.14	3.17
1500	2.62	0.01	34.532	0.001	27.57	61.7	1.667	98.57	0.65	0.02	0.61
2000	1.91	0.02	34.602	0.001	27.68	50.4	1.952	149.23	1.32	0.01	3.43

CNAV OSHAWA CRUISE OS1 STATION 061 OBSERVED VALUES

DATE 25/03/63 HR 09.1 LAT 48-14 N LONG 129-18 W SNDG 2286 WEA 02 WIND VEL 12 DIR 12
BAROM 11. TEMP DRY 8.9 WET 8.9 RELHU 99 WTRCLR SECDI SEA 2 DIR 13 SWELL 4 DIR 13
CLOUD TYPE AMT 2 VIS 7 WIRE ANGLE(S) 10,10

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN AOU	OXYGEN SATN
1	0	8.70	32.494	25.23	6.59	0.589	-0.015	103
1	5	8.74	32.489	25.22	6.52	0.582	-0.010	102
1	10	8.74	32.492	25.22	6.59	0.589	-0.016	103
1	20	8.73	32.490	25.22	6.59	0.589	-0.016	103
1	30	8.69	32.498	25.23	6.57	0.587	-0.013	102
1	50	8.67	32.502	25.24	6.60	0.589	-0.016	103
1	75	8.67	32.506	25.24	6.56	0.586	-0.012	102
1	99	8.43	32.604	25.35	6.34	0.566	0.010	98
1	124	7.17	32.945	25.80				
1	149	6.57	33.422	26.26	5.69	0.508	0.091	85
2	171	6.65	33.629	26.41	4.99	0.446	0.151	75
2	195	6.72	33.828	26.56	4.14	0.370	0.225	62
2	294	5.70	33.927	26.76	3.06	0.273	0.336	45
2	493	4.23	34.050	27.03	1.38	0.123	0.509	20
2	741	3.78	34.246	27.23	0.45	0.040	0.598	6
2	988	3.30	34.384	27.39	0.29	0.026	0.620	4
2	1486	2.49	34.477	27.53	0.76	0.068	0.591	10
2	1786	2.10	34.568	27.64	1.13	0.101	0.564	15

CNAV OSHAWA CRUISE OS1 STATION 061 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	8.70	0.00	32.494	0.000	25.23	275.1	0.000	0.00	6.59	0.00	
10	8.74	0.00	32.492	0.000	25.22	276.0	0.028	0.01	6.59	0.00	
20	8.73	0.00	32.490	0.000	25.22	276.2	0.056	0.06	6.59	0.00	
30	8.69	0.00	32.498	0.000	25.23	275.2	0.084	0.13	6.57	0.00	
50	8.67	0.00	32.502	0.000	25.24	274.9	0.139	0.36	6.60	0.00	
75	8.67	0.00	32.506	0.000	25.24	275.1	0.209	0.80	6.56	0.00	
100	8.38	0.01	32.614	0.001	25.37	263.3	0.276	1.41	6.33	0.00	0.99
150	6.57	0.00	33.434	0.001	26.27	178.4	0.388	2.78	5.66	0.00	0.93
200	6.69	0.02	33.847	0.009	26.57	149.9	0.470	4.25	4.04	0.03	1.09
250	6.27	0.09	33.956	0.047	26.72	137.0	0.543	5.92	3.29	0.15	1.27
300	5.64	0.00	33.931	0.001	26.77	131.7	0.610	7.83	3.00	0.00	0.99
400	4.81	0.01	33.997	0.005	26.92	118.0	0.736	12.32	2.07	0.01	0.77
500	4.21	0.01	34.056	0.000	27.04	107.8	0.850	17.57	1.34	0.00	0.97
600	3.94	0.06	34.135	0.004	27.13	99.8	0.955	23.48	0.85	0.02	0.68
700	3.80	0.04	34.214	0.002	27.20	93.2	1.053	29.98	0.53	0.01	0.80
800	3.66	0.00	34.284	0.000	27.27	87.3	1.144	37.01	0.37	0.02	0.73
1000	3.28	0.00	34.387	0.001	27.39	76.8	1.310	52.27	0.29	0.00	0.99
1200	2.93	0.00	34.434	0.013	27.46	70.7	1.459	69.13	0.41	0.04	0.90
1500	2.47	0.00	34.479	0.001	27.54	63.8	1.664	97.42	0.78	0.00	1.00

CNAV OSHAWA CRUISE OS1 STATION 062 OBSERVED VALUES

DATE 25/03/63 HR 14.2 LAT 48-14 N LONG 128-30 W SNDG 2468 WEA 01 WIND VEL 15 DIR 15
BAROM 11. TEMP DRY 8.9 WET 8.3 RELHU 92 WTRCLR SECDI SEA 2 DIR 15 SWELL 4 DIR 13
CLOUD TYPE AMT 7 VIS 7 WIRE ANGLE(S) 17,18

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN AOU	OXYGEN SATN
1	0	8.90	32.432	25.15	6.51	0.581	-0.011	102
1	5	8.93	32.424	25.14	6.53	0.583	-0.013	102
1	10	8.96	32.431	25.14	6.59	0.589	-0.019	103
1	19	8.98	32.434	25.14	6.43	0.574	-0.005	101
1	29	8.94	32.424	25.13	6.51	0.581	-0.011	102
1	48	8.92	32.426	25.14	6.55	0.585	-0.014	103
1	72	8.83	32.421	25.15	6.55	0.585	-0.013	102
1	96	8.50	32.656	25.38	5.26	0.470	0.105	82
1	119	7.40	33.179	25.95	5.02	0.448	0.140	76
1	143	7.36	33.516	26.22	4.27	0.381	0.206	65
2	164	7.16	33.664	26.37	4.18	0.373	0.216	63
2	187	7.23	33.854	26.51	3.12	0.279	0.309	47
2	280	6.03	33.942	26.74	2.89	0.258	0.346	43
2	470	4.85	34.068	26.98	0.97	0.087	0.535	14
2	710	4.14	34.252	27.20	0.30	0.027	0.606	4
2	950	3.58	34.372	27.35	0.28	0.025	0.616	4
2	1434	2.59	34.459*	27.51	0.64	0.057	0.600	9
2	1724	2.18	34.562	27.63	1.09	0.097	0.566	15

CNAV OSHAWA CRUISE OS1 STATION 062 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	SAL
0	0.39		7.28	32.418
0			8.74	

MESSENGER TIME 0625 INCOMING SOLAR RADIATION - AM 231 PM 182

THE SECOND PRODUCTIVITY VALUE WAS INCUBATED AT 50 PERCENT LIGHT INTENSITY INSTEAD OF 100 PERCENT

CNAV OSHAWA CRUISE OS1 STATION 062 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	8.90	0.00	32.432	0.000	25.15	282.7	0.000	0.00	6.51	0.00	
10	8.96	0.00	32.431	0.000	25.14	283.8	0.029	0.02	6.59	0.00	
20	8.98	0.00	32.433	0.000	25.14	284.1	0.058	0.06	6.43	0.00	0.88
30	8.94	0.00	32.424	0.000	25.13	284.4	0.086	0.13	6.51	0.00	0.97
50	8.92	0.00	32.421	0.003	25.14	284.6	0.144	0.37	6.58	0.02	0.91
75	8.82	0.01	32.435	0.001	25.16	282.5	0.215	0.83	6.39	0.04	0.84
100	8.30	0.04	32.744	0.012	25.48	252.5	0.282	1.43	5.20	0.03	0.78
150	7.29	0.02	33.572	0.006	26.28	177.6	0.391	2.77	4.26	0.05	0.66
200	7.12	0.06	33.900	0.022	26.56	151.7	0.474	4.25	2.91	0.14	1.23
250	6.52	0.10	33.974	0.039	26.70	139.0	0.547	5.93	2.63	0.25	1.07
300	5.85	0.02	33.957	0.001	26.77	132.4	0.615	7.86	2.70	0.05	0.96
400	5.15	0.05	34.025	0.003	26.91	120.0	0.743	12.41	1.72	0.12	0.75
500	4.73	0.01	34.092	0.002	27.01	111.1	0.859	17.78	0.81	0.02	0.86
600	4.40	0.03	34.170	0.004	27.11	102.4	0.967	23.86	0.45	0.05	0.67
700	4.16	0.00	34.245	0.001	27.19	95.0	1.067	30.51	0.30	0.01	0.94
800	3.92	0.00	34.302	0.00.	27.26	88.8	1.160	37.66	0.25	0.02	0.64
1000	3.46	0.00	34.391	0.002	27.38	78.6	1.329	53.25	0.29	0.00	1.67
1200	3.03	0.01	34.451	0.010	27.47	70.7	1.481	70.29	0.40	0.00	7.31
1500	2.48	0.00	34.514	0.016	27.57	61.4	1.681	98.01	0.73	0.00	9.56

CNAV OSHAWA CRUISE OS1 STATION 063 OBSERVED VALUES

DATE 25/03/63 HR 18.8 LAT 48-14 N LONG 128-00 W SNDG 2560 WEA 01 WIND VEL 10 DIR 17
BAROM 16. TEMP DRY 9.4 WET 8.9 RELHU 94 WTRCLR SECDI SEA 2 DIR 18 SWELL 3 DIR 18
CLOUD TYPE AMT 1 VIS 7 WIRE ANGLE(S) 0,14

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN AOU	OXYGEN SATN
1	0	8.73	32.300	25.07	6.63	0.592	-0.019	103
1	5	8.71	32.282	25.06	6.62	0.591	-0.017	103
1	10	8.80	32.327	25.08	6.74	0.602	-0.029	105
1	20	8.76	32.335	25.09	6.73	0.601	-0.028	105
1	30	8.71	32.338	25.10	6.58	0.588	-0.014	102
1	50	8.70	32.350	25.11	6.60	0.589	-0.016	103
1	75	8.68	32.382	25.14	6.60	0.589	-0.016	103
1	100	8.11	33.199	25.87	4.49	0.401	0.177	69
1	125	7.63	33.808	26.41	2.47	0.221	0.362	38
1	150	7.57	33.871	26.47	2.20	0.196	0.386	34
2	168	7.48	33.880	26.49	2.29	0.205	0.380	35
2	289*	6.86	33.962	26.64	2.18	0.195	0.398	33
2	483*	5.34	34.056	26.91	1.20	0.107	0.507	17
2	727	4.19	34.250	27.19	0.31	0.028	0.604	4
2	970	3.56	34.405	27.38	0.27	0.024	0.617	4
2	1458	2.58	34.472*	27.52	0.69	0.062	0.596	9
2	1752	2.17	34.442*	27.53	1.07	0.096	0.569	14

CNAV OSHAWA CRUISE OS1 STATION 063 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	SAL
0	0.68		16.28	32.200
7	0.72		13.78	32.197
24	0.86		2.40	32.220
51	0.37		0.00	32.334
	34.92		275.14	- WATER COLUMN VALUES

MESSENGER TIME 1041 INCOMING SOLAR RADIATION - AM 231 PM 182

CNAV OSHAWA CRUISE OS1 STATION 063 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	8.73	0.00	32.300	0.000	25.07	290.0	0.000	0.00	6.63	0.00	
10	8.80	0.00	32.327	0.000	25.08	289.2	0.030	0.02	6.74	0.00	
20	8.76	0.00	32.335	0.000	25.09	288.2	0.059	0.06	6.73	0.00	
30	8.71	0.00	32.338	0.000	25.10	287.4	0.088	0.13	6.58	0.00	
50	8.70	0.00	32.350	0.000	25.11	286.6	0.146	0.37	6.60	0.00	
75	8.68	0.00	32.382	0.000	25.14	284.4	0.217	0.83	6.60	0.00	
100	8.11	0.00	33.199	0.000	25.87	215.9	0.280	1.39	4.49	0.00	
150	7.57	0.00	33.871	0.000	26.47	159.2	0.375	2.57	2.20	0.00	
200	7.27	0.03	33.899	0.002	26.54	153.8	0.454	3.98	2.27	0.11	3.77
250	6.95	0.07	33.929	0.004	26.60	147.9	0.530	5.73	2.21	0.25	11.19
300	6.63	0.11	33.960	0.006	26.67	142.1	0.603	7.80	2.12	0.36	19.77
400	6.02	0.14	34.024	0.008	26.80	130.7	0.741	12.72	1.87	0.48	31.94
500	5.43	0.14	34.090	0.008	26.93	119.6	0.867	18.53	1.51	0.48	30.31
600	4.87	0.10	34.159	0.006	27.05	108.7	0.982	25.02	1.05	0.35	16.15
700	4.33	0.03	34.230	0.001	27.16	98.0	1.087	31.98	0.48	0.09	2.00
800	3.97	0.01	34.300	0.001	27.25	89.5	1.181	39.27	0.26	0.01	99.99
1000	3.49	0.00							0.28	0.00	0.97
1200	3.05	0.00							0.41	0.02	0.89
1500	2.51	0.00							0.74	0.00	11.79

CNAV OSHAWA CRUISE OS1 STATION 064 OBSERVED VALUES

DATE 25/03/63 HR 22.3 LAT 48-15 N LONG 127-32 W SNDG 2560 WEA 03 WIND VEL 3 DIR 15
BAROM 17. TEMP DRY 11.7 WET 10.0 RELHU 81 WTRCLR SECDI SEA 2 DIR 18 SWELL 3 DIR 18
CLOUD TYPE 6 AMT 4 VIS 7 WIRE ANGLE(S) 0,20

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN AOU	OXYGEN SATN
1	0	8.83	32.140	24.93	6.64	0.593	-0.020	104
1	5	9.07	32.417	25.11	6.64	0.593	-0.024	104
1	10	9.00	32.414	25.12	6.68	0.597	-0.027	105
1	20	8.91	32.422	25.14	6.66	0.595	-0.024	104
1	30	8.88	32.427	25.15	6.65	0.594	-0.023	104
1	50	8.85	32.424	25.15	6.68	0.597	-0.025	104
1	75	8.86	32.418	25.14	6.58	0.588	-0.016	103
1	100	8.04	33.161	25.85	4.62	0.413	0.167	71
1	125	7.76	33.550	26.19	3.41	0.305	0.277	52
1	150	7.59	33.817	26.43	2.89	0.258	0.325	44
2	163	7.57	33.820*	26.43	2.84	0.254	0.329	44
2	186	7.32	33.896	26.53	2.68	0.239	0.347	41
2	279	6.08	33.939	26.73	2.54	0.227	0.377	38
2	471	4.90	34.091	26.99	0.86	0.077	0.544	12
2	713	4.14	34.277	27.22	0.34	0.030	0.602	5
2	957	3.60	34.390	27.36	0.28	0.025	0.615	4
2	1448	2.57	34.508	27.55	0.65	0.058	0.599	9
2	1744	2.23	34.560	27.62	1.00	0.089	0.573	13

CNAV OSHAWA CRUISE OS1 STATION 064 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	8.83	0.00	32.140	0.000	24.93	303.3	0.000	0.00	6.64	0.00	
10	9.00	0.00	32.414	0.000	25.12	285.6	0.030	0.02	6.68	0.00	
20	8.91	0.00	32.422	0.000	25.14	283.9	0.059	0.06	6.66	0.00	
30	8.88	0.00	32.427	0.000	25.15	283.2	0.087	0.13	6.65	0.00	
50	8.85	0.00	32.424	0.000	25.15	283.3	0.144	0.37	6.68	0.00	
75	8.86	0.00	32.418	0.000	25.14	284.3	0.216	0.83	6.58	0.00	
100	8.04	0.00	33.161	0.000	25.85	217.7	0.279	1.38	4.62	0.00	
150	7.59	0.00	33.817	0.000	26.43	163.5	0.375	2.58	2.89	0.00	
200	7.13	0.02	33.909	0.005	26.56	151.1	0.455	4.00	2.65	0.03	1.24
250	6.46	0.03	33.937	0.009	26.68	140.9	0.528	5.69	2.56	0.04	1.05
300	5.89	0.02	33.954	0.001	26.76	133.1	0.597	7.64	2.37	0.05	0.96
400	5.20	0.05	34.030	0.003	26.91	120.1	0.725	12.20	1.53	0.12	0.76
500	4.78	0.01	34.115	0.001	27.02	109.9	0.841	17.55	0.74	0.02	0.87
600	4.43	0.02	34.195	0.003	27.12	100.8	0.947	23.54	0.44	0.05	0.67
700	4.17	0.00	34.268	0.000	27.21	93.3	1.046	30.08	0.34	0.01	0.92
800	3.93	0.01	34.324	0.001	27.28	87.4	1.137	37.11	0.28	0.01	0.65
1000	3.50	0.01	34.404	0.001	27.38	78.0	1.304	52.51	0.29	0.01	0.96
1200	3.05	0.02	34.460	0.004	27.47	70.1	1.454	69.42	0.41	0.02	0.89
1500	2.49	0.00	34.517	0.000	27.57	61.2	1.654	97.00	0.71	0.00	11.42

CNAV OSHAWA CRUISE OS1 STATION 065 OBSERVED VALUES

DATE 26/03/63 HR 01.8 LAT 48-14 N LONG 127-03 W SNDG 2560 WEA 03 WIND VEL 10 DIR 13
BAROM 18. TEMP DRY 10.0 WET 9.4 RELHU 93 WTRCLR SECDI SEA 2 DIR 13 SWELL 4 DIR 14
CLOUD TYPE AMT 7 VIS 7 WIRE ANGLE(S) 2

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN ADU	OXYGEN SATN
1	0	8.92	32.239	24.99	6.62	0.591	-0.020	103
1	5	8.83	32.238	25.01	6.68	0.597	-0.024	104
1	10	8.67	32.238	25.03	6.66	0.595	-0.020	104
1	20	8.65	32.240	25.04	6.68	0.597	-0.022	104
1	30	8.63	32.236	25.04	6.64	0.593	-0.018	103
1	50	8.58	32.248	25.05	6.62	0.591	-0.015	103
1	75	8.56	32.512	25.26	6.22	0.556	0.019	97
1	100	7.86	33.269	25.96	4.50	0.402	0.179	69
1	125	7.53	33.594	26.26	3.77	0.337	0.248	58
1	150	7.23	33.801	26.46	3.49	0.312	0.276	53

CNAV OSHAWA CRUISE OS1 STATION 065 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	8.92	0.00	32.239	0.000	24.99	297.3	0.000	0.00	6.62	0.00	
10	8.67	0.00	32.238	0.000	25.03	293.9	0.030	0.02	6.66	0.00	
20	8.65	0.00	32.240	0.000	25.04	293.6	0.060	0.06	6.68	0.00	
30	8.63	0.00	32.236	0.000	25.04	293.8	0.089	0.14	6.64	0.00	
50	8.58	0.00	32.248	0.000	25.05	292.5	0.149	0.38	6.62	0.00	
75	8.56	0.00	32.512	0.000	25.26	273.0	0.220	0.83	6.22	0.00	
100	7.86	0.00	33.269	0.000	25.96	207.2	0.280	1.37	4.50	0.00	
150	7.23	0.00	33.801	0.000	26.46	159.8	0.373	2.52	3.49	0.00	

CNAV OSHAWA CRUISE OS1 STATION 066 OBSERVED VALUES

DATE 26/03/63 HR 04.0 LAT 48-14 N LONG 126-35 W SNDG 2377 WEA 02 WIND VEL 15 DIR 12
BAROM 18. TEMP DRY 8.3 WET 8.3 RELHU 99 WTRCLR SECDI SEA 2 DIR 13 SWELL 4 DIR 14
CLOUD TYPE AMT 8 VIS 7 WIRE ANGLE(S) 15,26

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN AOU	OXYGEN SATN
1	0	9.02	32.230	24.97	5.25	0.469	0.101	82
1	5	9.05	32.227	24.96	4.56	0.407	0.162	71
1	10	9.05	32.235	24.97	4.74	0.423	0.147	74
1	19	9.00	32.249	24.99	5.55	0.496	0.075	87
1	29	8.98	32.264	25.00	5.90	0.527	0.043	92
1	48	8.88	32.365	25.10	5.60	0.500	0.071	88
1	72	8.75	32.766	25.43	5.05	0.451	0.120	79
1	97	8.02	33.130	25.83	4.52	0.404	0.176	70
1	121	7.85	33.646	26.25	2.63*	0.235	0.345	41
1	145	7.52	33.809	26.43	2.75*	0.246	0.338	42
2	160	7.44	33.827	26.46	3.37	0.301	0.284	51
2	179	7.11	33.874	26.54	3.43	0.306	0.283	52
2	269	6.41	33.968	26.71	2.33	0.208	0.391	35
2	453	4.82			1.08	0.096		
2	685	4.25	34.238	27.18	0.38	0.034	0.597	5
2	919	3.61	34.262*	27.26	0.31	0.028	0.613	4
2	1200	3.12	34.457	27.46	0.39	0.035	0.613	5
2	1671	2.37	34.553	27.61	0.86	0.077	0.584	12
2	1954	2.04	34.584	27.66	1.25	0.112	0.554	17
2	2170	1.85	34.630	27.71	1.38	0.123	0.546	18

CNAV OSHAWA CRUISE OS1 STATION 066 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	9.02	0.00	32.230	0.000	24.97	299.4	0.000	0.00	5.25	0.00	
10	9.05	0.00	32.235	0.000	24.97	299.7	0.031	0.02	4.74	0.00	
20	9.00	0.00	32.250	0.000	24.99	298.0	0.061	0.06	5.61	0.00	0.88
30	8.98	0.00	32.266	0.001	25.01	296.6	0.091	0.14	5.90	0.01	0.97
50	8.88	0.01	32.394	0.004	25.12	286.0	0.149	0.38	5.56	0.00	0.91
75	8.66	0.02	32.806	0.004	25.48	252.6	0.217	0.81	4.98	0.00	0.86
100	7.99	0.01	33.200	0.009	25.88	214.1	0.276	1.33	4.44	0.01	1.00
150	7.50	0.01	33.818	0.003	26.44	162.2	0.371	2.52	3.47	0.04	1.15
200	6.89	0.04	33.906	0.006	26.59	148.1	0.449	3.91	3.26	0.08	1.53
250	6.50	0.04	33.958	0.005	26.69	139.9	0.522	5.58	2.64	0.07	1.02
300	6.11	0.03	33.994	0.002	26.77	132.8	0.590	7.52	2.05	0.02	1.17
400	5.24	0.04	34.072	0.007	26.93	117.4	0.717	12.02	1.34	0.02	1.56
500	4.64	0.04	34.140	0.008	27.06	106.4	0.830	17.22	0.87	0.01	1.45
600	4.37	0.06	34.197	0.005	27.13	100.0	0.934	23.10	0.54	0.01	1.02
700	4.21	0.00	34.246	0.000	27.19	95.4	1.033	29.69	0.36	0.01	0.96
800	3.93	0.01	34.298	0.000	27.26	89.2	1.126	36.88	0.30	0.02	0.78
1000	3.45	0.01	34.387	0.000	27.38	78.8	1.296	52.51	0.32	0.00	0.73
1200	3.12	0.00	34.457	0.000	27.46	71.1	1.448	69.63	0.39	0.00	
1500	2.62	0.01	34.527	0.001	27.56	62.0	1.650	97.59	0.65	0.01	0.84
2000	2.00	0.00	34.591	0.000	27.67	52.2	1.940	149.33	1.30	0.00	2.56

CNAV OSHAWA CRUISE OS1 STATION 067 OBSERVED VALUES

DATE 26/03/63 HR 08.0 LAT 48-14 N LONG 126-06 W SNDG 1372 WEA 01 WIND VEL 15 DIR 12
BAROM 18. TEMP DRY 7.8 WET 7.2 RELHU 92 WTRCLR SECDI SEA 2 DIR 12 SWELL 3 DIR 14
CLOUD TYPE AMT 5 VIS 7 WIRE ANGLE(S) 10,20

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN AOU	OXYGEN SATN
1	0	8.78	31.910	24.76	6.66	0.595	-0.020	104
1	5	8.84	31.902	24.74	6.69	0.598	-0.024	104
1	10	8.84	31.907	24.75	6.71	0.599	-0.026	104
1	20	8.79	31.908	24.75	6.73	0.601	-0.027	105
1	30	8.81	32.122	24.92	6.63	0.592	-0.019	103
1	49	8.72	32.330	25.10	6.51	0.581	-0.008	101
1	74	8.44	32.637	25.38	5.86	0.523	0.053	91
1	99	8.25	33.218	25.86	4.59	0.410	0.166	71
1	124	7.99	33.538	26.15	3.71	0.331	0.247	57
1	149	7.39	33.802	26.44	3.55	0.317	0.268	54
2	162	7.32	33.838	26.48	3.48	0.311	0.276	53
2	186	7.01	33.900	26.57	3.19	0.285	0.306	48
2	280	6.36	34.033	26.76	1.98	0.177	0.423	30
2	472	5.21	34.100	26.96	0.93	0.083	0.533	13
2	713	4.21	34.256	27.19	0.36	0.032	0.599	5
2	1041	3.51	34.409	27.39	0.35	0.031	0.611	5

CNAV OSHAWA CRUISE OS1 STATION 067 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	8.78	0.00	31.910	0.000	24.76	319.7	0.000	0.00	6.66	0.00	
10	8.84	0.00	31.907	0.000	24.75	321.0	0.033	0.02	6.71	0.00	
20	8.79	0.00	31.908	0.000	24.75	320.3	0.065	0.07	6.73	0.00	
30	8.81	0.00	32.122	0.000	24.92	304.9	0.097	0.15	6.63	0.00	
50	8.71	0.00	32.339	0.002	25.10	287.6	0.156	0.39	6.50	0.00	0.95
75	8.43	0.00	32.660	0.003	25.40	260.2	0.225	0.83	5.81	0.01	0.94
100	8.24	0.00	33.234	0.001	25.87	215.3	0.285	1.36	4.54	0.00	0.94
150	7.38	0.00	33.806	0.001	26.45	161.5	0.380	2.54	3.55	0.00	0.87
200	6.88	0.02	33.927	0.002	26.61	146.5	0.458	3.93	3.00	0.01	1.22
250	6.52	0.03	34.004	0.004	26.72	136.7	0.529	5.57	2.35	0.02	1.04
300	6.23	0.00	34.045	0.005	26.79	130.5	0.596	7.47	1.81	0.02	0.96
400	5.61	0.00	34.088	0.013	26.90	120.8	0.723	12.01	1.18	0.05	0.75
500	5.07	0.00	34.117	0.002	26.99	113.2	0.841	17.46	0.83	0.01	0.88
600	4.62	0.00	34.180	0.005	27.09	104.2	0.951	23.64	0.55	0.01	0.64
700	4.25	0.00	34.247	0.001	27.18	95.9	1.052	30.38	0.37	0.00	0.91
800	3.96	0.00	34.312	0.006	27.27	88.5	1.146	37.56	0.30	0.02	1.64
1000	3.56	0.00	34.402	0.005	27.38	78.9	1.315	53.15	0.33	0.02	0.91

CNAV OSHAWA CRUISE OS1 STATION 068 OBSERVED VALUES

DATE 26/03/63 HR 11.5 LAT 48-14 N LONG 125-37 W SNDG 155 WEA 01 WIND VEL 13 DIR 10
BAROM 17. TEMP DRY 8.9 WET 8.9 RELHU 99 WTRCLR SECDI SEA 1 DIR 09 SWELL 1 DIR 12
CLOUD TYPE AMT 3 VIS 7 WIRE ANGLE(S) 0

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN AOU	OXYGEN SATN
1	0	8.66	31.872	24.75	6.54	0.584	-0.008	101
1	5	8.68	31.876	24.75	6.57	0.587	-0.011	102
1	10	8.74	31.868	24.73	6.60	0.589	-0.014	102
1	20	8.70	31.876	24.74	6.59	0.589	-0.013	102
1	30	8.51	31.929	24.81	6.55	0.585	-0.007	101
1	50	8.52	32.599	25.34	5.86	0.523	0.052	91
1	75	7.85	33.234	25.93	4.54	0.405	0.176	70
1	100	7.88	33.559	26.18	3.53	0.315	0.265	54
1	125	7.73			3.15*	0.281		
1	150	7.21	33.760	26.44	2.84	0.254	0.335	43

CNAV OSHAWA CRUISE OS1 STATION 068 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	8.66	0.00	31.872	0.000	24.75	320.8	0.000	0.00	6.54	0.00	
10	8.74	0.00	31.868	0.000	24.73	322.4	0.033	0.02	6.60	0.00	
20	8.70	0.00	31.876	0.000	24.74	321.4	0.065	0.07	6.59	0.00	
30	8.51	0.00	31.929	0.000	24.81	314.9	0.097	0.15	6.55	0.00	
50	8.52	0.00	32.599	0.000	25.34	265.6	0.156	0.38	5.86	0.00	
75	7.85	0.00	33.234	0.000	25.93	209.3	0.216	0.76	4.54	0.00	
100	7.88	0.00	33.559	0.000	26.18	185.9	0.265	1.20	3.53	0.00	
150	7.21	0.00	33.760	0.000	26.44	162.5	0.353	2.31	2.84	0.00	

CNAV OSHAWA CRUISE OS1 STATION 069 OBSERVED VALUES

DATE 26/03/63 HR 13.8 LAT 48-14 N LONG 125-09 W SNDG 119 WEA 03 WIND VEL 15 DIR 05
BAROM 15. TEMP DRY . WET . RELHU WTRCLR SECDI SEA 2 DIR 05 SWELL 3 DIR 15
CLOUD TYPE AMT VIS WIRE ANGLE(S) 15

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN AOU	OXYGEN SATN
1	0	8.68	31.952	24.81				
1	10	8.64	31.959	24.82				
1	19	8.67	31.961	24.81	6.60	0.589	-0.014	102
1	29	8.70	31.961	24.81	6.55	0.585	-0.010	102
1	48	8.57	32.617	25.34	5.61	0.501	0.073	87
1	72	8.11	33.116	25.80	4.26	0.380	0.198	66
1	97	7.32	33.634	26.32	2.89	0.258	0.329	44
1	106	7.27	33.682	26.37	2.80	0.250	0.338	43

CNAV OSHAWA CRUISE OS1 STATION 069 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	8.68	0.00	31.952	0.000	24.81	315.2	0.000	0.00			
10	8.64	0.00	31.959	0.000	24.82	314.2	0.032	0.02			
20	8.67	0.00	31.956	0.004	24.81	315.1	0.064	0.07	6.60	0.00	0.88
30	8.70	0.00	31.988	0.009	24.83	313.2	0.096	0.15	6.52	0.01	0.97
50	8.54	0.00	32.666	0.005	25.38	260.9	0.153	0.38	5.50	0.00	0.91
75	8.00	0.02	33.193	0.010	25.88	214.4	0.213	0.76	4.05	0.03	0.87
100	7.28	0.01	33.662	0.003	26.35	170.0	0.262	1.18	2.83	0.01	0.69

CNAV OSHAWA CRUISE OS1 STATION 69A BIOLOGICAL DATA

DATE 26/03/63 LAT 48-13 N LONG 125-01 W

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I
0	0.60		

MESSENGER TIME 0625

CNAV OSHAWA CRUISE OS1 STATION 070 OBSERVED VALUES

POINT OF THE ARCHES

DATE 26/03/63 HR 15.3 LAT 48-14 N LONG 124-52 W SNDG 64 WEA 02 WIND VEL 10 DIR 07
BAROM 16. TEMP DRY 9.4 WET 8.9 RELHU 94 WTRCLR SECDI SEA 2 DIR 07 SWELL 3 DIR 16
CLOUD TYPE AMT 8 VIS 7 WIRE ANGLE(S) 20

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN AOU	OXYGEN SATN
1	0	8.80	29.421	22.81	6.66	0.595	-0.011	102
1	5	8.77	30.144	23.38	6.68	0.597	-0.015	103
1	9	8.73	30.992	24.05	6.65	0.594	-0.015	103
1	19	8.76	31.354	24.33	6.69	0.598	-0.020	104
1	28	8.67	31.584	24.52	6.45	0.576	0.001	100
1	47	8.59	31.794	24.70	6.27	0.560	0.018	97

CNAV OSHAWA CRUISE OS1 STATION 070 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	8.80	0.00	29.421	0.000	22.81	505.3	0.000	0.00	6.66	0.00	
10	8.73	0.00	31.087	0.036	24.12	380.4	0.045	0.02	6.66	0.01	1.00
20	8.75	0.00	31.384	0.000	24.35	358.7	0.082	0.08	6.67	0.01	0.85
30	8.65	0.01	31.623	0.000	24.55	339.6	0.118	0.17	6.39	0.01	1.54

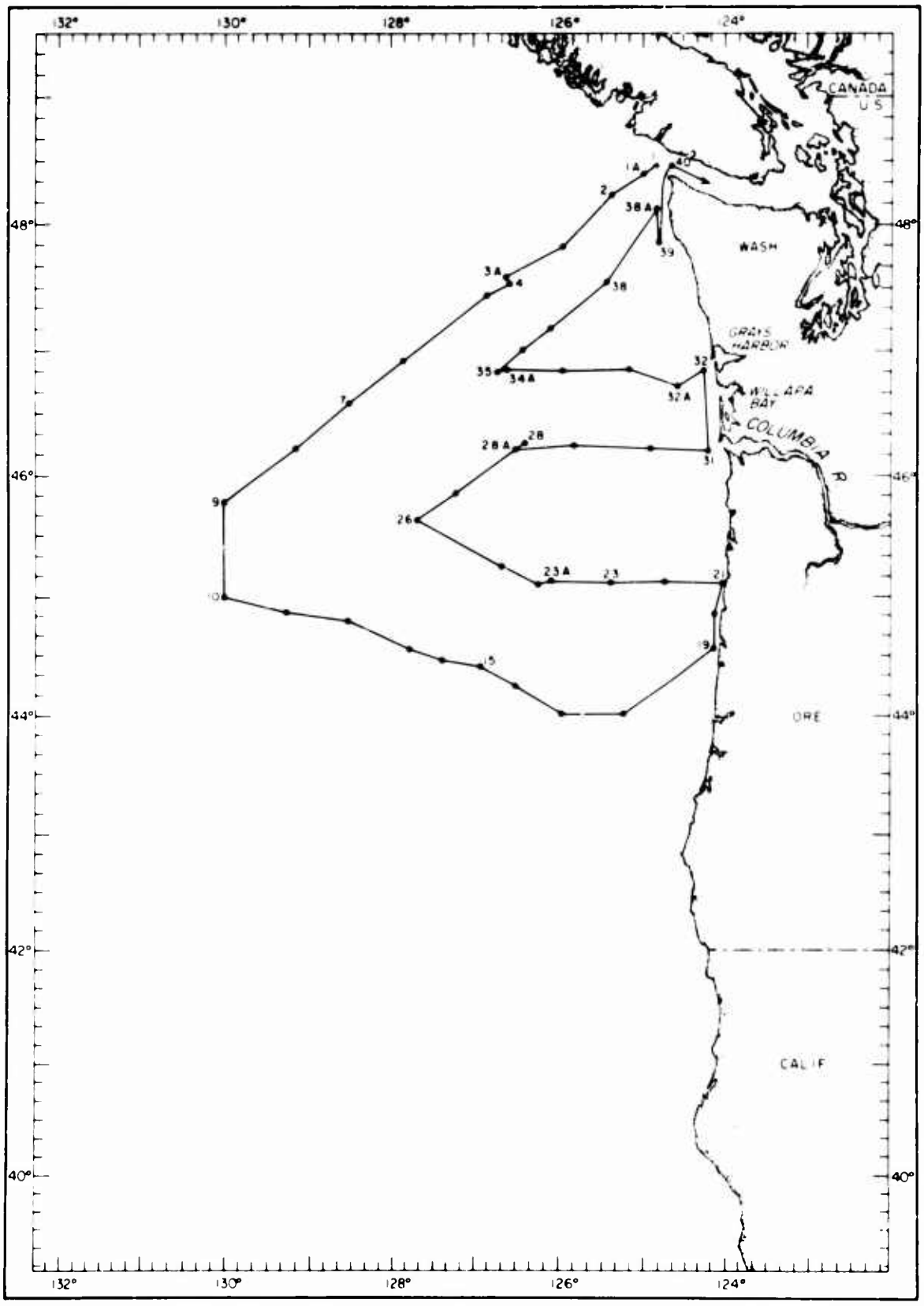

Fig. 2. Station locations Brown Bear Cruise 320, 28 March – 10 April 1963

BROWN BEAR CRUISE 320 STATION 001 OBSERVED VALUES

TATOOSH ISLAND

DATE 29/03/63 HR 12.5 LAT 48-27 N LONG 124-51 W SNDG 281 WEA 21 WIND VEL 26 DIR 23
BAROM 28.0 TEMP DRY 7.9 WET 5.8 RELHU 72 WTRCLR SECDI SEA 2 DIR 23 SWELL 3 DIR 23
CLOUD TYPE 7 AMT 2 VIS 7 WIRE ANGLE(S) 25

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN AOU	OXYGEN SATN
1	0	8.57	31.447	24.43	6.20	0.554	0.025	96
1	4	8.58	31.546	24.50	5.81	0.519	0.060	90
1	9	8.61	31.631	24.57	5.95	0.531	0.046	92
1	18	8.68	31.764	24.66	5.78	0.516	0.060	90
1	26	8.70	31.777	24.67	5.85	0.522	0.054	91
1	44	8.67	31.876	24.75	5.66	0.506	0.071	88
1	66	8.58	31.886	24.77	5.52	0.493	0.084	85
1	88	7.85	32.496	25.35	4.18	0.373	0.211	64
1	110	7.64	33.041	25.81	3.29	0.294	0.292	50
1	132	7.37	33.534	26.24	3.16	0.282	0.305	48
1	153	7.34	33.534	26.24	3.08	0.275	0.312	47
1	174	7.24	33.658	26.35	2.90	0.259	0.329	44
1	218	7.15	33.790	26.47	2.90	0.259	0.330	44

BROWN BEAR CRUISE 320 STATION 001 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	SAL
0	0.98	1.25		30.590
3	1.23	2.08		30.601
6	1.33	2.03		30.590
12	1.42	2.38		30.587
	15.43	24.40	- WATER COLUMN VALUES	

MESSENGER TIME 0315 INCOMING SOLAR RADIATION - AM 162 PM 121

ZOOPLANKTON (CLARKE-BUMPUS) HORIZ - TIME 0211-0221 DEPTHS 100, 70
0250-0300 35, 0

BROWN BEAR CRUISE 320 STATION 001 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	8.57	0.00	31.447	0.000	24.43	351.2	0.000	0.00	6.20	0.00	
10	8.62	0.00	31.650	0.002	24.58	336.9	0.035	0.02	5.94	0.01	0.93
20	8.69	0.00	31.771	0.004	24.66	329.0	0.069	0.07	5.79	0.01	0.71
30	8.70	0.00	31.798	0.005	24.68	327.3	0.102	0.15	5.83	0.02	0.94
50	8.68	0.02	31.855	0.024	24.73	323.1	0.167	0.42	5.68	0.04	0.75
75	8.29	0.05	32.103	0.027	24.98	299.5	0.246	0.92	5.02	0.07	0.65
100	7.71	0.02	32.801	0.001	25.61	239.9	0.314	1.52	3.62	0.01	0.64
150	7.34	0.01	33.544	0.012	26.25	180.3	0.419	2.84	3.09	0.00	0.82
200	7.14	0.01	33.719	0.026	26.41	165.3	0.507	4.40	2.78	0.02	12.40

BROWN BEAR CRUISE 320 STATION 01A BIOLOGICAL DATA

DATE 29/03/63 LAT 48-24 N LONG 124-59 W

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	SAL
0	0.51	0.52	2.10	31.840

MESSENGER TIME 0626 INCOMING SOLAR RADIATION - AM 162 PM 121

BROWN BEAR CRUISE 320 STATION 002 OBSERVED VALUES

DATE 30/03/63 HR 00.0 LAT 48-14 N LONG 125-23 W SNDG 113 WEA 02 WIND VEL 30 DIR 23
BAROM 97.0 TEMP DRY 6.9 WET 5.2 RELHU 78 WTRCLR SECDI SEA 3 DIR 23 SWELL 4 DIR 23
CLOUD TYPE 8 AMT 7 VIS 7 WIRE ANGLE(S) 15

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN AOU	OXYGEN SATN
1	0	8.88	32.022	24.83	5.92	0.529	0.044	92
1	5	8.83	32.022	24.84	5.85	0.522	0.051	91
1	15	8.84	32.026	24.84	6.31	0.564	0.010	98
1	24	8.88	32.019	24.83	5.90	0.527	0.046	92
1	44	8.96	32.753	25.39	5.92	0.529	0.040	93
1	68	8.66	33.579	26.08	4.89	0.437	0.133	77
1	92	7.50			2.77	0.247		

BROWN BEAR CRUISE 320 STATION 002 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	LIGHT SAT PROD	LIGHT SAT FILT	SAL	PHOS	NITR	SIL
0	0.55	0.56	4.00			32.111	0.85	5.1	10
7	0.64	0.70	4.66			32.111	0.87	5.1	10
24	0.72	0.85	0.80			32.107	0.87	5.0	10
49	0.75	0.93	0.00	0.21	100	32.107	0.75	3.6	8
				0.24	59				
				0.21	44				
				0.24	32				
				0.13	13				
				0.03	4				
100	0.61	0.23				32.142	0.91	5.4	10
	34.05	39.74	86.46	- WATER COLUMN VALUES					

MESSENGER TIME 1146 INCOMING SOLAR RADIATION - AM 162 PM 121

LIGHT SATURATION INCUBATOR ILLUMINATION 22200

BROWN BEAR CRUISE 320 STATION 002 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	8.88	0.00	32.022	0.000	24.83	312.8	0.000	0.00	5.92	0.00	
10	8.82	0.00	32.024	0.001	24.84	312.0	0.032	0.02	6.09	0.07	0.81
20	8.86	0.00	32.010	0.009	24.82	313.8	0.063	0.07	6.11	0.04	0.58
30	8.92	0.01	32.187	0.038	24.95	301.7	0.094	0.14	5.88	0.07	0.91
50	8.95	0.01	33.036	0.047	25.61	239.3	0.149	0.36	5.77	0.00	1.66
75	8.43	0.01									

BROWN BEAR CRUISE 320 STATION 003 OBSERVED VALUES

DATE 30/03/63 HR 07.4 LAT 47-50 N LONG 125-57 W SNDG 1646 WEA 02 WIND VEL 24 DIR 20
BAROM 00.7 TEMP DRY 7.2 WET 5.0 RELHU 71 WTRCLR SECDI SEA 2 DIR 20 SWELL 1 DIR 18
CLOUD TYPE 8 AMT 3 VIS 7 WIRE ANGLE(S) 22, 7

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN AOU	OXYGEN SATN
2	0	8.90	32.165	24.94	6.65	0.594	-0.022	104
2	5	8.87	32.141	24.92	6.73	0.601	-0.029	105
2	10	8.85	32.135	24.92	6.65	0.594	-0.021	104
2	20	8.92	32.178	24.95	6.73	0.601	-0.030	105
2	31	8.96	32.183	24.94	6.73	0.601	-0.030	105
2	51	9.05	32.252	24.98	6.55	0.585	-0.015	103
2	75	8.60	32.611	25.33	5.91	0.528	0.046	92
2	100	8.13	33.163	25.84	4.60	0.411	0.167	71
2	125	7.96	33.396	26.04	4.13	0.369	0.211	64
2	150	7.58	33.597	26.26	3.89	0.347	0.236	60
2	174	7.35	33.753	26.41	3.44	0.307	0.279	52
1	190	7.12	33.875	26.54	2.97	0.265	0.324	45
1	286	5.84	34.018	26.82	1.58	0.141	0.466	23
1	478	4.93	34.131	27.02	0.74	0.066	0.554	11
1	719	4.17	34.273	27.21	0.32	0.029	0.603	5
1	960	3.57	34.391	27.37	0.27	0.024	0.617	4
1	1445	2.64	34.519	27.56	0.73	0.065	0.591	10
1	1542	2.53	34.526	27.57	0.77	0.069	0.589	10

BROWN BEAR CRUISE 320 STATION 003 BIOLOGICAL DATA

INCOMING SOLAR RADIATION - AM 163 PM 146

ZOOPLANKTON (CLARKE-BUMPUS) HORIZ - TIME 0108-0118 DEPTHS 100, 70
0139-0149 35, 0

BROWN BEAR CRUISE 320 STATION 003 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	8.90	0.00	32.165	0.000	24.94	302.5	0.000	0.00	6.65	0.00	
10	8.85	0.00	32.135	0.000	24.92	304.2	0.031	0.02	6.65	0.00	
20	8.92	0.00	32.178	0.000	24.95	302.2	0.062	0.06	6.73	0.00	
30	8.96	0.00	32.183	0.001	24.94	302.5	0.092	0.14	6.73	0.00	0.84
50	9.05	0.00	32.245	0.001	24.98	299.6	0.153	0.39	6.57	0.00	0.92
75	8.60	0.00	32.611	0.000	25.33	266.2	0.224	0.84	5.91	0.00	
100	8.13	0.00	33.163	0.000	25.84	218.9	0.285	1.38	4.60	0.00	
150	7.58	0.00	33.597	0.000	26.26	179.7	0.386	2.65	3.89	0.00	
200	6.97	0.01	33.915	0.015	26.59	148.6	0.468	4.12	2.75	0.03	1.41
250	6.28	0.01	34.027	0.037	26.77	131.9	0.539	5.74	1.92	0.07	1.78
300	5.73	0.02	34.030	0.003	26.84	125.4	0.604	7.57	1.47	0.02	0.97
400	5.15	0.08	34.099	0.009	26.97	114.4	0.725	11.89	0.90	0.09	0.75
500	4.85	0.00	34.144	0.000	27.04	108.5	0.837	17.08	0.68	0.00	0.90
600	4.51	0.01	34.204	0.001	27.12	101.1	0.943	23.05	0.46	0.01	0.67
700	4.22	0.00	34.262	0.000	27.20	94.4	1.042	29.64	0.33	0.00	0.89
800	3.95	0.00	34.316	0.000	27.27	88.2	1.134	36.75	0.27	0.01	0.66
1000	3.47	0.00	34.407	0.000	27.39	77.5	1.302	52.17	0.30	0.01	1.01
1200	3.05	0.01	34.473	0.000	27.48	69.2	1.451	68.91	0.48	0.05	1.80
1500	2.57	0.00	34.524	0.000	27.56	61.7	1.650	96.43	0.76	0.00	0.52

BROWN BEAR CRUISE 320 STATION 03A BIOLOGICAL DATA

DATE 30/03/63 LAT 47-35 N LONG 126-35 W

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I
0	0.20	0.16	

MESSENGER TIME 0632 INCOMING SOLAR RADIATION - AM 163 PM 146

BROWN BEAR CRUISE 320 STATION 004 OBSERVED VALUES

DATE 30/03/63 HR 16.0 LAT 47-32 N LONG 126-34 W SNDG 2377 WEA 90 WIND VEL 24 DIR 20
BAROM 01.0 TEMP DRY 7.2 WET 5.8 RELHU 76 WTRCLR SECDI SEA 2 DIR 24 SWELL 5 DIR 24
CLOUD TYPE 3 AMT 6 VIS 7 WIRE ANGLE(S) 20,16

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN AOU	OXYGEN SATN
2	0		32.490		6.62	0.591		
2	5		32.504		6.78	0.606		
2	10		32.491		6.63	0.592		
2	20	9.17	32.487	25.15	6.62	0.591	-0.024	104
2	29	9.19	32.487	25.14	6.64	0.593	-0.026	105
2	48	9.18	32.487	25.15	6.61	0.590	-0.023	104
2	71	9.16	32.492	25.15	6.61	0.590	-0.023	104
2	95	8.07	32.895	25.63	4.66	0.416	0.164	72
2	125	7.60	33.333	26.05	3.96	0.354	0.231	60
2	144	7.47	33.640	26.30	3.76	0.336	0.249	57
	168	7.32	33.796	26.45				
2	190	7.20	33.849	26.51	3.65	0.326	0.262	55
1	287	7.00	33.934	26.60	2.77	0.247	0.343	42
1	477	4.72	34.049	26.98	1.10	0.098	0.526	16
1	719	3.98	34.253	27.22	0.27	0.024	0.611	4
1	961	3.36	34.359	27.36	0.28	0.025	0.620	4
1	1447	2.59	34.508	27.55	0.62	0.055	0.601	8
1	1739	2.21						

BROWN BEAR CRUISE 320 STATION 004 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	SAL
0				32.494
10	0.21	0.22		32.487
25	0.25	0.22		32.487
46	0.25	0.15		32.482
	10.80	9.38	- WATER COLUMN VALUES	

MESSENGER TIME 0817 INCOMING SOLAR RADIATION - AM 163 PM 146

BROWN BEAR CRUISE 320 STATION 004 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0			32.490	0.000					6.62	0.00	
10			32.491	0.000					6.63	0.00	
20	9.17	0.00	32.487	0.000	25.15	282.9			6.62	0.00	
30	9.19	0.00	32.487	0.000	25.14	283.4			6.64	0.00	0.98
50	9.20	0.01	32.480	0.005	25.14	284.4			6.65	0.02	0.90
75	8.99	0.04	32.547	0.010	25.22	276.8			6.31	0.07	0.80
100	7.95	0.02	32.969	0.003	25.71	230.7			4.46	0.03	0.83
150	7.43	0.00	33.696	0.005	26.35	170.3			3.74	0.01	1.00
200	7.18	0.02	33.864	0.003	26.52	155.2			3.58	0.01	1.21
250	7.08	0.05	33.917	0.009	26.58	150.6			3.16	0.04	1.26
300	6.86	0.04	33.942	0.001	26.63	146.5			2.64	0.01	0.97
400	5.70	0.16	34.004	0.004	26.82	128.2			1.72	0.03	0.74
500	4.59	0.03	34.069	0.002	27.01	111.1			0.97	0.01	0.89
600	4.18	0.10	34.155	0.007	27.12	101.0			0.53	0.03	0.68
700	3.99	0.03	34.238	0.002	27.20	93.6			0.29	0.01	0.89
800	3.76	0.00	34.295	0.003	27.27	87.5			0.22	0.03	0.66
1000	3.28	0.01	34.371	0.001	27.38	78.0			0.32	0.01	6.98
1200	2.93	0.02	34.424	0.006	27.45	71.4			0.58	0.06	12.55
1500	2.52	0.00									11.29

BROWN BEAR CRUISE 320 STATION 005 OBSERVED VALUES

DATE 30/03/63 HR 20.0 LAT 47-26 N LONG 126-51 W SNDG 2468 WEA 03 WIND VEL 16 DIR 26
BAROM 05.1 TEMP DRY 7.3 WET 4.4 RELHU 65 WTRCLR SECDI SEA 2 DIR 26 SWELL 3 DIR 22
CLOUD TYPE 7 AMT 6 VIS 7 WIRE ANGLE(S) 11

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN AOU	OXYGEN SATN
1	0	9.02	32.420	25.12	6.61	0.590	-0.021	104
1	5		32.413		6.62	0.591		
1	10	8.98	32.421	25.13	6.88	0.614	-0.045	108
1	19	8.98	32.418	25.12	6.96	0.622	-0.052	109
1	29	8.98	32.417	25.12	6.65	0.594	-0.0[illegible]	104
1	48	8.98	32.416	25.12	6.65	0.594	-0.024	104
1	71	9.01	32.452	25.15	6.59	0.589	-0.019	103
1	96	8.03	32.809	25.57	5.61	0.501	0.080	86
1	120	6.88	33.297	26.12	5.23	0.467	0.128	79
1	145	7.29	33.685	26.36	4.08	0.364	0.228	61
1	170	7.17	33.807	26.48	3.84	0.343	0.246	58
1	193	6.96	33.887	26.57	3.57	0.319	0.272	54
1	282	5.69	33.921	26.76	2.77	0.247	0.362	41

BROWN BEAR CRUISE 320 STATION 005 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	LIGHT PROD	SAT FILT	IRRAD	SAL	PHOS	NITR	SIL
0	0.24	0.24	1.87				32.406	0.88	4.8	8
9	0.30	0.20	1.98			50	32.401	0.86	4.6	8
31	0.34	0.16	0.40	0.22	100	10	32.407	0.82	3.6	7
				0.19	59					
				0.17	44					
				0.20	32					
				0.13	13					
				0.04	4					
64	0.30	0.17	0.08			1	32.405	0.91	5.0	8
	19.93	11.47	51.28	- WATER COLUMN VALUES						

MESSENGER TIME 1130 INCOMING SOLAR RADIATION - AM 163 PM 146

LIGHT SATURATION INCUBATOR ILLUMINATION 22100

BROWN BEAR CRUISE 320 STATION 005 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	9.02	0.00	32.420	0.000	25.12	285.3	0.000	0.00	6.61	0.00	
10	8.98	0.00	32.421	0.000	25.13	284.8	0.029	0.02	6.88	0.00	
20	8.98	0.00	32.418	0.000	25.12	285.2	0.058	0.06	6.93	0.01	0.88
30	8.98	0.00	32.417	0.000	25.12	285.5	0.087	0.13	6.64	0.01	0.97
50	9.00	0.01	32.413	0.003	25.12	286.4	0.144	0.37	6.66	0.01	0.90
75	8.90	0.02	32.493	0.004	25.20	279.4	0.216	0.83	6.45	0.03	0.81
100	7.79	0.04	32.889	0.006	25.67	234.5	0.280	1.40	5.55	0.03	0.79
150	7.29	0.01	33.721	0.006	26.39	166.5	0.381	2.65	4.00	0.03	0.77
200	6.88	0.00	33.905	0.000	26.59	148.1	0.461	4.07	3.48	0.01	2.15
250	6.18	0.03	33.958	0.001	26.73	135.8	0.532	5.71	2.94	0.05	17.24

BROWN BEAR CRUISE 320 STATION 006 OBSERVED VALUES

DATE 31/03/63 HR 05.0 LAT 46-56 N LONG 127-51 W SNDG 2670 WEA 10 WIND VEL 18 DIR 27
BAROM 11.2 TEMP DRY 7.8 WET 5.0 RELHU 65 WTRCLR SECDI SEA 2 DIR 27 SWELL 1 DIR 23
CLOUD TYPE 4 AMT 7 VIS 7 WIRE ANGLE(S) 25, 7

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN ADU	OXYGEN SATN
2	0	9.58	32.551	25.13	6.61	0.590	-0.029	105
2	5	9.54	32.551	25.14	6.57	0.587	-0.025	104
2	10	9.53	32.544	25.14	6.60	0.589	-0.027	105
2	20	9.53	32.546	25.14	6.57	0.587	-0.025	104
2	30	9.54	32.552	25.14	6.69	0.598	-0.035	106
2	50	9.58	32.546	25.13	6.53	0.583	-0.022	104
2	74	9.56	32.555	25.14	6.57	0.587	-0.025	104
2	99	9.15	32.835	25.42	5.99	0.535	0.031	95
2	124	7.10	33.175	25.99	5.42	0.484	0.108	82
2	149	7.38	33.574	26.27	4.40	0.393	0.194	67
2	174	7.21	33.850	26.51	3.76	0.336	0.252	57
1	185	7.12	33.867	26.53	3.77	0.337	0.252	57
1	279	5.94	33.929	26.74	2.82	0.252	0.354	42
1	468	4.63	34.056	26.99	1.00	0.089	0.536	14
1	705	3.89	34.237	27.21	0.41	0.037	0.600	6
1	945	3.54	34.371	27.35	0.35	0.031	0.610	5
1	1425	2.59	34.509	27.55	0.69	0.062	0.595	9
1	1716	2.16	32.559	26.03	1.05	0.094	0.580	14

BROWN BEAR CRUISE 320 STATION 006 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	SAL
0	0.18	0.17		32.561
9	0.20	0.06		32.548
31	0.16	0.14		32.543
64	0.21	0.10		32.555
	11.83	7.17	- WATER COLUMN VALUES	

MESSENGER TIME 2128 INCOMING SOLAR RADIATION - AM 163 PM 146

BROWN BEAR CRUISE 320 STATION 006 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	9.58	0.00	32.551	0.000	25.13	284.1	0.000	0.00	6.61	0.00	
10	9.53	0.00	32.544	0.000	25.14	284.0	0.029	0.02	6.60	0.00	
20	9.53	0.00	32.546	0.000	25.14	284.0	0.058	0.06	6.57	0.00	
30	9.54	0.00	32.552	0.000	25.14	283.9	0.086	0.13	6.69	0.00	
50	9.58	0.00	32.546	0.000	25.13	285.4	0.144	0.37	6.53	0.00	
75	9.56	0.01	32.563	0.001	25.14	284.3	0.215	0.83	6.55	0.00	0.94
100	9.06	0.03	32.847	0.000	25.45	256.0	0.283	1.44	5.97	0.00	0.94
150	7.38	0.00	33.586	0.001	26.27	177.8	0.393	2.79	4.37	0.00	0.96
200	6.94	0.02	33.954	0.052	26.62	145.3	0.474	4.23	3.44	0.12	1.48
250	6.32	0.04	33.996	0.057	26.74	134.8	0.545	5.86	2.95	0.10	1.04
300	5.74	0.01	33.943	0.000	26.77	132.1	0.612	7.76	2.59	0.02	0.95
400	4.98	0.03	34.009	0.000	26.91	119.1	0.739	12.28	1.58	0.04	0.75
500	4.49	0.01	34.081	0.001	27.03	109.1	0.854	17.58	0.85	0.03	0.85
600	4.13	0.03	34.158	0.003	27.13	100.2	0.960	23.54	0.52	0.06	0.67
700	3.90	0.00	34.233	0.000	27.21	92.9	1.057	30.04	0.41	0.00	0.97
800	3.73	0.02	34.296	0.000	27.28	87.2	1.148	37.05	0.34	0.02	0.63
1000	3.43	0.01	34.497	0.068	27.47	70.4	1.308	51.64	0.37	0.01	0.95
1200	3.04	0.03	34.715	0.166	27.68	51.2	1.431	65.39	0.47	0.01	0.88
1500	2.46	0.01	34.231	0.052	27.34	81.9	1.633	94.29	0.78	0.00	0.94

BROWN BEAR CRUISE 320 STATION 007 OBSERVED VALUES

DATE 31/03/63 HR 12.1 LAT 46-35 N LONG 128-31 W SNDG 2706 WEA 90 WIND VEL 22 DIR 30
BAROM 14.0 TEMP DRY 7.5 WET 5.8 RELHU 79 WTRCLR SECDI SEA 2 DIR 30 SWELL 3 DIR 30
CLOUD TYPE 3 AMT 6 VIS 5 WIRE ANGLE(S) 32,15

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN AOU	OXYGEN SATN
2	0	9.60	32.548	25.13	6.38	0.570	-0.009	102
2	5	9.58	32.552	25.13	6.41	0.573	-0.011	102
2	9	9.54	32.553	25.14	6.41	0.573	-0.010	102
2	18	9.56	32.566	25.15	6.37	0.569	-0.007	101
2	27	9.58	32.555	25.14	6.38	0.570	-0.008	101
2	44	9.59	32.550	25.13	6.38	0.570	-0.008	101
2	66	9.59	32.548	25.13	6.38	0.570	-0.008	101
2	87	9.09	32.636	25.28	6.12	0.547	0.021	96
2	109	7.64	33.007	25.78	5.41	0.483	0.102	83
2	131	6.66	33.192	26.06				
2	152	6.88	33.473	26.25	4.96	0.443	0.151	75
1	170	7.01	33.712	26.43	4.46	0.398	0.193	67
1	257	5.90	33.922	26.74	3.16	0.282	0.324	47
1	430	4.99	34.028	26.93	1.18	0.105	0.515	17
1	649	4.12	34.206	27.16	0.38	0.034	0.599	5
1	871	3.54	34.327	27.32	0.27	0.024	0.618	4
1	1315	2.70	34.501	27.54	0.60	0.054	0.601	8
1	1584	2.26	34.542	27.61	0.91	0.081	0.581	12

BROWN BEAR CRUISE 320 STATION 007 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	SAL
0	0.24	0.28	1.64	32.554
9	0.22	0.29		32.555
31	0.24	0.17		32.556
64	0.20	0.26		32.555
100	0.22	0.20		32.556
	14.30	15.05	- WATER COLUMN VALUES	

MESSENGER TIME 0554 INCOMING SOLAR RADIATION - AM 195 PM 211

BROWN BEAR CRUISE 320 STATION 007 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	9.60	0.00	32.548	0.000	25.13	284.6	0.000	0.00	6.38	0.00	
10	9.54	0.00	32.555	0.001	25.14	283.3	0.029	0.02	6.41	0.00	0.97
20	9.56	0.00	32.564	0.001	25.15	283.2	0.058	0.06	6.37	0.00	0.75
30	9.58	0.00	32.553	0.000	25.13	284.5	0.086	0.13	6.38	0.00	0.91
50	9.62	0.02	32.544	0.003	25.12	286.0	0.144	0.37	6.39	0.01	0.76
75	9.46	0.02	32.564	0.007	25.16	282.6	0.215	0.83	6.31	0.01	0.64
100	8.26	0.06	32.849	0.019	25.57	244.1	0.282	1.42	5.71	0.03	0.66
150	6.84	0.02	33.444	0.001	26.24	181.1	0.389	2.75	4.98	0.02	0.99
200	6.77	0.12	33.879	0.055	26.59	148.5	0.472	4.22	3.90	0.06	1.65
250	6.03	0.04	33.936	0.018	26.73	135.6	0.543	5.87	3.23	0.02	0.91
300	5.58	0.05	33.966	0.014	26.81	128.4	0.610	7.75	2.57	0.01	0.89
400	5.08	0.04	34.023	0.011	26.91	119.2	0.735	12.22	1.45	0.01	0.79
500	4.68	0.00	34.085	0.004	27.01	110.9	0.851	17.57	0.78	0.04	0.73
600	4.29	0.00	34.167	0.003	27.12	101.4	0.958	23.61	0.45	0.04	0.75
700	3.97	0.01	34.237	0.001	27.21	93.4	1.057	30.17	0.32	0.02	0.74
800	3.70	0.01	34.293	0.001	27.28	87.1	1.148	37.19	0.26	0.02	0.62
1000	3.27	0.01	34.389	0.001	27.39	76.5	1.313	52.41	0.32	0.02	0.91
1200	2.89	0.01	34.467	0.001	27.49	67.8	1.460	68.88	0.47	0.02	0.88
1500	2.40	0.01	34.536	0.001	27.59	58.8	1.652	95.48	0.82	0.01	0.66

BROWN BEAR CRUISE 320 STATION 008 OBSERVED VALUES

DATE 31/03/63 HR 20.4 LAT 46-13 N LONG 129-10 W SNDG 2597 WEA 01 WIND VEL 22 DIR 32
BAROM 17.3 TEMP DRY 8.1 WET 5.8 RELHU 70 WTRCLR SECDI SEA 3 DIR 23 SWELL 4 DIR 27
CLOUD TYPE 6 AMT 5 VIS 6 WIRE ANGLE(S) 31,10

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN ADU	OXYGEN SATN
2	0	9.39	32.526	25.14	6.40	0.572	-0.008	101
2	5	9.37	32.526	25.15	6.45	0.576	-0.012	102
2	10	9.36	32.524	25.15	6.46	0.577	-0.013	102
2	20	9.35	32.526	25.15	6.48	0.579	-0.014	103
2	29	9.37	32.526	25.15	6.42	0.573	-0.009	102
2	49	9.35	32.523	25.15	6.38	0.570	-0.005	101
2	73	9.35	32.531	25.15	6.40	0.572	-0.007	101
2	97	9.32	32.528	25.16	6.37	0.569	-0.004	101
2	121	7.27	32.962	25.80	5.73	0.512	0.079	87
2	145	6.63	33.277	26.13	5.38	0.481	0.118	80
2	172	6.85	33.676	26.42	4.61	0.412	0.182	69
1	230	6.20	33.918	26.69	3.42	0.305	0.297	51
1	395	4.91	33.997	26.91	1.50	0.134	0.487	22
1	606	4.24	34.187	27.14	0.46	0.041	0.590	7
1	819	3.74	34.304	27.28	0.26	0.023	0.615	4
1	1246	2.74	34.474	27.51	0.43	0.038	0.616	6
1	1510	2.36						

BROWN BEAR CRUISE 320 STATION 008 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	9.39	0.00	32.526	0.000	25.14	283.0	0.000	0.00	6.40	0.00	
10	9.36	0.00	32.524	0.000	25.15	282.9	0.029	0.02	6.46	0.00	
20	9.35	0.00	32.526	0.000	25.15	282.8	0.057	0.06	6.48	0.00	
30	9.37	0.00	32.526	0.000	25.15	283.2	0.086	0.13	6.42	0.00	0.99
50	9.35	0.00	32.523	0.000	25.15	283.5	0.143	0.37	6.38	0.00	0.95
75	9.39	0.03	32.523	0.006	25.14	284.5	0.215	0.83	6.41	0.01	0.89
100	9.08	0.06	32.574	0.010	25.23	276.5	0.285	1.46	6.30	0.02	0.84
150	6.65	0.03	33.356	0.006	26.19	185.2	0.402	2.89	5.25	0.01	0.80
200	6.63	0.07	33.852	0.030	26.59	148.6	0.486	4.38	3.98	0.02	0.80
250	6.00	0.00	33.950	0.017	26.74	134.1	0.557	6.02	3.10	0.02	1.04
300	5.56	0.01	34.003	0.039	26.84	125.3	0.622	7.86	2.41	0.05	1.01
400	4.89	0.00	34.001	0.001	26.92	118.6	0.745	12.27	1.46	0.00	0.97
500	4.50	0.04	34.090	0.007	27.03	108.5	0.860	17.55	0.83	0.03	0.68
600	4.25	0.00	34.181	0.001	27.13	99.8	0.965	23.47	0.47	0.00	0.96
700	4.01	0.01	34.245	0.002	27.21	93.2	1.063	29.98	0.31	0.03	0.61
800	3.78	0.00	34.296	0.001	27.27	87.7	1.154	37.02	0.26	0.01	0.84
1000	3.29	0.02	34.374	0.004	27.38	77.8	1.322	52.43	0.39	0.05	12.94
1200	2.84	0.01	34.453	0.002	27.49	68.2	1.470	69.08	0.33	0.03	12.65
1500	2.37	0.00									23.66

BROWN BEAR CRUISE 320 STATION 009 OBSERVED VALUES

DATE 1/04/63 HR 05.4 LAT 45-47 N LONG 130-00 W SNOG 1829 WEA 61 WIND VEL 20 DIR 32
BAROM 19.6 TEMP DRY 8.1 WET 5.4 RELHU 68 WTRCLR SECDI SEA 2 DIR 32 SWELL 3 DIR 31
CLOUD TYPE 0 AMT 6 VIS 6 WIRE ANGLE(S) 23,15

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN AOU	OXYGEN SATN
2	0	9.37	32.532	25.15	6.48	0.579	-0.014	103
2	5	9.36	32.528	25.15	6.78	0.606	-0.041	107
2	10	9.32	32.524	25.15	6.52	0.582	-0.017	103
2	20	9.34	32.530	25.15	6.62	0.591	-0.027	105
2	30	9.35	32.533	25.16	6.68	0.597	-0.032	106
2	50	9.34	32.531	25.16	6.48	0.579	-0.014	102
2	74	9.36	32.533	25.15	6.53	0.583	-0.019	103
2	99	8.81	32.640	25.32	6.23	0.556	0.015	97
2	124	7.07	33.112	25.95	5.56	0.497	0.096	84
2	149	6.63	33.433	26.26	5.24	0.468	0.130	78
2	174	6.98	33.796	26.50	4.07	0.364	0.228	61
2	186	6.94	33.835	26.53	3.84	0.343	0.249	58
1	280	5.81	33.913	26.74	3.07	0.274	0.334	45
1	468	4.51	34.036	26.99	1.16	0.104	0.524	17
1	704	3.89	34.252	27.22	0.37	0.033	0.603	5
1	940	3.36	34.370	27.37	0.24	0.021	0.623	3
1	1413	2.64	34.511	27.55	0.60	0.054	0.602	8
1	1703	2.12	34.570	27.64	1.13	0.101	0.564	15

BROWN BEAR CRUISE 320 STATION 009 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	SAL
0	0.19	0.04		32.535
9	0.18	0.19		32.532
31	0.18	0.12		32.531
64	0.21	0.07		32.527
100	0.18	0.15		32.527
	12.07	7.39	- WATER COLUMN VALUES	

MESSENGER TIME 2202 INCOMING SOLAR RADIATION - AM 195 PM 211

ZOOPLANKTON (CLARKE-BUMPUS) HORIZ - TIME 0025-0035 DEPTHS 100, 70
0055-0105 35, 0

BROWN BEAR CRUISE 320 STATION 009 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	9.37	0.00	32.532	0.000	25.15	282.3	0.000	0.00	6.48	0.00	
10	9.32	0.00	32.524	0.000	25.15	282.3	0.029	0.02	6.52	0.00	
20	9.34	0.00	32.530	0.000	25.15	282.3	0.057	0.06	6.62	0.00	
30	9.35	0.00	32.533	0.000	25.16	282.4	0.086	0.13	6.68	0.00	
50	9.34	0.00	32.531	0.000	25.16	282.8	0.143	0.37	6.48	0.00	
75	9.36	0.00	32.533	0.002	25.15	283.3	0.214	0.82	6.53	0.00	0.94
100	8.74	0.02	32.657	0.003	25.35	265.3	0.283	1.44	6.20	0.00	0.94
150	6.64	0.01	33.451	0.003	26.27	178.0	0.395	2.82	5.19	0.01	0.94
200	6.81	0.04	33.860	0.008	26.57	150.5	0.478	4.29	3.67	0.04	1.97
250	6.23	0.06	33.911	0.014	26.68	139.9	0.551	5.98	3.22	0.07	2.26
300	5.62	0.01	33.926	0.001	26.77	131.8	0.619	7.91	2.85	0.03	0.95
400	4.87	0.02	33.992	0.003	26.91	119.0	0.746	12.43	1.81	0.06	0.75
500	4.39	0.02	34.066	0.003	27.03	109.0	0.861	17.72	0.98	0.02	0.85
600	4.09	0.04	34.159	0.007	27.13	99.7	0.966	23.66	0.57	0.05	0.67
700	3.90	0.00	34.248	0.000	27.22	91.7	1.063	30.10	0.37	0.00	0.97
800	3.66	0.00	34.308	0.003	27.29	85.4	1.153	37.00	0.26	0.02	0.62
1000	3.26	0.01	34.393	0.001	27.40	76.1	1.316	52.04	0.25	0.00	0.94
1200	2.95	0.03	34.459	0.003	27.48	69.0	1.463	68.62	0.35	0.01	0.88
1500	2.50	0.00	34.529	0.001	27.58	60.5	1.660	95.81	0.74	0.00	9.64

BROWN BEAR CRUISE 320 STATION 010 OBSERVED VALUES

DATE 1/04/63 HR 14.5 LAT 45-00 N LONG 130-00 W SNDG 2468 WEA 02 WIND VEL 8 DIR 36
BAROM 21.0 TEMP DRY 9.6 WET 6.1 RELHU 60 WTRCLR SECDI SEA 1 DIR 36 SWELL 2 DIR 36
CLOUD TYPE 3 AMT 6 VIS 7 WIRE ANGLE(S) 10, 8, 7

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN AOU	OXYGEN SATN
3	0	9.93	32.597	25.11	6.42	0.573	-0.016	103
3	5	9.90	32.594	25.11	6.41	0.573	-0.015	103
3	10	9.87	32.593	25.12	6.40	0.572	-0.014	102
3	20	9.88	32.587	25.11	6.41	0.573	-0.015	103
3	30	9.89	32.591	25.11	6.37	0.569	-0.011	102
3	50	9.87	32.587	25.11	6.40	0.572	-0.014	102
3	73	9.85	32.592	25.12	6.41	0.573	-0.015	103
3	98	9.93	32.599	25.11	6.37	0.569	-0.012	102
3	123	7.18	33.022	25.86	5.73	0.512	0.080	86
3	148	6.76	33.360	26.18	5.23	0.467	0.129	78
3	173	7.06	33.747	26.45	4.40	0.393	0.198	67
2	196	7.06	33.864	26.54	3.96	0.354	0.236	60
2	294	5.66	33.919	26.76	2.91	0.260	0.350	43
2	492	4.50	34.090	27.03	0.79	0.071	0.557	11
2	737	3.86	34.284	27.25	0.24	0.021	0.615	3
2	984	3.37	34.404	27.40	0.28	0.025	0.619	4
2	1479	2.47	34.525	27.57	0.77	0.069	0.590	10
2	1776	2.10	34.573	27.64	1.16	0.104	0.561	16
1	1780	2.07	34.567	27.64	1.28	0.114	0.551	17
1	2077	1.87	34.614	27.69	1.71	0.153	0.516	23
1	2428	1.81	34.643	27.72	2.06	0.184	0.486	27

BROWN BEAR CRUISE 320 STATION 010 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	LIGHT PROD	SAT FILT	IRRAD	SAL	PHOS	NITR	SIL
0	0.16	0.30	1.18				32.591	0.57	0.9	2
8	0.16	0.22	1.72	0.33	100	50	32.586	0.60	1.5	3
				0.32	59					
				0.29	44					
				0.22	32					
				0.10	13					
				0.00	4					
26	0.19	0.26	0.10			10	32.586	0.64	1.5	3
60	0.21	0.20	0.06			1	32.589	0.72	1.9	3
100	0.06	0.00					32.826	0.98	6.9	9
150	0.00						33.352	1.63	26.3	28
200	0.00						33.884	1.96	27.5	39
	11.07	14.30	30.78	- WATER COLUMN VALUES						

MESSENGER TIME 1123 INCOMING SOLAR RADIATION - AM 200 PM 211

LIGHT SATURATION INCUBATOR ILLUMINATION 20600

BROWN BEAR CRUISE 320 STATION 010 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	9.93	0.00	32.597	0.000	25.11	286.1	0.000	0.00	6.42	0.00	
10	9.87	0.00	32.593	0.000	25.12	285.7	0.029	0.02	6.40	0.00	
20	9.88	0.00	32.587	0.000	25.11	286.4	0.058	0.06	6.41	0.00	
30	9.89	0.00	32.591	0.000	25.11	286.5	0.087	0.13	6.37	0.00	
50	9.87	0.00	32.587	0.000	25.11	286.9	0.145	0.37	6.40	0.00	
75	9.91	0.04	32.585	0.005	25.11	288.1	0.217	0.84	6.42	0.01	0.90
100	9.72	0.06	32.627	0.006	25.17	282.5	0.289	1.48	6.33	0.01	0.89
150	6.78	0.01	33.395	0.004	26.21	184.0	0.407	2.93	5.16	0.01	0.89
200	7.02	0.02	33.873	0.005	26.55	152.3	0.491	4.43	3.90	0.01	1.08
250	6.40	0.12	33.938	0.030	26.68	140.0	0.565	6.13	3.30	0.06	1.32
300	5.60	0.01	33.924	0.000	26.77	131.8	0.634	8.06	2.83	0.01	0.99
400	4.86	0.07	34.006	0.004	26.93	118.0	0.760	12.55	1.68	0.06	0.77
500	4.47	0.00	34.097	0.000	27.04	107.7	0.873	17.80	0.75	0.01	0.96
600	4.15	0.03	34.181	0.002	27.14	98.7	0.978	23.67	0.37	0.07	0.68
700	3.92	0.02	34.258	0.001	27.23	91.3	1.074	30.07	0.23	0.04	0.81
800	3.73	0.00	34.320	0.001	27.30	85.3	1.163	36.94	0.22	0.01	0.72
1000	3.34	0.00	34.410	0.001	27.40	75.8	1.326	51.94	0.29	0.00	0.98
1200	2.95	0.01	34.470	0.004	27.49	68.3	1.472	68.40	0.45	0.01	0.89
1500	2.44	0.00	34.528	0.000	27.58	59.8	1.667	95.30	0.80	0.00	0.88
2000	1.72	0.12	34.556	0.032	27.66	51.5	1.950	145.82	2.41	0.53	3.97

BROWN BEAR CRUISE 320 STATION 10A BIOLOGICAL DATA

DATE 1/04/63 LAT 45-00 N LONG 130-00 W

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I
0	0.22	0.42	2.68

MESSENGER TIME 0550 INCOMING SOLAR RADIATION - AM 200 PM 211

BROWN BEAR CRUISE 320 STATION 011 OBSERVED VALUES

DATE 2/04/63 HR 00.0 LAT 44-53 N LONG 129-16 W SNDG 2642 WEA 02 WIND VEL 4 DIR 20
BAROM 20.0 TEMP DRY 9.0 WET 6.1 RELHU 65 WTRCLR SECDI SEA 1 DIR 20 SWELL 1 DIR 20
CLOUD TYPE 3 AMT 6 VIS 9 WIRE ANGLE(S) 0, 2

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN ADU	OXYGEN SATN
2	0	10.33	32.640	25.08	6.50	0.581	-0.029	105
2	5	10.32	32.613	25.06	6.46	0.577	-0.025	105
2	10	9.96	32.593	25.10	6.50	0.581	-0.024	104
2	20	9.94	32.597	25.11	6.42	0.573	-0.017	103
2	30	9.89	32.583	25.11	6.50	0.581	-0.023	104
2	50	9.68	32.552	25.12	6.48	0.579	-0.019	103
2	74	9.68	32.554	25.12	6.46	0.577	-0.017	103
2	99	8.95	32.929	25.53	5.63	0.503	0.065	89
2	124	8.00	33.089	25.80	5.36	0.479	0.101	83
2	149	6.92	33.358	26.16	5.19	0.464	0.131	78
2	174	7.42	33.788	26.43				
1	190	7.00	33.819	26.51	4.16	0.372	0.220	63
1	294	5.64	33.923	26.77	2.92	0.261	0.350	43
1	492	4.54	34.068	27.01	0.97	0.087	0.540	14
1	740	3.92	34.270	27.24	0.27	0.024	0.612	4
1	990	3.38	34.411	27.40	0.29	0.026	0.618	4
1	1484	2.45	34.529	27.58	0.76	0.068	0.591	10
1	1785	2.05	34.575	27.65	1.22	0.109	0.557	16

BROWN BEAR CRUISE 320 STATION 011 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	SAL
0	0.17	0.34		32.626
8	0.24	0.24		32.603
26	0.31	0.44		32.590
60	0.31	0.35		32.546
100	0.06	0.01		32.931
	17.19	21.82	- WATER COLUMN VALUES	

MESSENGER TIME 1637 INCOMING SOLAR RADIATION - AM 200 PM 211

BROWN BEAR CRUISE 320 STATION 011 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	10.33	0.00	32.640	0.000	25.08	289.3	0.000	0.00	6.50	0.00	
10	9.96	0.00	32.593	0.000	25.10	287.1	0.030	0.02	6.50	0.00	
20	9.94	0.00	32.597	0.000	25.11	286.6	0.058	0.06	6.42	0.00	
30	9.89	0.00	32.583	0.000	25.11	287.1	0.087	0.13	6.50	0.00	
50	9.68	0.00	32.552	0.000	25.12	286.5	0.145	0.37	6.48	0.00	
75	9.66	0.00	32.567	0.004	25.13	285.5	0.217	0.83	6.43	0.01	0.94
100	8.92	0.00	32.936	0.002	25.54	247.2	0.284	1.43	5.61	0.00	0.94
150	6.94	0.02	33.378	0.004	26.17	187.3	0.394	2.80	5.17	0.00	0.98
200	6.81	0.03	33.333	0.002	26.55	152.5	0.479	4.31	3.99	0.03	1.44
250	6.04	0.07	33.890	0.006	26.69	139.0	0.553	6.00	3.32	0.07	2.14
300	5.59	0.01	33.928	0.000	26.78	131.3	0.621	7.92	2.85	0.00	0.98
400	4.90	0.06	34.004	0.003	26.92	118.5	0.747	12.42	1.77	0.03	0.75
500	4.51	0.00	34.075	0.000	27.02	109.8	0.862	17.73	0.93	0.01	0.96
600	4.21	0.03	34.158	0.003	27.12	101.1	0.969	23.74	0.50	0.05	0.68
700	3.99	0.02	34.239	0.002	27.20	93.5	1.067	30.29	0.29	0.03	0.80
800	3.78	0.00	34.309	0.000	27.28	86.8	1.158	37.30	0.23	0.02	0.73
1000	3.36	0.00	34.415	0.001	27.41	75.7	1.323	52.41	0.29	0.00	0.99
1200	2.95	0.01	34.477	0.007	27.49	67.8	1.468	68.78	0.43	0.01	0.89
1500	2.42	0.00	34.531	0.000	27.58	59.5	1.661	95.51	0.78	0.00	1.00

BROWN BEAR CRUISE 320 STATION 012 OBSERVED VALUES

DATE 2/04/63 HR 05.8 LAT 44-48 N LONG 128-32 W SNDG 2287 WEA 03 WIND VEL 10 DIR 14
BAROM 18.3 TEMP DRY 11.0 WET 5.4 RELHU 40 WTRCLR SECDI SEA 1 DIR 14 SWELL 2 DIR 11
CLOUD TYPE 2 AMT 7 VIS 6 WIRE ANGLE(S) 13,10

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN ADU	OXYGEN SATN
2	0	10.70	32.737	25.09	6.27	0.560	-0.013	102
2	5	10.68	32.709	25.07	6.37	0.569	-0.022	104
2	10	10.66	32.707	25.07	6.34	0.566	-0.019	103
2	20	10.55	32.707	25.09	6.33	0.565	-0.017	103
2	30	10.55	32.710	25.09	6.29	0.562	-0.013	102
2	50	10.55	32.702	25.09	6.25	0.558	-0.009	102
2	74	10.56	32.703	25.09	6.23	0.556	-0.008	101
2	99	9.49	32.864	25.39	5.68	0.507	0.054	90
2	124	8.46	33.092	25.73	5.25	0.469	0.105	82
2	149	8.14	33.442	26.05	4.12	0.368	0.209	64
2	174	7.71	33.786	26.38	3.57	0.319	0.262	55
1	195	7.66	33.890	26.47	2.99	0.267	0.315	46
1	293	5.96	33.929	26.73	2.88	0.257	0.348	42
1	490	4.55	34.074	27.01	0.96	0.086	0.541	14
1	736	3.96	34.255	27.22	0.34	0.030	0.605	5
1	983	3.42	34.389	27.38	0.36	0.032	0.611	5
1	1476	2.47	34.530	27.58	0.76	0.068	0.591	10
1	1774	2.06			1.32	0.118		

BROWN BEAR CRUISE 320 STATION 012 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	SAL
0	0.24	0.36		32.702
8	0.25	0.12		32.698
26	0.42	0.29		32.658
60	0.39	0.25		32.694
100	0.05	0.00		32.953
	21.87	14.86	- WATER COLUMN VALUES	

MESSENGER TIME 2119 INCOMING SOLAR RADIATION - AM 200 PM 211

ZOOPLANKTON (CLARKE-BUMPUS) HORIZ - TIME 2259-2309 DEPTHS 100, 70
2326-2336 35, 0

BROWN BEAR CRUISE 320 STATION 012 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	10.70	0.00	32.737	0.000	25.09	288.2	0.000	0.00	6.27	0.00	
10	10.66	0.00	32.707	0.000	25.07	289.9	0.030	0.02	6.34	0.00	
20	10.55	0.00	32.707	0.000	25.09	288.3	0.059	0.06	6.33	0.00	
30	10.55	0.00	32.710	0.000	25.09	288.3	0.088	0.13	6.29	0.00	
50	10.55	0.00	32.702	0.000	25.09	289.3	0.146	0.37	6.25	0.00	
75	10.53	0.01	32.707	0.001	25.10	289.0	0.219	0.84	6.21	0.00	0.94
100	9.44	0.00	32.871	0.000	25.40	260.0	0.288	1.46	5.67	0.01	0.94
150	8.12	0.00	33.458	0.001	26.07	197.6	0.403	2.90	4.09	0.00	0.94
200	7.59	0.02	33.901	0.006	26.49	158.1	0.493	4.48	2.94	0.04	1.12
250	6.81	0.13	33.956	0.031	26.64	144.1	0.569	6.24	2.70	0.20	1.44
300	5.88	0.01	33.933	0.001	26.75	134.4	0.639	8.22	2.82	0.02	0.98
400	4.98	0.08	34.002	0.004	26.91	119.5	0.767	12.79	1.90	0.15	0.77
500	4.51	0.01	34.082	0.000	27.02	109.3	0.883	18.10	0.91	0.01	0.95
600	4.20	0.05	34.158	0.002	27.12	101.0	0.989	24.09	0.52	0.06	0.68
700	4.00	0.03	34.230	0.001	27.20	94.3	1.088	30.66	0.35	0.03	0.82
800	3.82	0.00	34.294	0.000	27.27	88.2	1.180	37.77	0.31	0.02	0.72
1000	3.38	0.00	34.397	0.000	27.39	77.2	1.347	53.16	0.36	0.00	5.85
1200	2.97	0.01	34.471	0.000	27.49	68.4	1.495	69.78	0.47	0.01	12.71
1500	2.43	0.00							0.80	0.00	12.36

BROWN BEAR CRUISE 320 STATION 013 OBSERVED VALUES

DATE 2/04/63 HR 12.7 LAT 44-34 N LONG 127-48 W SNDG 2834 WEA 03 WIND VEL 18 DIR 12
BAROM 18.0 TEMP DRY 9.7 WET 7.2 RELHU 67 WTRCLR SECDI SEA 1 DIR 12 SWELL 3 DIR 15
CLOUD TYPE 3 AMT 8 VIS 6 WIRE ANGLE(S) 32,20

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MG/L	OXYGEN AOU	OXYGEN SATN
2	0	9.99	32.592	25.10	6.48	0.579	-0.023	104
2	5	9.96	32.590	25.10	6.46	0.577	-0.020	104
2	10	9.91	32.587	25.11	6.52	0.582	-0.025	105
2	20	9.94	32.591	25.10	6.47	0.578	-0.021	104
2	30	9.96	32.590	25.10	6.47	0.578	-0.021	104
2	50	9.93	32.589	25.10	6.42	0.573	-0.016	103
2	74	9.93	32.589	25.10	6.44	0.575	-0.018	103
2	99	9.14	32.741	25.35	6.00	0.536	0.031	95
2	124	8.08	33.362	26.00	4.70	0.420	0.158	73
2	149	7.81	33.689	26.29	4.02	0.359	0.221	62
1	171	7.61	33.868	26.46	3.42	0.305	0.277	52
2	174	7.54	33.878	26.48	3.36	0.300	0.283	51
1	258	6.30	33.955	26.71	2.72	0.243	0.358	40
1	435	4.86	34.017	26.93	1.36	0.121	0.501	20
1	658	4.04	34.184	27.16	0.50	0.045	0.590	7
1	883	3.66	34.328	27.31	0.39	0.035	0.605	5
1	1334	2.78	34.494	27.52	0.54	0.048	0.605	7
1	1609	2.20			0.97	0.087		

BROWN BEAR CRUISE 320 STATION 013 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	SAL
0	0.24	0.39	2.54	32.601
8	0.26	0.34		32.591
26	0.24	0.27		32.590
60	0.26	0.22		32.587
	15.16	16.74	- WATER COLUMN VALUES	

MESSENGER TIME 0604 INCOMING SOLAR RADIATION - AM 55 PM 47

BROWN BEAR CRUISE 320 STATION 013 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	9.99	0.00	32.592	0.000	25.10	287.4	0.000	0.00	6.48	0.00	
10	9.91	0.00	32.587	0.000	25.11	286.7	0.029	0.02	6.52	0.00	
20	9.94	0.00	32.591	0.000	25.10	287.1	0.058	0.06	6.47	0.00	
30	9.96	0.00	32.590	0.000	25.10	287.7	0.087	0.13	6.47	0.00	
50	9.93	0.00	32.589	0.000	25.10	287.6	0.145	0.37	6.42	0.00	
75	9.91	0.00	32.589	0.002	25.11	287.7	0.218	0.84	6.44	0.00	0.94
100	9.09	0.01	32.764	0.005	25.38	262.6	0.287	1.46	5.95	0.01	0.94
150	7.80	0.00	33.699	0.000	26.30	175.2	0.397	2.82	3.99	0.00	0.95
200	7.19	0.05	33.956	0.034	26.59	148.5	0.479	4.27	3.03	0.09	1.38
250	6.43	0.02	33.969	0.013	26.70	138.1	0.551	5.93	2.73	0.04	0.88
300	5.85	0.03	33.973	0.006	26.78	131.2	0.619	7.84	2.37	0.02	0.91
400	5.05	0.02	34.008	0.005	26.90	120.0	0.746	12.37	1.61	0.02	0.78
500	4.54	0.02	34.062	0.004	27.01	111.1	0.862	17.75	1.02	0.01	0.74
600	4.18	0.02	34.137	0.004	27.10	102.3	0.970	23.82	0.64	0.01	0.73
700	3.95	0.01	34.213	0.000	27.19	94.9	1.070	30.46	0.45	0.02	0.78
800	3.78	0.02	34.279	0.001	27.26	88.9	1.163	37.61	0.38	0.02	0.60
1000	3.44	0.00	34.389	0.001	27.38	78.5	1.332	53.19	0.37	0.01	11.24
1200	3.05	0.00	34.466	0.001	27.48	69.7	1.482	70.10	0.43	0.01	9.61
1500	2.43	0.00							0.76	0.00	6.44

BROWN BEAR CRUISE 320 STATION 014 BIOLOGICAL DATA

DATE 2/04/63 LAT 44-28 N LONG 127-24 W

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	LIGHT SAT PROD	LIGHT SAT FILT	SAL	PHOS	NITR	SIL
0	0.32	0.76	3.12	0.39	100	32.561	0.68	2.3	4
				0.54	59				
				0.49	44				
				0.48	32				
				0.17	13				
				0.02	4				
8	0.27	0.38	2.06			32.557			
26	0.28	0.43	0.24			32.558	0.68	1.9	3
60	0.38	0.21	0.00			32.560	0.45	2.0	3
	18.60	22.82	45.50	- WATER COLUMN VALUES					

MESSENGER TIME 1120 INCOMING SOLAR RADIATION - AM 55 PM 47

LIGHT SATURATION INCUBATOR ILLUMINATION 19500

BROWN BEAR CRUISE 320 STATION 015 OBSERVED VALUES

DATE 3/04/63 HR 14.8 LAT 44-25 N LONG 126-52 W SNDG 2834 WEA 02 WIND VEL 20 DIR 22
BAROM 15.0 TEMP DRY 10.6 WET 9.7 RELHU 88 WTRCLR SECDI SEA 1 DIR 22 SWELL 6 DIR 15
CLOUD TYPE 3 AMT 8 VIS 7 WIRE ANGLE(S) 20,14,14

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN AOU	OXYGEN SATN
2	0	9.73	32.569	25.12	6.46	0.577	-0.017	103
2	5	9.74	32.564	25.12	6.44	0.575	-0.016	103
2	10	9.68	32.568	25.13	6.47	0.578	-0.018	103
2	20	9.70	32.570	25.13	6.46	0.577	-0.017	103
3	30	9.66	32.571	25.14	6.47	0.578	-0.017	103
3	50	9.66	32.565	25.13	6.47	0.578	-0.017	103
3	74	9.68	32.568	25.13	6.50	0.581	-0.020	104
3	99	8.84	33.144	25.71	4.70	0.420	0.149	74
3	124	8.68	33.659	26.14	3.45	0.308	0.261	54
3	149	7.80	33.745	26.34	3.56	0.318	0.262	55
3	174	7.31	33.847	26.49	3.45	0.308	0.278	53
1	188	7.14	33.901	26.56	3.29	0.294	0.295	50
1	279	6.19	33.973	26.74	2.28	0.204	0.398	34
1	474	4.78	34.069	26.98	1.05	0.094	0.529	15
1	714	4.16	34.267	27.21	0.39	0.035	0.597	6
1	955	3.50	34.399	27.38	0.37	0.033	0.609	5
1	1437	2.61	34.518	27.56	0.71	0.063	0.593	10
1	1733	2.11	34.558	27.63	1.15	0.103	0.562	15

BROWN BEAR CRUISE 320 STATION 015 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	SAL
0	0.35	0.45		32.562
8	0.43	0.53		32.562
26	0.45	0.36		32.561
60	0.46	0.23		32.561
	26.37	22.00	- WATER COLUMN VALUES	

MESSENGER TIME 0740 INCOMING SOLAR RADIATION - AM 136 PM 106

BROWN BEAR CRUISE 320 STATION 015 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	9.73	0.00	32.569	0.000	25.12	285.1	0.000	0.00	6.46	0.00	
10	9.68	0.00	32.568	0.000	25.13	284.5	0.029	0.02	6.47	0.00	
20	9.70	0.00	32.570	0.000	25.13	284.9	0.058	0.06	6.46	0.00	
30	9.66	0.00	32.571	0.000	25.14	284.4	0.087	0.13	6.47	0.00	
50	9.66	0.00	32.565	0.000	25.13	285.2	0.144	0.37	6.47	0.00	
75	9.65	0.01	32.586	0.004	25.15	283.9	0.216	0.83	6.44	0.02	0.94
100	8.83	0.01	33.169	0.002	25.73	228.7	0.280	1.40	4.63	0.01	0.94
150	7.77	0.00	33.749	0.000	26.35	171.2	0.381	2.66	3.56	0.00	0.94
200	7.00	0.00	33.925	0.009	26.59	148.2	0.461	4.09	3.15	0.00	1.61
250	6.47	0.00	33.977	0.017	26.71	138.0	0.534	5.75	2.58	0.01	1.76
300	6.00	0.00	33.984	0.002	26.77	132.2	0.602	7.67	2.10	0.01	0.97
400	5.22	0.00	34.034	0.005	26.91	120.1	0.729	12.22	1.41	0.03	0.77
500	4.68	0.02	34.090	0.002	27.01	110.7	0.845	17.58	0.94	0.00	0.88
600	4.38	0.05	34.172	0.006	27.11	102.1	0.953	23.64	0.60	0.01	0.67
700	4.18	0.01	34.255	0.001	27.20	94.5	1.052	30.25	0.41	0.00	0.92
800	3.92	0.01	34.321	0.001	27.28	87.5	1.144	37.33	0.34	0.02	0.65
1000	3.40	0.01	34.416	0.002	27.40	76.1	1.310	52.54	0.38	0.00	0.95
1200	3.01	0.02	34.476	0.005	27.49	68.5	1.456	69.05	0.48	0.00	0.88
1500	2.51	0.01	34.526	0.001	27.57	60.8	1.653	96.22	0.79	0.00	0.97

BROWN BEAR CRUISE 320 STATICN 016 OBSERVED VALUES

DATE 3/04/63 HR 19.8 LAT 44-15 N LONG 126-31 W SNDG 2926 WEA 03 WIND VEL 18 DIR 23
BAROM 20.7 TEMP DRY 11.4 WET 9.9 RELHU 84 WTRCLR SECDI SEA 2 DIR 23 SWELL 8 DIR 23
CLOUD TYPE 7 AMT 8 VIS 5 WIRE ANGLE(S) 5

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN AOU	OXYGEN SATN
1	0	9.94	32.558	25.08	6.46	0.577	-0.020	104
1	5	9.99	32.561	25.07	6.50	0.581	-0.024	104
1	10	9.89	32.557	25.09	6.55	0.585	-0.027	105
1	20	9.90	32.557	25.08	6.51	0.581	-0.024	104
1	30	9.90	32.555	25.08	7.38	0.659	-0.102	118
1	50	9.92	32.558	25.08	6.46	0.577	-0.020	104
1	73	9.90	32.559	25.09	6.44	0.575	-0.018	103
1	98	8.09	33.191	25.86	4.86	0.434	0.145	75
1	123	7.61	33.564	26.22	4.47	0.399	0.184	68
1	148	7.65	33.823	26.42	3.40	0.304	0.278	52
1	172	7.49	33.899	26.50	3.16	0.282	0.302	48

BROWN BEAR CRUISE 320 STATION 016 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	LIGHT PROD	SAT FILT	IRRAD	SAL	PHOS	NITR	SIL
0		0.49	2.66				32.570	0.68	1.7	4
6	0.37	0.47	3.34			50	32.565	0.61	1.8	5
24	0.38	0.37	0.14			10	32.579	0.61	0.8	3
60	0.32	0.30	0.00	0.38	100	1	32.567	0.64	1.4	3
				0.41	59					
				0.36	44					
				0.27	32					
				0.18	13					
				0.03	4					
	21.57	22.52	44.28	- WATER COLUMN VALUES						

MESSENGER TIME 1127 INCOMING SOLAR RADIATION - AM 136 PM 106

LIGHT SATURATION INCUBATOR ILLUMINATION 19700

BROWN BEAR CRUISE 320 STATION 016 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	9.94	0.00	32.558	0.000	25.08	289.2	0.000	0.00	6.46	0.00	
10	9.89	0.00	32.557	0.000	25.09	288.6	0.030	0.02	6.55	0.00	
20	9.90	0.00	32.557	0.000	25.08	289.0	0.059	0.06	6.51	0.00	
30	9.90	0.00	32.555	0.000	25.08	289.3	0.088	0.14	7.38	0.00	
50	9.92	0.00	32.558	0.000	25.08	289.8	0.146	0.37	6.46	0.00	
75	9.77	0.04	32.602	0.011	25.14	284.5	0.218	0.84	6.32	0.03	0.90
100	8.02	0.01	33.228	0.002	25.90	212.5	0.281	1.39	4.82	0.02	0.89
150	7.65	0.01	33.837	0.001	26.43	162.9	0.376	2.57	3.33	0.01	1.07

BROWN BEAR CRUISE 320 STATION 017 OBSERVED VALUES

DATE 4/04/63 HR 00.2 LAT 44-01 N LONG 125-59 W SNDG 2926 WEA 00 WIND VEL 18 DIR 22
BAROM 24.0 TEMP DRY 10.3 WET 10.1 RELHU 97 WTRCLR SECDI SEA 2 DIR 22 SWELL 4 DIR 16
CLOUD TYPE 3 AMT 8 VIS 5 WIRE ANGLE(S) 33,--

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN AOU	OXYGEN SATN
2	0	10.07	32.598	25.09	6.57	0.587	-0.032	106
2	5	10.04	32.602	25.10	6.60	0.589	-0.034	106
2	10	10.02	32.595	25.09	6.57	0.587	-0.031	106
2	20	10.02	32.599	25.10	6.57	0.587	-0.031	106
2	30	10.07	32.631	25.11	6.53	0.583	-0.028	105
2	50	10.09	32.632	25.11	6.46	0.577	-0.022	104
2	74	9.71	33.320	25.71	6.50	0.581	-0.024	104
2	99	9.00	33.706	26.13	4.93	0.440	0.124	78
2	124	8.57	33.834	26.29	2.88	0.257	0.312	45
2	149	8.31	33.896	26.38	2.65	0.237	0.336	41
1	169	8.13	33.923	26.43	2.54	0.227	0.348	39
2	174	8.08	33.943	26.45	2.46	0.220	0.356	38
1	259	6.96	34.019	26.67	1.88	0.168	0.423	28
1	435	5.53	34.074	26.90	1.09	0.097	0.514	16
1	663	4.56	34.249	27.15	0.34	0.030	0.595	5
1	895	3.95	34.318	27.27	0.31	0.028	0.607	4
1	1363	2.76	34.515	27.54	0.69	0.062	0.592	9
1	1650	2.24	34.550	27.61	1.01	0.090	0.572	14

BROWN BEAR CRUISE 320 STATION 017 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	10.07	0.00	32.598	0.000	25.09	288.3	0.000	0.00	6.57	0.00	
10	10.02	0.00	32.595	0.000	25.09	287.9	0.030	0.02	6.57	0.00	
20	10.02	0.00	32.599	0.000	25.10	287.8	0.059	0.06	6.57	0.00	
30	10.07	0.00	32.631	0.000	25.11	286.4	0.087	0.13	6.53	0.00	
50	10.09	0.00	32.632	0.000	25.11	287.0	0.145	0.37	6.46	0.00	
75	9.68	0.00	33.341	0.001	25.73	228.5	0.210	0.78	6.46	0.01	0.94
100	8.98	0.00	33.714	0.001	26.14	190.5	0.263	1.25	4.84	0.01	0.94
150	8.30	0.00	33.898	0.000	26.38	167.7	0.353	2.39	2.64	0.00	0.94
200	7.75	0.03	33.965	0.003	26.52	155.6	0.435	3.85	2.31	0.02	1.57
250	7.08	0.01	34.012	0.000	26.65	143.6	0.510	5.58	1.95	0.01	0.89
300	6.55	0.02	34.035	0.006	26.74	135.5	0.580	7.57	1.66	0.01	0.91
400	5.74	0.02	34.066	0.006	26.87	124.1	0.711	12.25	1.22	0.01	0.78
500	5.18	0.02	34.123	0.008	26.98	114.1	0.832	17.79	0.82	0.01	0.75
600	4.76	0.02	34.200	0.007	27.09	104.4	0.942	24.00	0.50	0.01	0.72
700	4.45	0.01	34.263	0.003	27.17	97.0	1.044	30.79	0.31	0.01	0.81
800	4.18	0.01	34.295	0.005	27.23	92.3	1.140	38.16	0.27	0.02	0.59
1000	3.66	0.01	34.366	0.007	27.34	82.7	1.317	54.47	0.36	0.01	0.92
1200	3.15	0.01	34.452	0.009	27.46	71.9	1.473	72.10	0.51	0.02	0.87
1500	2.48	0.01	34.547	0.005	27.59	58.9	1.672	99.48	0.85	0.01	0.81

BROWN BEAR CRUISE 320 STATION 018 OBSERVED VALUES

DATE 4/04/63 HR 06.1 LAT 44-01 N LONG 125-16 W SNDG 2825 WEA 02 WIND VEL 12 DIR 22
BAROM 36.2 TEMP DRY 11.2 WET 10.4 RELHU 92 WTRCLR SECDI SEA 2 DIR 22 SWELL 4 DIR 17
CLOUD TYPE 3 AMT 7 VIS 7 WIRE ANGLE(S) 25,12, 6

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN AOU	OXYGEN SATN
2	0	10.18	32.731*	25.17	6.53	0.583	-0.030	105
2	5	10.16	32.642	25.11	6.52	0.582	-0.028	105
2	10	10.12	32.652	25.12	6.53	0.583	-0.029	105
2	20	10.10	32.647	25.12	6.51	0.581	-0.027	105
2	30	10.12	32.643	25.12	6.50	0.581	-0.026	105
2	50	10.09	32.644	25.12	6.40	0.572	-0.017	103
2	74	9.97	33.176	25.56	5.38	0.481	0.074	87
2	99	9.47	33.436	25.84	4.45	0.397	0.162	71
2	124	8.97	33.666	26.10	3.57	0.319	0.246	56
2	149	8.38	33.830	26.32	2.84	0.254	0.318	44
2	174	8.15	33.913	26.42	2.53	0.226	0.349	39
3	198	7.86	33.961	26.50	2.42	0.216	0.362	37
3	297	6.71	34.030	26.72	1.80	0.161	0.434	27
3	494	5.17	34.131	26.99	0.76	0.068	0.549	11
3	741	4.31	34.309	27.23	0.27	0.024	0.605	4
3	988	3.70	34.404	27.36	0.35	0.031	0.607	5
3	1484	2.71	34.522	27.55	0.82	0.073	0.581	11
3	1781	2.19	34.564	27.63	1.19	0.106	0.557	16
1	1815	2.21	34.572	27.63	1.21	0.108	0.555	16
1	1963	2.05	34.601	27.67	1.38	0.123	0.542	19
1	2356	1.77	34.630	27.71	1.92	0.171	0.499	26
1	2750	1.69	34.628	27.72	2.07	0.185	0.487	28

BROWN BEAR CRUISE 320 STATION 018 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	SAL
0	1.22	1.43		32.630
2	1.33	0.96		32.630
9	1.35	1.16		32.630
24	1.51	0.85		32.631
	33.36	24.81	- WATER COLUMN VALUES	

MESSENGER TIME 2107 INCOMING SOLAR RADIATION - AM 136 PM 106

ZOOPLANKTON (CLARKE-BUMPUS) HORIZ - TIME 0050-0100 DEPTHS 100, 70
0115-0125 35, 0

BROWN BEAR CRUISE 320 STATION 018 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	10.18	0.00	32.731	0.000	25.17	280.2	0.000	0.00	6.53	0.00	
10	10.12	0.00	32.652	0.000	25.12	285.2	0.029	0.02	6.53	0.00	
20	10.10	0.00	32.647	0.000	25.12	285.5	0.058	0.06	6.51	0.00	
30	10.12	0.00	32.643	0.000	25.12	286.3	0.087	0.13	6.50	0.00	
50	10.09	0.00	32.644	0.000	25.12	286.1	0.144	0.37	6.40	0.00	
75	9.95	0.00	33.190	0.002	25.57	244.1	0.211	0.79	5.34	0.00	0.94
100	9.45	0.00	33.446	0.000	25.85	217.6	0.269	1.31	4.41	0.00	0.94
150	8.37	0.00	33.834	0.000	26.32	173.4	0.368	2.55	2.82	0.00	0.94
200	7.84	0.00	33.963	0.001	26.51	156.9	0.451	4.03	2.41	0.00	1.04
250	7.24	0.01	34.011	0.008	26.63	145.8	0.527	5.79	2.11	0.01	1.31
300	6.68	0.00	34.032	0.000	26.72	137.5	0.599	7.80	1.78	0.00	0.99
400	5.80	0.01	34.084	0.004	26.88	123.5	0.730	12.50	1.20	0.01	0.77
500	5.14	0.00	34.135	0.001	27.00	112.7	0.849	17.99	0.74	0.00	0.97
600	4.71	0.04	34.209	0.006	27.10	103.2	0.959	24.13	0.46	0.01	0.68
700	4.40	0.02	34.280	0.003	27.19	95.2	1.059	30.81	0.30	0.01	0.80
800	4.15	0.01	34.337	0.002	27.27	89.0	1.152	37.98	0.26	0.01	0.73
1000	3.67	0.00	34.408	0.000	27.37	79.8	1.323	53.70	0.36	0.00	0.99
1200	3.25	0.01	34.464	0.002	27.46	72.2	1.477	71.06	0.51	0.01	0.90
1500	2.68	0.00	34.524	0.000	27.56	63.0	1.682	99.43	0.84	0.00	0.91
2000	2.01	0.00	34.606	0.001	27.68	51.4	1.973	151.13	1.44	0.01	1.01
2500	1.72	0.00	34.630	0.002	27.72	47.8	2.225	209.60	2.05	0.02	1.60

BROWN BEAR CRUISE 320 STATION 18A BIOLOGICAL DATA

DATE 4/04/63 LAT 44-20 N LONG 124-36 W

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	SAL
0	1.05	2.44	15.04	32.594

MESSENGER TIME 0602 INCOMING SOLAR RADIATION - AM 101 PM 135

BROWN BEAR CRUISE 320 STATION 019 OBSERVED VALUES

YAQUINA BAY ENTRANCE

DATE 4/04/63 HR 17.2 LAT 44-34 N LONG 124-08 W SNDG 40 WEA 45 WIND VEL 6 DIR 18
BAROM 26.1 TEMP DRY 11.7 WET 11.2 RELHU 94 WTRCLR SECDI SEA 1 DIR 18 SWELL 2 DIR 25
CLOUD TYPE 7 AMT 9 VIS 2 WIRE ANGLE(S) 15

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN AOU	OXYGEN SATN
1	0	10.11	28.576	21.96	6.71	0.599	-0.029	105
1	5	10.02	30.353	23.35	6.64	0.593	-0.029	105
1	10	10.00	30.866	23.75	6.62	0.591	-0.028	105
1	14	10.00	31.436	24.20	6.55	0.585	-0.024	104
1	19	10.04	31.741	24.43	6.48	0.579	-0.020	104
1	24	10.00	31.756	24.44	6.50	0.581	-0.021	104

BROWN BEAR CRUISE 320 STATION 019 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	SAL
0	3.07	13.94		28.386
2	3.32	14.06		29.435
6	2.93	13.91		30.377
10	2.59	11.79		30.771
25	1.99	8.53		31.756
	29.93	135.43	- WATER COLUMN VALUES	

MESSENGER TIME 0920 INCOMING SOLAR RADIATION - AM 101 PM 135

BROWN BEAR CRUISE 320 STATION 019 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	10.11	0.00	28.576	0.000	21.96	587.3	0.000	0.00	6.71	0.00	
10	10.00	0.00	30.866	0.000	23.75	415.7	0.051	0.02	6.62	0.00	
20	10.04	0.00	31.762	0.004	24.44	350.2	0.090	0.08	6.47	0.00	1.19

BROWN BEAR CRUISE 320 STATION 020 OBSERVED VALUES

DATE 4/04/63 HR 20.3 LAT 44-52 N LONG 124-07 W SNDG 62 WEA 02 WIND VEL 6 DIR 18
BAROM 24.7 TEMP DRY 12.3 WET 11.5 RELHU 92 WTRCLR SECDI SEA 0 DIR 18 SWELL 1 DIR 28
CLOUD TYPE 7 AMT 8 VIS 5 WIRE ANGLE(S) 20

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN AOU	OXYGEN SATN
1	0	10.39	29.335	22.50	7.00	0.625	-0.061	111
1	5	10.03	31.066	23.90	6.78	0.606	-0.044	108
1	9	9.98	31.726	24.42	6.57	0.587	-0.027	105
1	14	9.96	32.256	24.84	6.46	0.577	-0.019	103
1	19	9.97	32.300	24.87	6.27	0.560	-0.002	100
1	23	9.92	32.319	24.90	6.42	0.573	-0.015	103
1	33	9.90	32.334	24.91	6.35	0.567	-0.009	102
1	42	9.91	32.347	24.92	6.38	0.570	-0.012	102
1	52	9.88	32.352	24.93	6.33	0.565	-0.007	101

BROWN BEAR CRUISE 320 STATION 020 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	LIGHT PROD	SAT FILT	IRRAD	SAL	PHOS	NITR	SIL
0	2.51	6.66					29.459	0.61	4.7	24
2	3.04	13.87				50	30.289	0.62	4.2	19
7	2.94	11.11		18.56	100	10	31.201	0.71	3.5	14
				13.84	59					
				9.70	44					
				8.70	32					
				3.25	13					
				0.77	4					
12	2.59	8.05				1	31.816	0.64	1.3	8
52	0.77	1.59					32.340	0.68	2.7	6
	34.32	130.88	- WATER COLUMN VALUES							

MESSENGER TIME 1232 INCOMING SOLAR RADIATION - AM 101 PM 135

LIGHT SATURATION INCUBATOR ILLUMINATION 18500

BROWN BEAR CRUISE 320 STATION 020 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	10.39	0.00	29.335	0.000	22.50	535.2	0.000	0.00	7.00	0.00	
10	9.97	0.00	31.865	0.004	24.53	341.2	0.045	0.02	6.54	0.01	0.80
20	9.96	0.00	32.306	0.000	24.88	308.5	0.077	0.07	6.30	0.01	0.70
30	9.90	0.00	32.332	0.002	24.91	305.8	0.108	0.15	6.40	0.03	0.85
50	9.89	0.00	32.352	0.000	24.93	304.6	0.170	0.40	6.36	0.01	0.80

BROWN BEAR CRUISE 320 STATION 021 OBSERVED VALUES

CASCADE HEAD

DATE 4/04/63 HR 22.3 LAT 45-07 N LONG 124-02 W SNOG 38 WEA 45 WIND VEL 8 DIR 20
BAROM 23.0 TEMP DRY 11.8 WET 11.3 RELHU 96 WTRCLR SECDI SEA 0 DIR 20 SWELL 1 DIR 18
CLOUD TYPE 7 AMT 9 VIS 2 WIRE ANGLE(S) 10

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN AOU	OXYGEN SATN
1	0	10.30	30.008	23.04	6.85	0.612	-0.050	109
1	5	10.07	30.462	23.43	6.73	0.601	-0.038	107
1	10	10.00	30.790	23.69	6.59	0.589	-0.026	105
1	15	9.95	31.538	24.28	6.50	0.581	-0.020	104
1	20	9.96	31.770	24.46	6.43	0.574	-0.015	103
1	30	9.91	32.082	24.71	6.23	0.556	0.003	100

BROWN BEAR CRUISE 320 STATION 021 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	10.30	0.00	30.008	0.000	23.04	483.9	0.000	0.00	6.85	0.00	
10	10.00	0.00	30.790	0.000	23.69	421.3	0.046	0.02	6.59	0.00	
20	9.96	0.00	31.770	0.000	24.46	348.2	0.085	0.08	6.43	0.00	
30	9.91	0.00	32.082	0.000	24.71	324.5	0.119	0.17	6.23	0.00	

BROWN BEAR CRUISE 320 STATION 022 OBSERVED VALUES

DATE 5/04/63 HR 03.0 LAT 45-07 N LONG 124-44 W SNDG 366 WEA 10 WIND VEL 4 DIR 18
BAROM 19.3 TEMP DRY 10.4 WET 9.9 RELHU 93 WTRCLR SECDI SEA 2 DIR 18 SWELL 1 DIR 13
CLOUD TYPE / AMT 9 VIS 1 WIRE ANGLE(S) 0

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN AOU	OXYGEN SATN
1	0	9.93	32.045	24.68	6.69	0.598	-0.038	107
1	5	9.94	32.042	24.68	6.69	0.598	-0.039	107
1	10	9.85	32.038	24.69	6.66	0.595	-0.035	106
1	20	9.75	32.051	24.72	6.56	0.586	-0.025	104
1	30	9.80	32.117	24.76	6.54	0.584	-0.024	104
1	50	9.83	32.222	24.84	6.50	0.581	-0.021	104
1	75	9.80	33.023	25.46	5.25	0.469	0.088	84
1	100	9.11	33.438	25.90	4.13	0.369	0.195	65
1	125	8.41	33.632	26.16	3.45	0.308	0.264	54
1	150	8.11	33.751*	26.30	3.12	0.279	0.295	48
1	181	7.74	33.877*	26.45	2.77	0.247	0.333	43
1	203	7.38	34.019*	26.61	2.48	0.221	0.363	38
1	253	6.18	33.934*	26.71	1.79	0.160	0.442	27

BROWN BEAR CRUISE 320 STATION 022 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	SAL
0	1.39	1.80		32.043
2	1.37	1.85		32.043
7	1.58	2.06		32.040
12	1.49	2.17		32.047
	17.81	24.01	- WATER COLUMN VALUES	

MESSENGER TIME 1918 INCOMING SOLAR RADIATION - AM 101 PM 135

BROWN BEAR CRUISE 320 STATION 022 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	9.93	0.00	32.045	0.000	24.68	327.0	0.000	0.00	6.69	0.00	
10	9.85	0.00	32.038	0.000	24.69	326.5	0.033	0.02	6.66	0.00	
20	9.75	0.00	32.051	0.000	24.72	324.1	0.066	0.07	6.56	0.00	
30	9.80	0.00	32.117	0.000	24.76	320.2	0.099	0.15	6.54	0.00	
50	9.83	0.00	32.222	0.000	24.84	313.2	0.162	0.41	6.50	0.00	
75	9.80	0.00	33.023	0.000	25.46	253.9	0.234	0.86	5.25	0.00	
100	9.11	0.00	33.438	0.000	25.90	212.9	0.293	1.38	4.13	0.00	
150	8.11	0.00							3.12	0.00	
200	7.43	0.00							2.52	0.00	0.77
250	6.27	0.00							1.83	0.00	10.77

BROWN BEAR CRUISE 320 STATION 023 OBSERVED VALUES

DATE 5/04/63 HR 07.9 LAT 45-07 N LONG 125-24 W SNDG 1920 WEA 62 WIND VEL 10 DIR 14
BAROM 13.9 TEMP DRY 11.7 WET 10.0 RELHU 83 WTRCLR SECDI SEA 1 DIR 14 SWELL 2 DIR 11
CLOUD TYPE 7 AMT 9 VIS 2 WIRE ANGLE(S) 16, 3

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN AOU	OXYGEN SATN
2	0	10.15	32.424*	24.94	6.54	0.584	-0.029	105
2	5	10.11	32.420*	24.94	6.70	0.598	-0.043	108
2	10	10.00	32.461	24.99	6.65	0.594	-0.037	107
2	20	9.98	32.465	25.00	6.85	0.612	-0.055	110
2	30	9.94	32.467	25.01	6.27	0.560	-0.003	100
2	50	9.91	32.592	25.11	6.34	0.566	-0.009	102
2	74	9.66	33.187	25.62	5.05	0.451	0.107	81
2	99	9.20	33.440	25.89	4.20	0.375	0.188	67
2	124	8.74	33.624	26.10	3.37	0.301	0.267	53
2	149	8.32	33.710	26.23	3.00	0.268	0.305	47
2	174	8.15	33.854	26.37	2.50	0.223	0.352	39
1	188	8.10	33.893	26.41	2.62	0.234	0.342	41
1	281	6.21	33.994	26.75	2.07	0.185	0.417	31
1	471	5.18	34.102	26.96	0.95	0.085	0.532	14
1	707	4.30	34.269	27.20	0.36	0.032	0.598	5
1	943	3.65	34.399	27.37	0.43	0.038	0.601	6
1	1421	2.81	34.511	27.53	0.85	0.076	0.577	12
1	1706	2.26	34.563	27.62	1.18	0.105	0.557	16

BROWN BEAR CRUISE 320 STATION 023 BIOLOGICAL DATA

INCOMING SOLAR RADIATION - AM 134 PM 156

ZOOPLANKTON (CLARKE-BUMPUS) HORIZ - TIME 0123-0133 DEPTHS 100, 70
0151-0201 30, 0

BROWN BEAR CRUISE 320 STATION 023 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	10.15	0.00							6.54	0.00	
10	10.00	0.00	32.461	0.000	24.99	297.5			6.65	0.00	
20	9.98	0.00	32.465	0.000	25.00	297.1			6.85	0.00	
30	9.94	0.00	32.467	0.000	25.01	296.5			6.27	0.00	
50	9.91	0.00	32.592	0.000	25.11	287.1			6.34	0.00	
75	9.64	0.00	33.201	0.002	25.63	238.3			5.01	0.00	0.94
100	9.18	0.00	33.449	0.000	25.90	213.2			4.16	0.00	0.94
150	8.31	0.00	33.716	0.001	26.24	181.3			2.97	0.01	0.94
200	7.91	0.07	33.915	0.005	26.46	161.6			2.01	0.04	1.62
250	6.94	0.13	33.977	0.009	26.64	144.2			2.38	0.09	1.87
300	6.02	0.05	34.007	0.002	26.79	130.7			1.94	0.01	0.96
400	5.33	0.14	34.068	0.006	26.92	118.8			1.33	0.02	0.75
500	5.05	0.00	34.123	0.001	27.00	112.6			0.84	0.00	0.86
600	4.66	0.01	34.193	0.003	27.10	103.7			0.53	0.01	0.67
700	4.32	0.00	34.264	0.000	27.19	95.4			0.37	0.00	0.96
800	4.02	0.00	34.325	0.000	27.27	88.3			0.34	0.02	0.63
1000	3.54	0.01	34.418	0.003	27.39	77.4			0.47	0.00	0.95
1200	3.17	0.03	34.474	0.007	27.47	70.5			0.62	0.01	0.89
1500	2.68	0.00	34.523	0.001	27.56	63.0			0.94	0.00	9.99

BROWN BEAR CRUISE 320 STATION 024 OBSERVED VALUES

DATE 5/04/63 HR 15.2 LAT 45-06 N LONG 126-15 W SNDG 2779 WEA 45 WIND VEL 4 DIR 12
BAROM 03.7 TEMP DRY 11.8 WET 11.1 RELHU 93 WTRCLR SECDI SEA 1 DIR 13 SWELL 0 DIR 12
CLOUD TYPE 7 AMT 9 VIS 2 WIRE ANGLE(S) 0, 7

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN ADU	OXYGEN SATN
2	0	10.02	32.545	25.06	7.02	0.627	-0.071	113
2	5	10.00	32.560	25.07	6.80	0.607	-0.051	109
2	10	10.00	32.606	25.11	6.71	0.599	-0.043	108
2	20	9.99	32.636	25.13	6.64	0.593	-0.037	107
2	30	10.02	32.638	25.13	6.54	0.584	-0.028	105
2	50	9.99	32.649	25.14	6.43	0.574	-0.018	103
2	74	9.63	33.011	25.48	5.43	0.485	0.074	87
2	99	9.13	33.406	25.87	4.39	0.392	0.172	70
2	124	8.74						
2	149	8.37	33.644	26.18	3.04	0.272	0.301	47
2	174	7.93	33.790	26.36	2.97	0.265	0.313	46
1	198	7.60	33.884	26.48	2.63	0.235	0.348	40
1	297	6.38	34.012	26.75	2.04	0.182	0.417	30
1	496	5.04	34.138	27.01	0.78	0.070	0.549	11
1	743	4.19	34.296	27.23	0.38	0.034	0.597	5
1	990	3.48	34.420	27.40	0.46	0.041	0.601	6
1	1486	2.58	34.529	27.57	0.90	0.080	0.576	12
1	1784	2.12	34.574	27.64	1.37	0.122	0.542	18

BROWN BEAR CRUISE 320 STATION 024 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	SAL
0	0.90	0.91		32.556
6	0.99	1.58		32.557
16	1.35	1.45		32.625
31	1.06	0.97		32.624
100	0.05	0.01		33.420
	35.45	40.85	- WATER COLUMN VALUES	

MESSENGER TIME 0750 INCOMING SOLAR RADIATION - AM 134 PM 156

BROWN BEAR CRUISE 320 STATION 024 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	10.02	0.00	32.545	0.000	25.06	291.4	0.000	0.00	7.02	0.00	
10	10.00	0.00	32.606	0.000	25.11	286.7	0.030	0.02	6.71	0.00	
20	9.99	0.00	32.636	0.000	25.13	284.6	0.058	0.06	6.64	0.00	
30	10.02	0.00	32.638	0.000	25.13	285.1	0.087	0.13	6.54	0.00	
50	9.99	0.00	32.649	0.000	25.14	284.2	0.144	0.37	6.43	0.00	
75	9.61	0.00	33.028	0.001	25.50	250.6	0.212	0.80	5.39	0.00	0.95
100	9.11	0.00	33.414	0.003	25.88	214.8	0.270	1.32	4.35	0.00	0.99
150	8.35	0.00	33.650	0.000	26.18	186.8	0.372	2.60	3.04	0.00	0.94
200	7.57	0.00	33.889	0.001	26.49	158.7	0.459	4.14	2.61	0.00	1.04
250	6.92	0.01	33.980	0.016	26.65	143.8	0.535	5.90	2.24	0.06	1.31
300	6.35	0.00	34.015	0.000	26.75	134.4	0.605	7.88	2.02	0.00	0.99
400	5.56	0.04	34.088	0.007	26.91	120.2	0.734	12.46	1.34	0.04	0.78
500	5.02	0.00	34.141	0.000	27.01	110.9	0.850	17.83	0.77	0.00	0.98
600	4.62	0.03	34.206	0.001	27.11	102.2	0.958	23.90	0.50	0.03	0.68
700	4.30	0.02	34.270	0.001	27.20	94.8	1.057	30.53	0.39	0.02	0.79
800	4.01	0.00	34.328	0.000	27.27	88.0	1.150	37.64	0.37	0.01	0.74
1000	3.46	0.00	34.423	0.000	27.40	76.1	1.316	52.90	0.46	0.00	0.99
1200	3.05	0.02	34.480	0.006	27.49	68.6	1.462	69.43	0.60	0.00	0.90
1500	2.56	0.00	34.531	0.000	27.57	61.0	1.660	96.69	0.92	0.00	1.00

BROWN BEAR CRUISE 320 STATION 025 OBSERVED VALUES

DATE 5/04/63 HR 19.9 LAT 45-15 N LONG 126-41 W SNDG 2761 WEA 02 WIND VEL 12 DIR 25
BAROM 03.7 TEMP DRY 11.2 WET 10.7 RELHU 95 WTRCLR SECDI SEA 1 DIR 25 SWELL 1 DIR 25
CLOUD TYPE 7 AMT 8 VIS 3 WIRE ANGLE(S) --

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN AOU	OXYGEN SATN
1	0	10.25	32.635	25.09	6.62	0.591	-0.038	107
1	5	10.19	32.631	25.09	6.62	0.591	-0.038	107
1	10	10.11	32.633	25.11	6.65	0.594	-0.039	107
1	20	10.11	32.633	25.11	6.62	0.591	-0.037	107
1	30	10.09	32.644	25.12	6.56	0.586	-0.031	106
1	50	10.00	32.655	25.14	6.45	0.576	-0.020	104
1	74	9.90	33.316	25.68	4.92	0.439	0.115	79
1	99	9.33	33.552	25.95	3.99	0.356	0.204	64
1	124	8.75	33.772	26.22	3.55	0.317	0.250	56
1	149	8.39	33.888	26.36	2.69	0.240	0.331	42
1	174	7.97	33.942	26.47	2.55	0.228	0.349	39

BROWN BEAR CRUISE 320 STATION 025 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	LIGHT SAT PROD	LIGHT SAT FILT	IRRAD	SAL	PHOS	NITR	SIL
0	1.17	2.61	17.00				32.631	0.66	2.4	4
6	1.27	2.41	12.14	2.38	100	50	32.629	0.39	3.8	4
				2.22	77					
				1.57	59					
				1.19	32					
				1.01	21					
				0.07	4					
20		1.90	1.86			10	32.634	0.67	2.4	4
42	1.12	1.10	0.04			1	32.645	0.69	2.3	5
100	0.10						33.522	1.68	23.1	25
200	0.00						33.963	2.19	34.0	42
	50.34	78.24	206.30	- WATER COLUMN VALUES						

MESSENGER TIME 1136 INCOMING SOLAR RADIATION - AM 134 PM 156

LIGHT SATURATION INCUBATOR ILLUMINATION 18800

BROWN BEAR CRUISE 320 STATION 025 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	10.25	0.00	32.635	0.000	25.09	288.4	0.000	0.00	6.62	0.00	
10	10.11	0.00	32.633	0.000	25.11	286.5	0.029	0.02	6.65	0.00	
20	10.11	0.00	32.633	0.000	25.11	286.7	0.058	0.06	6.62	0.00	
30	10.09	0.00	32.644	0.000	25.12	285.7	0.087	0.13	6.56	0.00	
50	10.00	0.00	32.655	0.000	25.14	283.9	0.145	0.37	6.45	0.00	
75	9.88	0.00	33.330	0.003	25.69	232.5	0.210	0.78	4.87	0.00	0.94
100	9.30	0.00	33.562	0.001	25.97	206.8	0.265	1.27	3.97	0.01	0.94
150	8.38	0.00	33.891	0.000	26.37	169.3	0.360	2.46	2.66	0.01	1.04

BROWN BEAR CRUISE 320 STATION 026 OBSERVED VALUES

DATE 6/04/63 HR 02.2 LAT 45-38 N LONG 127-41 W SNDG 2834 WEA 03 WIND VEL 10 DIR 20
BAROM 03.0 TEMP DRY 10.6 WET 9.0 RELHU 82 WTRCLR SECDI SEA 2 DIR 20 SWELL 2 DIR 21
CLOUD TYPE 3 AMT 8 VIS 6 WIRE ANGLE(S) 17, 6

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN AOU	OXYGEN SATN
2	0	9.78	32.547	25.10	6.63	0.592	-0.033	106
2	5	9.75	32.547	25.10	6.68	0.597	-0.037	107
2	10	9.70	32.544	25.11	6.62	0.591	-0.031	106
2	20	9.70	32.555	25.12	6.62	0.591	-0.031	106
2	30	9.64	32.568	25.14	6.50	0.581	-0.020	104
2	50	9.60	32.568	25.14	6.50	0.581	-0.019	103
2	74	8.40	33.051	25.71	5.08	0.454	0.121	79
2	99	8.24	33.566	26.13	3.61	0.322	0.253	56
2	124	8.03	33.827	26.37	2.92	0.261	0.316	45
2	153	7.67	33.888	26.47	2.69	0.240	0.341	41
1	172	7.45	33.944	26.55	2.51	0.224	0.360	36
2	174	7.40	33.926	26.54	2.59	0.231	0.354	40
1	276	6.32	34.008	26.75	1.89	0.169	0.431	28
1	466	5.10	34.108	26.98	0.96	0.086	0.532	14
1	706	4.26	34.276	27.21	0.44	0.039	0.591	6
1	948	3.58	34.409	27.38	0.38	0.034	0.607	5
1	1432	2.76	34.507	27.54	0.75	0.067	0.587	10
1	1728	2.18	34.558	27.63	1.22	0.109	0.555	16

BROWN BEAR CRUISE 320 STATION 026 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	SAL
0	0.54	0.34		32.595
6	0.56	0.50		32.552
20	0.61	0.48		32.546
42	0.57	0.23		32.566
	24.51	17.21	- WATER COLUMN VALUES	

MESSENGER TIME 1950 INCOMING SOLAR RADIATION - AM 134 PM 156

BROWN BEAR CRUISE 320 STATION 026 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	9.78	0.00	32.547	0.000	25.10	287.5	0.000	0.00	6.63	0.00	
10	9.70	0.00	32.544	0.000	25.11	286.6	0.029	0.02	6.62	0.00	
20	9.70	0.00	32.555	0.000	25.12	286.0	0.058	0.06	6.62	0.00	
30	9.64	0.00	32.568	0.000	25.14	284.3	0.087	0.13	6.50	0.00	
50	9.60	0.00	32.568	0.000	25.14	284.0	0.144	0.37	6.50	0.00	
75	8.38	0.01	33.074	0.002	25.73	228.7	0.209	0.77	5.01	0.00	0.94
100	8.23	0.00	33.581	0.000	26.15	189.3	0.261	1.24	3.57	0.00	0.94
150	7.71	0.00	33.887	0.004	26.46	160.0	0.349	2.35	2.70	0.01	0.91
200	7.11	0.01	33.975	0.018	26.62	146.0	0.427	3.73	2.34	0.04	1.81
250	6.58	0.01	34.010	0.014	26.72	137.0	0.498	5.37	2.02	0.02	1.24
300	6.12	0.01	34.022	0.002	26.79	131.0	0.566	7.28	1.75	0.00	0.93
400	5.44	0.02	34.075	0.004	26.91	119.6	0.692	11.80	1.23	0.00	0.73
500	4.95	0.01	34.131	0.002	27.01	110.7	0.808	17.15	0.85	0.01	0.85
600	4.57	0.03	34.201	0.003	27.11	102.1	0.916	23.21	0.60	0.01	0.67
700	4.28	0.00	34.272	0.000	27.20	94.3	1.015	29.83	0.45	0.00	0.96
800	3.98	0.00	34.333	0.001	27.28	87.2	1.107	36.89	0.38	0.01	0.63
1000	3.48	0.01	34.425	0.003	27.40	76.2	1.272	52.09	0.39	0.00	0.95
1200	3.12	0.04	34.475	0.009	27.48	69.8	1.420	68.78	0.50	0.01	0.88
1500	2.65	0.01	34.516	0.002	27.55	63.2	1.622	96.78	0.84	0.00	0.96

BROWN BEAR CRUISE 320 STATION 027 OBSERVED VALUES

DATE 6/04/63 HR 09.3 LAT 45-51 N LONG 127-13 W SNDG 2761 WEA 21 WIND VEL 0 DIR 00
BAROM 02.0 TEMP DRY 9.0 WET 7.6 RELHU 82 WTRCLR SECDI SEA 0 DIR 00 SWELL 1 DIR 24
CLOUD TYPE 7 AMT 9 VIS 5 WIRE ANGLE(S) 5

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN AOU	OXYGEN SATN
1	0	9.70	32.474	25.05	6.62	0.591	-0.031	106
1	5	9.74	32.506	25.07	6.68	0.597	-0.037	107
1	10	9.74	32.528	25.09	6.69	0.598	-0.038	107
1	20	9.70	32.539	25.10	6.65	0.594	-0.034	106
1	30	9.69	32.546	25.11	6.60	0.589	-0.029	105
1	50	9.68	32.535	25.10	6.56	0.586	-0.026	105
1	74	8.44	33.020	25.68	5.12	0.457	0.117	80
1	99	8.24	33.579	26.14	3.47	0.310	0.265	54
1	124	8.05	33.774	26.33	2.88	0.257	0.319	45
1	149	7.82	33.859	26.43	2.56	0.229	0.351	39
1	170	7.53	33.920	26.52	2.36	0.211	0.372	36

BROWN BEAR CRUISE 320 STATION 027 BIOLOGICAL DATA

INCOMING SOLAR RADIATION - AM 330 PM 302

ZOOPLANKTON (CLARKE-BUMPUS) HORIZ - TIME 0012-0022 DEPTHS 100, 70
0039-0049 35, 0

BROWN BEAR CRUISE 320 STATION 027 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	9.70	0.00	32.474	0.000	25.05	291.6	0.000	0.00	6.62	0.00	
10	9.74	0.00	32.528	0.000	25.09	288.4	0.030	0.02	6.69	0.00	
20	9.70	0.00	32.539	0.000	25.10	287.2	0.059	0.06	6.65	0.00	
30	9.69	0.00	32.546	0.000	25.11	286.7	0.088	0.13	6.60	0.00	
50	9.68	0.00	32.535	0.000	25.10	287.7	0.145	0.37	6.56	0.00	
75	8.42	0.01	33.045	0.003	25.70	231.4	0.211	0.78	5.05	0.01	0.94
100	8.23	0.00	33.591	0.002	26.16	188.6	0.264	1.25	3.43	0.01	0.94
150	7.81	0.00	33.862	0.000	26.43	163.3	0.352	2.37	2.55	0.00	1.02

BROWN BEAR CRUISE 320 STATION 028 OBSERVED VALUES

DATE 6/04/63 HR 15.8 LAT 46-15 N LONG 126-24 W SNDG 2651 WEA 04 WIND VEL 20 DIR 24
BAROM 02.0 TEMP DRY 10.7 WET 8.8 RELHU 80 WTRCLR SECDI SEA 2 DIR 24 SWELL 1 DIR 21
CLOUD TYPE 1 AMT 7 VIS 7 WIRE ANGLE(S) 20, 8

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN ADU	OXYGEN SATN
2	0	9.56	32.495	25.09	6.62	0.591	-0.029	105
2	5	9.54						
2	10	9.52	32.502	25.10	6.64	0.593	-0.031	105
2	20	9.53	32.509	25.11	6.65	0.594	-0.032	106
2	30	9.43	32.524	25.14	6.57	0.587	-0.023	104
2	50	9.42	32.513	25.13	6.55	0.585	-0.021	104
2	74	9.40	32.524	25.14	6.56	0.586	-0.022	104
2	99	8.30	32.840	25.56	5.70	0.509	0.068	88
2	124	7.64	33.262	25.98	4.83	0.431	0.153	74
2	148	7.85	33.692	26.29	3.60	0.322	0.258	55
2	173	7.30	33.870	26.51	3.08	0.275	0.312	47
1	189	7.30	33.917	26.55	2.83	0.253	0.334	43
1	284	6.17	33.966	26.74	2.22	0.198	0.404	33
1	475	5.01	34.073	26.96	0.97	0.087	0.533	14
1	714	4.17	34.252	27.20	0.27	0.024	0.608	4
1	953	3.67	34.386	27.35	0.24	0.021	0.618	3
1	1433	2.80	34.505	27.53	0.63	0.056	0.597	9
1	1725	2.17	34.561	27.63	1.10	0.098	0.566	15

BROWN BEAR CRUISE 320 STATION 028 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	SAL
0				32.296
6	0.70	1.25		32.480
20	0.74	1.00		32.480
42	0.75	0.91		32.487
	22.48	44.26	- WATER COLUMN VALUES	

MESSENGER TIME 0719 INCOMING SOLAR RADIATION - AM 330 PM 302

BROWN BEAR CRUISE 320 STATION 028 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	9.56	0.00	32.495	0.000	25.09	287.9	0.000	0.00	6.62	0.00	
10	9.52	0.00	32.502	0.000	25.10	287.0	0.029	0.02	6.64	0.00	
20	9.53	0.00	32.509	0.000	25.11	286.8	0.058	0.06	6.65	0.00	
30	9.43	0.00	32.524	0.000	25.14	284.3	0.087	0.13	6.57	0.00	
50	9.42	0.00	32.513	0.000	25.13	285.3	0.144	0.37	6.55	0.00	
75	9.36	0.01	32.533	0.001	25.15	283.4	0.216	0.83	6.53	0.01	0.94
100	8.26	0.00	32.856	0.001	25.58	243.6	0.283	1.42	5.67	0.00	0.94
150	7.81	0.02	33.714	0.002	26.31	174.2	0.388	2.73	3.54	0.01	0.89
200	7.21	0.04	33.933	0.007	26.57	150.5	0.470	4.18	2.72	0.03	1.45
250	6.66	0.09	33.971	0.015	26.68	141.1	0.543	5.87	2.35	0.06	1.71
300	6.04	0.01	33.974	0.000	26.76	133.4	0.612	7.83	2.10	0.01	0.96
400	5.35	0.04	34.028	0.001	26.89	122.1	0.741	12.43	1.43	0.03	0.75
500	4.90	0.01	34.092	0.001	26.99	113.1	0.860	17.90	0.86	0.00	0.88
600	4.51	0.01	34.166	0.004	27.09	103.9	0.969	24.07	0.50	0.01	0.67
700	4.21	0.00	34.241	0.001	27.18	95.8	1.070	30.80	0.29	0.00	0.92
800	3.97	0.01	34.306	0.000	27.26	89.1	1.164	37.99	0.21	0.02	0.65
1000	3.59	0.01	34.403	0.002	27.38	79.1	1.334	53.66	0.25	0.00	0.95
1200	3.22	0.02	34.462	0.007	27.46	72.0	1.487	70.93	0.37	0.01	0.88
1500	2.67	0.00	34.516	0.002	27.55	63.4	1.693	99.39	0.72	0.00	0.96

BROWN BEAR CRUISE 320 STATION 28A BIOLOGICAL DATA

DATE 6/04/63 LAT 46-12 N LONG 126-28 W

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I
0	0.39	0.37	2.26

MESSENGER TIME 0558 INCOMING SOLAR RADIATION - AM 330 PM 302

BROWN BEAR CRUISE 320 STATION 029 OBSERVED VALUES

DATE 6/04/63 HR 20.6 LAT 46-14 N LONG 125-50 W SNDG 2578 WEA 01 WIND VEL 20 DIR 24
BAROM 06.4 TEMP DRY 10.0 WET 8.8 RELHU 77 WTRCLR SECDI SEA 2 DIR 24 SWELL 3 DIR 24
CLOUD TYPE 8 AMT 2 VIS 8 WIRE ANGLE(S) 30,10,12

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN AOU	OXYGEN SATN
2	0	9.61	32.316	24.94	6.65	0.594	-0.032	106
2	5	9.59	32.313	24.95	6.69	0.598	-0.035	106
2	10	9.54	32.314	24.95	6.68	0.597	-0.034	106
2	20	9.52	32.320	24.96	6.65	0.594	-0.031	105
2	30	9.48	32.408	25.04	6.62	0.591	-0.028	105
2	50	9.40	32.419	25.06	6.51	0.581	-0.017	103
2	74	9.37	32.565	25.18	6.15	0.549	0.015	97
2	99	8.35	33.205	25.84	4.51	0.403	0.172	70
2	124	8.01	33.527	26.14	3.70	0.330	0.248	57
2	149	7.57	33.807	26.42	3.04	0.272	0.312	47
2	174	7.33	33.881	26.51	2.83	0.253	0.333	43
3	194	7.02	33.937	26.60	2.45	0.219	0.371	37
3	292	6.00	33.992	26.78	1.83	0.163	0.441	27
3	489	4.93	34.113	27.00	0.72	0.064	0.556	10
3	735	4.17	34.284	27.22	0.30	0.027	0.605	4
3	980	3.45	34.391	27.38	0.27	0.024	0.619	4
3	1475	2.53	34.510	27.56	0.69	0.062	0.596	9
1	1676	2.24	34.550	27.61	0.97	0.087	0.576	13
3	1776	2.10	34.579	27.65	1.17	0.104	0.560	16
1	1842	2.04	34.578	27.65	1.31	0.117	0.549	18
1	2062	1.79	34.606	27.69	1.48	0.132	0.538	20
1	2186	1.74	34.628	27.72	1.83	0.163	0.508	24

BROWN BEAR CRUISE 320 STATION 029 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	LIGHT SAT PROD	LIGHT SAT FILT	SAL	PHOS	NITR	SIL
0	0.98	1.95	14.78	2.21	100	32.316	0.56	1.8	7
				2.06	77				
				1.87	59				
				1.23	32				
				0.90	21				
				0.04	4				
6	1.02	1.63	14.66			32.311	0.56	1.0	5
20	1.03	1.66	3.80			32.319	0.58	1.2	6
42	1.12	1.05	0.46			32.311	0.61	1.5	6
	43.90	63.57	264.40	- WATER COLUMN VALUES					

MESSENGER TIME 1151 INCOMING SOLAR RADIATION - AM 330 PM 302

LIGHT SATURATION INCUBATOR ILLUMINATION 18000

BROWN BEAR CRUISE 320 STATION 029 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	9.61	0.00	32.316	0.000	24.94	302.0	0.000	0.00	6.65	0.00	
10	9.54	0.00	32.314	0.000	24.95	301.2	0.031	0.02	6.68	0.00	
20	9.52	0.00	32.320	0.000	24.96	300.6	0.061	0.06	6.65	0.00	
30	9.48	0.00	32.408	0.000	25.04	293.7	0.091	0.14	6.62	0.00	
50	9.40	0.00	32.419	0.000	25.06	292.0	0.150	0.38	6.51	0.00	
75	9.33	0.01	32.589	0.005	25.20	278.8	0.222	0.84	6.09	0.01	0.94
100	8.33	0.00	33.221	0.002	25.85	217.4	0.284	1.39	4.47	0.00	0.94
150	7.56	0.00	33.812	0.001	26.43	163.4	0.380	2.59	3.03	0.00	0.94
200	6.94	0.00	33.946	0.004	26.62	145.9	0.458	3.98	2.38	0.02	1.16
250	6.37	0.02	33.991	0.015	26.73	135.7	0.529	5.61	1.97	0.08	1.51
300	5.94	0.01	33.997	0.000	26.79	130.5	0.597	7.51	1.78	0.00	0.98
400	5.31	0.04	34.057	0.000	26.91	119.4	0.723	12.01	1.17	0.02	0.77
500	4.89	0.00	34.121	0.001	27.01	110.7	0.839	17.36	0.69	0.00	0.95
600	4.55	0.02	34.193	0.004	27.11	102.4	0.946	23.43	0.44	0.03	0.68
700	4.26	0.01	34.261	0.002	27.19	94.9	1.046	30.07	0.32	0.01	0.82
800	3.97	0.00	34.317	0.001	27.27	88.3	1.139	37.20	0.27	0.01	0.71
1000	3.40	0.00	34.396	0.001	27.39	77.5	1.306	52.62	0.27	0.00	1.01
1200	2.98	0.02	34.452	0.005	27.47	69.9	1.456	69.45	0.39	0.01	0.89
1500	2.50	0.01	34.509	0.004	27.56	61.9	1.656	97.14	0.70	0.01	1.73
2000	1.85	0.01	34.595	0.001	27.68	50.2	1.941	147.79	1.43	0.03	1.06

BROWN BEAR CRUISE 320 STATION 030 OBSERVED VALUES

DATE 7/04/63 HR 04.4 LAT 46-14 N LONG 124-55 W SNDG 777 WEA 02 WIND VEL 4 DIR 20
BAROM 06.1 TEMP DRY 12.8 WET 9.9 RELHU 70 WTRCLR SECDI SEA 0 DIR 20 SWELL 2 DIR 22
CLOUD TYPE 0 AMT 1 VIS 8 WIRE ANGLE(S) 4

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN AOU	OXYGEN SATN
1	0	9.89	31.857	24.54	6.62	0.591	-0.031	106
1	5	9.95	31.857	24.53	6.63	0.592	-0.033	106
1	10	9.83	31.861	24.55	6.62	0.591	-0.030	105
1	20	9.83	31.858	24.55	6.57	0.587	-0.026	105
1	30	9.56	32.017	24.72	6.43	0.574	-0.010	102
1	50	9.47	32.354	25.00	6.29	0.562	0.002	100
1	74	9.36	32.582	25.19	5.96	0.532	0.032	94
1	99	9.27	33.262	25.74	4.50	0.402	0.161	71
1	124	8.71	33.638	26.12	3.51	0.313	0.255	55
1	149	7.84	33.768	26.35	3.15	0.281	0.298	49
1	174	7.63	33.854	26.45	2.89	0.258	0.324	44
1	198	7.33	33.903	26.53	2.68	0.239	0.347	41
1	297	6.23	33.969	26.73	1.99	0.178	0.424	30
1	496	5.09	34.101	26.97	0.76	0.068	0.550	11
1	759	4.05	34.315	27.26	0.30	0.027	0.607	4

BROWN BEAR CRUISE 320 STATION 030 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	SAL
0	0.81	0.67		31.853
2	0.98	1.02		31.853
9	1.06	1.13		31.852
24	1.19	1.19		31.862
	25.80	26.65	- WATER COLUMN VALUES	

MESSENGER TIME 1950 INCOMING SOLAR RADIATION - AM 330 PM 302

BROWN BEAR CRUISE 320 STATION 030 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	9.89	0.00	31.857	0.000	24.54	340.3	0.000	0.00	6.62	0.00	
10	9.83	0.00	31.861	0.000	24.55	339.3	0.035	0.02	6.62	0.00	
20	9.83	0.00	31.858	0.000	24.55	339.7	0.069	0.07	6.57	0.00	
30	9.56	0.00	32.017	0.000	24.72	323.9	0.102	0.16	6.43	0.00	
50	9.47	0.00	32.354	0.000	25.00	297.9	0.165	0.41	6.29	0.00	
75	9.36	0.00	32.608	0.005	25.21	277.8	0.237	0.87	5.91	0.01	0.94
100	9.26	0.00	33.282	0.000	25.76	226.7	0.301	1.44	4.45	0.00	0.94
150	7.83	0.00	33.772	0.000	26.36	170.1	0.401	2.68	3.14	0.00	0.94
200	7.30	0.00	33.905	0.001	26.54	153.8	0.483	4.14	2.66	0.00	1.04
250	6.72	0.01	33.951	0.009	26.65	143.2	0.557	5.86	2.30	0.01	1.31
300	6.21	0.00	33.971	0.000	26.74	135.8	0.628	7.85	1.97	0.00	0.99
400	5.53	0.05	34.036	0.001	26.87	123.7	0.759	12.52	1.29	0.02	0.77
500	5.08	0.00	34.104	0.000	26.98	114.2	0.879	18.06	0.74	0.00	13.62
600	4.74	0.04	34.177	0.001	27.07	105.8	0.990	24.32	0.36	0.02	19.85
700	4.36	0.04	34.260	0.001	27.18	96.1	1.092	31.12	0.23	0.02	16.98

BROWN BEAR CRUISE 320 STATION 031 OBSERVED VALUES

COLUMBIA RIVER ENTRANCE

DATE 7/04/63 HR 10.9 LAT 46-13 N LONG 124-12 W SNDG 37 WEA 53 WIND VEL 20 DIR 09
BAROM 98.0 TEMP DRY 9.4 WET 7.5 RELHU 76 WTRCLR SECDI SEA 2 DIR 09 SWELL 1 DIR 24
CLOUD TYPE 9 AMT 7 VIS 8 WIRE ANGLE(S) 25

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN AOU	OXYGEN SATN
1	0	9.89	27.251	20.96	6.65	0.594	-0.016	103
1	5	9.90	29.649	22.82	6.45	0.576	-0.007	101
1	9	9.87	31.040	23.91	6.50	0.581	-0.017	103
1	14	9.86	31.262	24.08	6.31	0.564	-0.001	100
1	18	9.76	31.437	24.24	6.29	0.562	0.002	100
1	23	9.70	31.508	24.30	6.19	0.553	0.011	98
1	27	9.73	31.756	24.49	6.29	0.562	0.001	100

BROWN BEAR CRUISE 320 STATION 031 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	SAL
0	1.08	3.79		26.566
2	1.23	3.36		27.039
6	0.69	1.83		30.381
10	0.60	1.40		31.231
	8.73	24.01	- WATER COLUMN VALUES	

MESSENGER TIME 0245 INCOMING SOLAR RADIATION - AM 134 PM 182

ZOOPLANKTON (CLARKE-BUMPUS) HORIZ - TIME 0022-0032 DEPTHS 75, 50
0050-0100 35, 0

BROWN BEAR CRUISE 320 STATION 031 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	9.89	0.00	27.251	0.000	20.96	682.6	0.000	0.00	6.65	0.00	
10	9.87	0.00	31.152	0.045	24.00	392.5	0.055	0.02	6.47	0.01	0.80
20	9.73	0.00	31.459	0.017	24.26	367.6	0.093	0.08	6.24	0.01	0.71

BROWN BEAR CRUISE 320 STATION 032 OBSERVED VALUES

GRAYLAND

DATE 7/04/63 HR 16.0 LAT 46-52 N LONG 124-14 W SNDG 33 WEA 03 WIND VEL 36 DIR 17
BAROM 93.9 TEMP DRY 11.2 WET 8.7 RELHU 73 WTRCLR SECDI SEA 3 DIR 17 SWELL 6 DIR 16
CLOUD TYPE 8 AMT 8 VIS 6 WIRE ANGLE(S) 30

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN AOU	OXYGEN SATN
1	0	9.68	27.134	20.90	6.62	0.591	-0.010	102
1	4	9.70	27.149	20.91	6.62	0.591	-0.010	102
1	9	9.67	28.573	22.02	6.57	0.587	-0.011	102
1	13	9.66	30.986	23.90	6.52	0.582	-0.016	103
1	17	9.58	31.363	24.21	6.43	0.574	-0.008	101
1	22	9.50	31.555	24.37	6.36	0.568	-0.002	100
1	26	9.47	31.746	24.52	6.07	0.542	0.024	96

BROWN BEAR CRUISE 320 STATION 032 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	9.68	0.00	27.134	0.000	20.90	688.3	0.000	0.00	6.62	0.00	
10	9.67	0.00	29.219	0.099	22.52	533.0	0.062	0.03	6.56	0.00	0.70
20	9.53	0.00	31.494	0.014	24.32	362.0	0.107	0.09	6.40	0.01	0.71

BROWN BEAR CRUISE 320 STATION 32A BIOLOGICAL DATA

DATE 7/04/63 LAT 46-43 N LONG 124-34 W

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	LIGHT SAT PROD	LIGHT SAT FILT	SAL
0	0.68	2.15	10.60	1.93	100	31.167
				2.38	77	
				1.96	59	
				1.27	32	
				0.90	21	
				0.07	4	

MESSENGER TIME 1210 INCOMING SOLAR RADIATION - AM 134 PM 182

LIGHT SATURATION INCUBATOR ILLUMINATION 17100

BROWN BEAR CRUISE 320 STATION 033 OBSERVED VALUES

DATE 8/04/63 HR 01.5 LAT 46-51 N LONG 125-10 W SNDG 744 WEA 02 WIND VEL 30 DIR 19
BAROM 00.0 TEMP DRY 9.1 WET 7.8 RELHU 77 WTRCLR SECDI SEA 4 DIR 19 SWELL 8 DIR 16
CLOUD TYPE 8 AMT 6 VIS 6 WIRE ANGLE(S) 18

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN AOU	OXYGEN SATN
1	0	9.42	32.207	24.89	6.46	0.577	-0.012	102
1	5	9.38	32.204	24.89	6.46	0.577	-0.012	102
1	10	9.37	32.209	24.90	6.51	0.581	-0.016	103
1	19	9.38	32.209	24.90	6.50	0.581	-0.015	103
1	29	9.36	32.234	24.92	6.43	0.574	-0.009	102
1	48	9.16	32.422	25.10	5.99	0.535	0.032	94
1	71		32.833		5.25	0.469		
1	95	8.14	33.078	25.77	4.09	0.365	0.213	63
1	119	8.17	33.707	26.26	3.15	0.281	0.294	49
1	143	7.86	33.800	26.37	2.88	0.257	0.322	44
1	180	7.60	33.862	26.46	2.79	0.249	0.333	43
1	197	7.37	33.900	26.52	2.69	0.240	0.345	41
1	249	6.23	33.995	26.75	1.79	0.160	0.442	27
1	476	5.18	34.080	26.95	0.88	0.079	0.538	13
1	666	4.39	34.227	27.15	0.11	0.010	0.619	2

BROWN BEAR CRUISE 320 STATION 033 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	SAL
0	1.11	0.69		32.201
5	1.14	1.08		32.204
17	1.14	1.11		32.199
34	1.01	0.74		32.226
	37.57	33.29	- WATER COLUMN VALUES	

MESSENGER TIME 1802 INCOMING SOLAR RADIATION - AM 134 PM 182

BROWN BEAR CRUISE 320 STATION 033 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VCL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	9.42	0.00	32.207	0.000	24.89	307.1	0.000	0.00	6.46	0.00	
10	9.37	0.00	32.209	0.000	24.90	306.4	0.031	0.02	6.51	0.00	
20	9.38	0.00	32.210	0.000	24.90	306.7	0.062	0.06	6.50	0.00	0.88
30	9.35	0.00	32.240	0.000	24.93	304.2	0.093	0.14	6.41	0.00	0.98
50	9.11	0.01	32.457	0.005	25.13	284.7	0.152	0.38	5.94	0.00	1.00
75	8.53	0.09	32.867	0.013	25.54	246.2	0.219	0.81	5.06	0.01	1.02
100	8.14	0.02	33.215	0.025	25.87	215.2	0.277	1.32	3.86	0.01	0.76
150	7.81	0.02	33.814	0.003	26.39	166.8	0.374	2.53	2.85	0.01	0.88
200	7.31	0.01	33.906	0.000	26.54	153.8	0.454	3.97	2.65	0.01	1.05
250	6.22	0.00	33.996	0.000	26.75	133.4	0.527	5.63	1.78	0.00	1.01
300	5.71	0.18	34.033	0.018	26.85	124.9	0.592	7.47	1.37	0.14	1.39
400	5.17	0.23	34.076	0.024	26.95	116.3	0.714	11.82	0.91	0.18	1.24
500	4.32	0.50	34.082	0.004	27.04	107.1	0.826	17.02	0.19	0.39	50.91
600	5.03	0.12	34.130	0.013	27.00	112.8	0.937	23.31	0.67	0.10	34.90

BROWN BEAR CRUISE 320 STATION 034 OBSERVED VALUES

DATE 8/04/63 HR 09.7 LAT 46-51 N LONG 125-58 W SNDG 2505 WEA 21 WIND VEL 18 DIR 13
BAROM 01.0 TEMP DRY 8.9 WET 7.2 RELHU 83 WTRCLR SECDI SEA 3 DIR 13 SWELL 5 DIR 12
CLOUD TYPE 8 AMT 9 VIS 6 WIRE ANGLE(S) 21, 5

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN AOU	OXYGEN SATN
2	0	9.50	32.314	24.96	6.60	0.589	-0.026	105
2	5	9.49	32.318	24.97	6.66	0.595	-0.031	106
2	10	9.46	32.313	24.97	6.73	0.601	-0.037	107
2	20	9.48	32.314	24.96	6.61	0.590	-0.027	105
2	30	9.48	32.334	24.98	6.61	0.590	-0.027	105
2	50	9.23	32.448	25.11	6.26	0.559	0.007	99
2	74	9.20	32.672	25.29	5.69	0.508	0.058	90
2	99	8.35	33.346	25.95	4.05	0.362	0.213	63
2	124	7.92	33.635	26.24	3.52	0.314	0.265	54
2	148	7.96	33.822	26.38	2.80	0.250	0.328	43
2	173	7.64	33.885	26.47	2.64	0.236	0.346	41
1	187	7.49	33.905	26.51	2.58	0.230	0.353	39
1	280	6.17	33.990	26.76	1.89	0.169	0.434	28
1	470	5.07	34.095	26.97	0.81	0.072	0.546	12
1	708	4.17	34.247	27.19	0.31	0.028	0.604	4
1	947	3.65	34.368	27.34	0.25	0.022	0.617	2
1	1429	2.67	34.495	27.53	0.55	0.049	0.606	7
1	1720	2.18	34.549	27.62	1.05	0.094	0.570	14

BROWN BEAR CRUISE 320 STATION 034 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	SAL
0	1.37	1.29		32.314
4	1.37	1.41		32.311
11	1.50	1.42		32.311
30	1.38	1.26		32.327
	42.88	40.67	- WATER COLUMN VALUES	

MESSENGER TIME 0113 INCOMING SOLAR RADIATION - AM 244 PM 175

ZOOPLANKTON (CLARKE-BUMPUS) HORIZ - TIME 0028-0038 DEPTHS 100, 70
0054-0104 35, 0

BROWN BEAR CRUISE 320 STATION 034 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	9.50	0.00	32.314	0.000	24.96	300.4	0.000	0.00	6.60	0.00	
10	9.46	0.00	32.313	0.000	24.97	300.1	0.031	0.02	6.73	0.00	
20	9.48	0.00	32.314	0.000	24.96	300.5	0.061	0.06	6.61	0.00	
30	9.48	0.00	32.334	0.000	24.98	299.2	0.091	0.14	6.61	0.00	
50	9.23	0.00	32.448	0.000	25.11	287.2	0.150	0.38	6.26	0.00	
75	9.17	0.01	32.698	0.005	25.31	268.2	0.220	0.83	5.62	0.01	0.94
100	8.32	0.00	33.362	0.002	25.96	206.9	0.280	1.36	4.02	0.01	0.94
150	7.94	0.01	33.830	0.001	26.39	167.4	0.374	2.54	2.77	0.01	0.89
200	7.31	0.02	33.920	0.001	26.55	152.7	0.455	3.98	2.50	0.01	1.67
250	6.60	0.04	33.968	0.002	26.68	140.3	0.529	5.68	2.13	0.02	1.83
300	6.00	0.03	34.003	0.002	26.79	130.7	0.597	7.61	1.75	0.00	0.96
400	5.33	0.07	34.061	0.004	26.91	119.4	0.723	12.12	1.15	0.01	0.75
500	4.93	0.00	34.114	0.001	27.00	111.7	0.840	17.49	0.71	0.01	0.86
600	4.52	0.01	34.179	0.002	27.10	103.1	0.949	23.61	0.45	0.02	0.67
700	4.19	0.00	34.242	0.000	27.19	95.5	1.049	30.30	0.32	0.00	0.95
800	3.95	0.01	34.298	0.000	27.26	89.4	1.143	37.50	0.25	0.01	0.63
1000	3.53	0.00	34.387	0.002	27.37	79.7	1.314	53.25	0.25	0.00	0.95
1200	3.15	0.00	34.447	0.005	27.49	71.8	1.467	70.55	0.33	0.00	0.89
1500	2.54	0.00	34.508	0.001	27.55	62.5	1.671	98.75	0.65	0.00	10.50

BROWN BEAR CRUISE 320 STATION 34A BIOLOGICAL DATA

DATE 8/04/63 LAT 46-51 N LONG 126-35 W

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	SAL
0	1.10	2.08	14.74	32.257

MESSENGER TIME 0548 INCOMING SOLAR RADIATION - AM 244 PM 175

BROWN BEAR CRUISE 320 STATION 035 OBSERVED VALUES

DATE 8/04/63 HR 15.0 LAT 46-50 N LONG 126-44 W SNDG 2606 WEA 02 WIND VEL 10 DIR 36
BAROM 03.0 TEMP DRY 10.3 WET 8.9 RELHU 84 WTRCLR SECDI SEA 2 DIR 36 SWELL 4 DIR 32
CLOUD TYPE 4 AMT 6 VIS 7 WIRE ANGLE(S) 2,10

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN AOU	OXYGEN SATN
2	0	9.67	32.510	25.09	6.50	0.581	-0.020	104
2	5	9.67	32.505	25.08	6.57	0.587	-0.026	105
2	10	9.61	32.511	25.10	6.57	0.587	-0.025	105
2	20	9.63	32.507	25.09	6.55	0.585	-0.024	104
2	30	9.64	32.503	25.09	6.54	0.584	-0.023	104
2	50	9.57	32.528	25.12	6.53	0.583	-0.021	104
2	74	9.49	32.531	25.13	6.46	0.577	-0.014	103
2	99	7.97	32.920	25.67	5.53	0.494	0.087	85
2	122	7.30			5.20	0.464		
2	153	7.45	33.204	25.97	4.12	0.368	0.219	63
2	175	7.05	33.623	26.35	3.85	0.344	0.247	58
1	195	6.95	33.823	26.52	3.58	0.320	0.272	54
1	293	5.78	33.932	26.76	2.45	0.219	0.390	36
1	490	4.53	34.064	27.01	0.95	0.085	0.542	14
1	736	3.91	34.253	27.22	0.47	0.042	0.594	7
1	982	3.43	34.384	27.38	0.38	0.034	0.609	5
1	1477	2.59	34.512	27.55	0.77	0.069	0.588	10
1	1776	2.10	34.554	27.63	1.20	0.107	0.558	16

BROWN BEAR CRUISE 320 STATION 035 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	SAL
0	0.46	0.54		32.507
8	0.37	0.57		32.502
29	0.47	0.60		32.502
47	0.45	0.44		32.509
100	0.11	0.08		32.736
	20.54	26.10	- WATER COLUMN VALUES	

MESSENGER TIME 0753 INCOMING SOLAR RADIATION - AM 244 PM 175

BROWN BEAR CRUISE 320 STATION 035 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	9.67	0.00	32.510	0.000	25.09	288.5	0.000	0.00	6.50	0.00	
10	9.61	0.00	32.511	0.000	25.10	287.7	0.030	0.02	6.57	0.00	
20	9.63	0.00	32.507	0.000	25.09	288.5	0.059	0.06	6.55	0.00	
30	9.64	0.00	32.503	0.000	25.09	289.1	0.088	0.13	6.54	0.00	
50	9.57	0.00	32.528	0.000	25.12	286.5	0.146	0.37	6.53	0.00	
75	9.44	0.01	32.544	0.004	25.15	283.7	0.217	0.83	6.43	0.01	0.95
100	7.93	0.00	32.924	0.006	25.68	233.8	0.283	1.41	5.51	0.01	0.99
150	7.43	0.03	33.184	0.016	25.95	208.3	0.394	2.82	4.22	0.02	0.99
200	6.90	0.01	33.846	0.011	26.55	152.7	0.485	4.42	3.52	0.00	1.13
250	6.34	0.06	33.975	0.058	26.72	136.5	0.558	6.10	2.91	0.00	1.52
300	5.72	0.00	33.938	0.001	26.77	132.1	0.626	8.01	2.38	0.00	0.98
400	4.97	0.03	34.010	0.006	26.92	118.9	0.752	12.53	1.51	0.00	0.77
500	4.49	0.01	34.072	0.001	27.02	109.8	0.868	17.85	0.91	0.01	0.95
600	4.18	0.04	34.150	0.003	27.11	101.3	0.974	23.85	0.62	0.05	0.68
700	3.96	0.02	34.226	0.002	27.20	94.1	1.073	30.43	0.48	0.02	0.82
800	3.78	0.00	34.292	0.000	27.27	87.9	1.165	37.51	0.42	0.01	0.72
1000	3.40	0.00	34.391	0.001	27.38	77.8	1.333	52.94	0.38	0.00	0.98
1200	3.05	0.01	34.456	0.004	27.47	70.4	1.483	69.87	0.48	0.01	0.89
1500	2.55	0.00	34.515	0.000	27.56	62.1	1.684	97.70	0.80	0.00	12.54

BROWN BEAR CRUISE 320 STATION 036 OBSERVED VALUES

DATE 8/04/63 HR 19.6 LAT 47-01 N LONG 126-25 W SNDG 2472 WEA 02 WIND VEL 10 DIR 35
BAROM 05.1 TEMP DRY 9.8 WET 8.5 RELHU 85 WTRCLR SECDI SEA 1 DIR 35 SWELL 1 DIR 14
CLOUD TYPE 8 AMT 6 VIS 8 WIRE ANGLE(S) --

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN AOU	OXYGEN SATN
1	0	9.57	32.279	24.92	6.62	0.591	-0.029	105
1	5	9.51	32.275	24.93	6.70	0.598	-0.035	106
1	10	9.37	32.291	24.96	6.69	0.598	-0.032	106
1	20	9.35	32.281	24.96	6.65	0.594	-0.028	105
1	30	9.39	32.286	24.96	6.62	0.591	-0.026	105
1	50	9.29	32.424	25.08	6.56	0.586	-0.020	104
1	74	9.20	32.635	25.26	5.91	0.528	0.038	93
1	99	8.48	33.278	25.87	4.30	0.384	0.189	67
1	124	8.01	33.578	26.18	3.65	0.326	0.252	56
1	149	7.78	33.795	26.38	3.01	0.269	0.311	46
1	176	7.58	33.890	26.48	2.69	0.240	0.342	41

BROWN BEAR CRUISE 320 STATION 036 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	LIGHT PROD	SAT FILT	IRRAD	SAL	PHOS	NITR	SIL
0	1.10	2.04	16.02				32.283	0.57	1.1	6
6	1.00	1.64	10.16			50	32.282	0.42	0.6	8
20	1.29	1.28	2.56			10	32.280	0.48	0.6	7
38	0.54	0.42	0.00	0.30	100	1	32.314	0.59	1.7	6
				0.37	77					
				0.31	59					
				0.31	32					
				0.20	21					
				0.00	4					
100	0.06						33.362	1.74	23.7	28
150	0.03						33.840	2.09	32.0	39
	38.78	46.79	190.62	- WATER COLUMN VALUES						

MESSENGER TIME 1112 INCOMING SOLAR RADIATION - AM 244 PM 175

LIGHT SATURATION INCUBATOR ILLUMINATION 18700

BROWN BEAR CRUISE 320 STATION 036 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	9.57	0.00	32.279	0.000	24.92	304.1	0.000	0.00	6.62	0.00	
10	9.37	0.00	32.291	0.000	24.96	300.3	0.031	0.02	6.69	0.00	
20	9.35	0.00	32.281	0.000	24.96	300.9	0.061	0.06	6.65	0.00	
30	9.39	0.00	32.286	0.000	24.96	301.3	0.092	0.14	6.62	0.00	
50	9.29	0.00	32.424	0.000	25.08	289.9	0.151	0.38	6.56	0.00	
75	9.17	0.01	32.660	0.005	25.28	271.1	0.222	0.83	5.85	0.01	0.94
100	8.46	0.00	33.294	0.002	25.89	213.8	0.283	1.37	4.26	0.01	0.94
150	7.77	0.00	33.801	0.000	26.39	167.2	0.379	2.58	2.99	0.00	5.20

BROWN BEAR CRUISE 320 STATION 037 OBSERVED VALUES

DATE 8/04/63 HR 22.1 LAT 47-11 N LONG 126-06 W SNDG 2395 WEA 02 WIND VEL 6 DIR 08
BAROM 05.0 TEMP DRY 10.0 WET 8.4 RELHU 81 WTRCLR SECDI SEA 2 DIR 08 SWELL 1 DIR 14
CLOUD TYPE 8 AMT 6 VIS 8 WIRE ANGLE(S) 2, 6, 5

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN AOU	OXYGEN SATN
2	0	9.61	32.356	24.98	6.65	0.594	0.032	106
2	5	9.59	32.356	24.98	6.73	0.601	-0.039	107
2	10	9.46	32.355	25.00	6.70	0.598	-0.035	106
2	20	9.30	32.358	25.03	6.61	0.590	-0.024	104
2	30	9.30	32.364	25.03	6.72	0.600	0.034	106
2	50	9.23	32.456	25.11	6.45	0.576	-0.010	102
2	74	9.03	32.651	25.30	5.84	0.521	0.047	92
2	99	8.42	33.242	25.85	4.32	0.386	0.188	67
2	124	7.91	33.518	26.15	3.77	0.337	0.243	58
2	149	7.69	33.669	26.30	3.54	0.316	0.266	54
2	176	7.48	33.836	26.46	2.99	0.267	0.317	46
3	197	7.30	33.897	26.53	2.68	0.239	0.347	41
3	294	6.21	33.981	26.74	2.48	0.221	0.380	37
3	492	5.05	34.106	26.98	0.49	0.044	0.575	7
3	738	4.19	34.267	27.21	0.44	0.039	0.592	6
3	985	3.59	34.376	27.35	0.38	0.034	0.607	5
3	1486	2.52	34.508	27.56	0.81	0.072	0.586	11
1	1776	2.08	34.587	27.66	1.18	0.105	0.560	16
3	1782	2.05	34.563	27.64	1.39	0.124	0.542	19
1	1925	1.96	34.587	27.67	1.40	0.125	0.542	19
1	2173	1.81	34.609	27.70	1.65	0.147	0.523	22
1	2323	1.75	34.614	27.70	1.79	0.160	0.511	24

BROWN BEAR CRUISE 320 STATION 037 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	9.61	0.00	32.356	0.000	24.98	299.0	0.000	0.00	6.65	0.00	
10	9.46	0.00	32.355	0.000	25.00	296.9	0.031	0.02	6.70	0.00	
20	9.30	0.00	32.358	0.000	25.03	294.5	0.060	0.06	6.61	0.00	
30	9.30	0.00	32.364	0.000	25.03	294.2	0.090	0.14	6.72	0.00	
50	9.23	0.00	32.456	0.000	25.11	286.6	0.148	0.38	6.45	0.00	
75	9.01	0.00	32.674	0.005	25.32	267.6	0.218	0.82	5.78	0.01	0.94
100	8.40	0.00	33.257	0.001	25.87	215.7	0.279	1.36	4.29	0.00	0.94
150	7.68	0.00	33.676	0.001	26.30	175.2	0.378	2.60	3.52	0.00	0.95
200	7.27	0.00	33.902	0.002	26.54	153.5	0.460	4.07	2.66	0.01	1.07
250	6.71	0.03	33.964	0.013	26.66	142.1	0.535	5.79	2.48	0.10	1.45
300	6.16	0.00	33.985	0.000	26.75	134.1	0.605	7.75	2.42	0.02	0.99
400	5.47	0.04	34.052	0.003	26.89	121.8	0.734	12.37	1.44	0.16	0.78
500	5.01	0.00	34.112	0.000	26.99	112.9	0.852	17.83	0.47	0.01	0.96
600	4.62	0.02	34.180	0.002	27.09	104.2	0.962	24.00	0.30	0.11	0.68
700	4.29	0.01	34.244	0.001	27.18	96.6	1.063	30.77	0.36	0.06	0.81
800	4.02	0.01	34.298	0.001	27.25	90.3	1.158	38.04	0.42	0.01	0.72
1000	3.55	0.00	34.381	0.001	27.36	80.4	1.331	53.93	0.39	0.00	0.98
1200	3.09	0.01	34.440	0.005	27.45	72.1	1.485	71.34	0.50	0.02	0.91
1500	2.49	0.00	34.511	0.000	27.56	61.7	1.689	99.41	0.84	0.01	0.91
2000	1.91	0.00	34.596	0.000	27.68	50.8	1.974	150.29	1.46	0.01	0.86

BROWN bEAR CRUISE 320 STATION 038 OBSERVED VALUES

DATE 9/04/63 HR 05.2 LAT 47-33 N LONG 125-27 W SNDG 1188 WEA 02 WIND VEL 6 DIR 15
BAROM 90.0 TEMP DRY 8.9 WET 7.5 RELHU 81 WTRCLR SECDI SEA 0 DIR 15 SWELL 1 DIR 16
CLOUD TYPE 6 AMT 6 VIS 8 WIRE ANGLE(S) 17,10

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN ADU	OXYGEN SATN
2	0	9.24	32.187	24.90	6.66	0.595	-0.027	105
2	5	9.24	32.177	24.90	6.70	0.598	-0.031	105
2	10	9.20	32.176	24.90	6.65	0.594	-0.026	105
2	20	9.23	32.184	24.90	6.65	0.594	-0.026	105
2	30	9.21	32.226	24.94	6.57	0.587	-0.019	103
2	50	9.21	32.253	24.96	6.57	0.587	-0.019	103
2	74	8.79	32.684	25.36	5.49	0.490	0.081	86
2	99	8.39	33.065	25.72	4.61	0.412	0.163	72
2	124	7.87	33.678	26.28	3.11	0.278	0.302	48
2	149	7.72	33.840	26.43	2.64	0.236	0.345	41
2	174	7.44	33.895	26.51	2.44	0.218	0.367	37
1	190	7.32	33.902	26.53	2.39	0.213	0.373	36
1	285	6.45	33.966	26.70	2.11	0.188	0.410	31
1	475	5.18	34.078	26.95	0.94	0.084	0.533	14
1	712	4.26	34.242	27.18	0.32	0.029	0.602	5
1	998	3.60	34.350	27.33	0.27	0.024	0.617	4

BROWN BEAR CRUISE 320 STATION 038 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	SAL
0	1.19	0.82		32.175
6	1.28	1.11		32.175
20	1.39	1.04		32.176
38	1.24	1.06		32.233
100	0.12	0.07		33.017
	49.85	39.81	- WATER COLUMN VALUES	

MESSENGER TIME 2213 INCOMING SOLAR RADIATION - AM 305 PM 340

ZOOPLANKTON (CLARKE-BUMPUS) HORIZ - TIME 2321-2331 DEPTHS 100, 70
2349-2359 35, 0

BROWN BEAR CRUISE 320 STATION 038 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	9.24	0.00	32.187	0.000	24.90	305.9	0.000	0.00	6.66	0.00	
10	9.20	0.00	32.176	0.000	24.90	306.3	0.031	0.02	6.65	0.00	
20	9.23	0.00	32.184	0.000	24.90	306.3	0.062	0.06	6.65	0.00	
30	9.21	0.00	32.226	0.000	24.94	303.1	0.093	0.14	6.57	0.00	
50	9.21	0.00	32.253	0.000	24.96	301.4	0.154	0.39	6.57	0.00	
75	8.77	0.00	32.698	0.002	25.37	262.3	0.225	0.84	5.46	0.01	0.94
100	8.37	0.00	33.092	0.004	25.74	227.6	0.286	1.39	4.55	0.01	0.94
150	7.71	0.00	33.844	0.000	26.43	163.2	0.385	2.61	2.63	0.00	0.94
200	7.23	0.01	33.908	0.001	26.55	152.6	0.465	4.04	2.36	0.00	1.41
250	6.78	0.02	33.940	0.002	26.64	144.8	0.539	5.76	2.22	0.01	1.74
300	6.33	0.00	33.975	0.000	26.72	137.0	0.611	7.77	2.02	0.02	0.97
400	5.62	0.01	34.034	0.002	26.86	124.9	0.743	12.49	1.41	0.06	0.75
500	5.06	0.01	34.096	0.001	26.97	114.6	0.864	18.05	0.84	0.01	0.88
600	4.63	0.02	34.167	0.004	27.08	105.2	0.975	24.31	0.52	0.02	0.65
700	4.29	0.00	34.234	0.001	27.17	97.3	1.077	31.13	0.33	0.00	0.92
800	4.03	0.01	34.292	0.002	27.24	90.8	1.172	38.45	0.25	0.01	8.36

BROWN BEAR CRUISE 320 STATION 38A BIOLOGICAL DATA

DATE 9/04/63 LAT 48-08 N LONG 124-50 W

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	SAL
0	0.93	2.69	26.32	32.749

MESSENGER TIME 0543 INCOMING SOLAR RADIATION - AM 305 PM 340

BROWN BEAR CRUISE 320 STATION 039 OBSERVED VALUES

TOLEAK POINT

DATE 9/04/63 HR 12.2 LAT 47-52 N LONG 124-50 W SNDG 73 WEA 60 WIND VEL 26 DIR 14
BAROM 09.0 TEMP DRY 8.9 WET 7.2 RELHU 80 WTRCLR SECDI SEA 2 DIR 14 SWELL 1 DIR 20
CLOUD TYPE 6 AMT 7 VIS 7 WIRE ANGLE(S) 15

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN AOU	OXYGEN SATN
1	0	9.51	31.591	24.40	6.57	0.587	-0.021	104
1	5	9.49	31.604	24.41	6.57	0.587	-0.020	104
1	10	9.51	31.604	24.41	6.45	0.576	-0.010	102
1	19	9.49	31.605	24.41	6.34	0.566	0.000	100
1	29	9.50	31.610	24.41	6.38	0.570	-0.004	101
1	39	9.47	31.606	24.41	6.45	0.576	-0.009	102
1	48	9.46	31.623	24.43	6.43	0.574	-0.008	101
1	58	9.42	31.631	24.44	6.15	0.549	0.018	97
1	67	9.40	31.656	24.46	6.50	0.581	-0.013	102

BROWN BEAR CRUISE 320 STATION 039 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	9.51	0.00	31.591	0.000	24.40	354.2	0.000	0.00	6.57	0.00	
10	9.51	0.00	31.604	0.000	24.41	353.4	0.036	0.02	6.45	0.00	
20	9.49	0.00	31.606	0.000	24.41	353.2	0.072	0.07	6.34	0.00	0.88
30	9.50	0.00	31.609	0.000	24.41	353.2	0.107	0.16	6.39	0.00	0.87
50	9.45	0.00	31.624	0.001	24.43	351.7	0.178	0.46	6.36	0.03	0.78

BROWN BEAR CRUISE 320 STATION 040 OBSERVED VALUES

TATOOSH ISLAND

DATE 9/04/63 HR 16.2 LAT 48-27 N LONG 124-40 W SNDG 1554 WEA 01 WIND VEL 4 DIR 90
BAROM 12.0 TEMP DRY 11.1 WET 5.7 RELHU 67 WTRCLR SECDI SEA 0 DIR 90 SWELL 1 DIR 22
CLOUD TYPE 6 AMT 6 VIS 7 WIRE ANGLE(S) 24,--

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN AOU	OXYGEN SATN
1	0	9.32	28.385	21.93	6.71	0.599	-0.018	103
1	5	9.30	28.481	22.01	6.71	0.599	-0.018	103
1	9	9.26	28.593	22.10	6.56	0.586	-0.005	101
1	18	9.30	29.341	22.68	6.70	0.598	-0.021	104
1	27	9.40	30.524	23.58	6.66	0.595	-0.023	104
1	46	9.39	31.693	24.49	6.44	0.575	-0.008	101
2	64	9.40	31.827	24.60	6.47	0.578	-0.011	102
2	85	9.26	32.082	24.82	6.44	0.575	-0.008	101
2	106	7.94	32.607	25.43	4.30	0.384	0.199	66
2	127	8.24	33.083	25.76	4.05	0.362	0.215	63
2	148	7.63	33.454	26.14	3.28	0.293	0.291	50
2	160	7.39	33.571	26.26	3.01	0.269	0.318	46
2	210	7.07	33.703	26.41	2.78	0.248	0.342	42

BROWN BEAR CRUISE 320 STATION 040 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	SAL
0	1.99	6.23		28.967
3	2.07	6.09		29.096
6	1.75	4.83		29.738
12	1.89	5.19		29.696
100	0.75	1.06		32.105
	22.73	64.92	- WATER COLUMN VALUES	

MESSENGER TIME 0836 INCOMING SOLAR RADIATION - AM 305 PM 340

BROWN BEAR CRUISE 320 STATION 040 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	9.32	0.00	28.385	0.000	21.93	589.9	0.000	0.00	6.71	0.00	
10	9.26	0.00	28.648	0.004	22.14	569.5	0.059	0.03	6.56	0.01	0.97
20	9.32	0.00	29.603	0.024	22.88	499.5	0.113	0.11	6.70	0.00	0.75
30	9.41	0.01	30.804	0.017	23.80	411.6	0.159	0.23	6.62	0.01	0.94
50	9.40	0.00	31.760	0.030	24.55	340.8	0.234	0.53	6.44	0.01	0.74
75	9.41	0.04	31.937	0.007	24.68	328.3	0.319	1.07	6.59	0.08	0.66
100	8.29	0.10	32.446	0.011	25.25	274.5	0.395	1.74	4.92	0.14	0.70
150	7.59	0.00	33.477	0.001	26.16	188.7	0.511	3.19	3.23	0.00	0.76
200	7.06	0.00	33.691	0.010	26.40	166.4	0.601	4.78	2.75	0.01	15.97

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13 ABSTRACT
This report contains tabulated physical, chemical, and biological data collected during Cruise Oshawa-1 of the CNAV Oshawa and Cruise 320 of the Research Vessel Brown Bear during the months of March - April 1963 in an area within 255 miles of the coasts of Vancouver Island, Washington, and Oregon. These data were collected as part of a year-round study which has as its objective the determination of the gross features of the movement and dispersion of Columbia River effluent water in the northeast Pacific.

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14. KEY WORDS	LINK A ROLE	LINK A WT	LINK B ROLE	LINK B WT	LINK C ROLE	LINK C WT
Oceanographic data						
Physical oceanographic data						
Chemical oceanographic data						
Biological oceanographic data						
Oceanographic cruises						
Research Vessel Brown Bear						
CNAV Oshawa						
Northeast Pacific Ocean						
Washington - Oregon coast						
Columbia River						
Effluent water						

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