U.S. Coast Guard Oceanographic Report

UNITED STATES COAST GUARD
OCEANOGRAPHIC
REPORT No. 52

Woods Hole Oceanographic Institution
ATLAS - GAZETTEER COLLECTION

CG 373-52

PLEASE RETURN
TO
INSTITUTION DATA LIBRARY
McLEAN

OCEANOGRAPHIC SURVEY OF THE
GULF OF ANADYR

AUGUST 1970

~~Atlas~~
~~582-AA~~
~~CG 373-52~~
~~shelf~~

GC
3
.07
A3
no. 52

UNITED STATES COAST GUARD
OCEANOGRAPHIC

UNITED STATES COAST GUARD OCEANOGRAPHIC UNIT

REPORT No. 52 CG 373-52

OCEANOGRAPHIC SURVEY OF THE GULF OF ANADYR

AUGUST 1970

Gary L. Hufford
David M. Husby

MBL/WHOI

0 0301 0091930 4

WASHINGTON, D.C.

APRIL 1972

USCGC NORTHWIND

ABSTRACT

An oceanographic investigation during August 1970 in the Gulf of Anadyr was conducted from the USCGC NORTHWIND (WAGB-282). Distributions of temperature, salinity, dissolved oxygen, inorganic phosphate, nitrate, nitrite, and silicate are described and interpreted. Origin of cold bottom water pockets in the Gulf is discussed.

Editor's note: Reference to a product or comment with respect to it in this publication does not indicate, or permit any person to hold out by republication in whole or in part or otherwise, that the product has been endorsed, authorized, or approved by the Coast Guard.

TABLE OF CONTENTS

	Page
Title Page	i
Abstract	iii
Table of Contents	v
List of Illustrations	v
Introduction	1
Methods	1
Distribution of Temperature and Salinity	1
Distribution of Dissolved Oxygen and Nutrients	3
References	4
Illustrations	5
Appendix—Oceanographic Data	43

LIST OF ILLUSTRATIONS

Figure	Page
1. Location of stations and sections in the Gulf of Anadyr during August 2–16, 1970	5
2. Gulf of Anadyr general bottom topography	6
3. Vertical distribution of temperature (°C) along section A, Gulf of Anadyr, August 1970	7
4. Vertical distribution of salinity (‰) along section A, Gulf of Anadyr, August 1970	7
5. Vertical distribution of dissolved oxygen (ml/l) along section A, Gulf of Anadyr, August 1970	8
6. Vertical distribution of phosphate-phosphorus (μg-at/l) along section A, Gulf of Anadyr, August 1970	8
7. Vertical distribution of nitrate-nitrogen (μg-at/l) along section A, Gulf of Anadyr, August 1970	9
8. Vertical distribution of nitrite-nitrogen (μg-at/l) along section A, Gulf of Anadyr, August 1970	9
9. Vertical distribution of silicate-silicon (μg-at/l) along section A, Gulf of Anadyr, August 1970	10
10. Vertical distribution of temperature (°C) along section B, Gulf of Anadyr, August 1970	10
11. Vertical distribution of salinity (‰) along section B, Gulf of Anadyr, August 1970	11
12. Vertical distribution of dissolved oxygen (ml/l) along section B, Gulf of Anadyr, August 1970	11
13. Vertical distribution of phosphate-phosphorus (μg-at/l) along section B, Gulf of Anadyr, August 1970	12

Figure	Page
14. Vertical distribution of nitrate-nitrogen ($\mu\text{g-at/l}$) along section B, Gulf of Anadyr, August 1970	12
15. Vertical distribution nitrite-nitrogen ($\mu\text{g-at/l}$) along section B, Gulf of Anadyr, August 1970	13
16. Vertical distribution of silicate-silicon ($\mu\text{g-at/l}$) along section B, Gulf of Anadyr, August 1970	13
17. Vertical distribution of temperature ($^{\circ}\text{C}$) along section C, Gulf of Anadyr, August 1970	14
18. Vertical distribution of salinity (‰) along section C, Gulf of Anadyr, August 1970	15
19. Vertical distribution of dissolved oxygen (ml/l) along section C, Gulf of Anadyr, August 1970	15
20. Vertical distribution of phosphate-phosphorus ($\mu\text{g-at/l}$) along section C, Gulf of Anadyr, August 1970	16
21. Vertical distribution of nitrate-nitrogen ($\mu\text{g-at/l}$) along section C, Gulf of Anadyr, August 1970	17
22. Vertical distribution of nitrite-nitrogen ($\mu\text{g-at/l}$) along section C, Gulf of Anadyr, August 1970	18
23. Vertical distribution of silicate-silicon ($\mu\text{g-at/l}$) along section C, Gulf of Anadyr, August 1970	18
24. Vertical distribution of temperature ($^{\circ}\text{C}$) along section D, Gulf of Anadyr, August 1970	19
25. Vertical distribution of salinity (‰) along section D, Gulf of Anadyr, August 1970	19
26. Vertical distribution of dissolved oxygen (ml/l) along section D, Gulf of Anadyr, August 1970	20
27. Vertical distribution of phosphate-phosphorus ($\mu\text{g-at/l}$) along section D, Gulf of Anadyr, August 1970	20
28. Vertical distribution of nitrate-nitrogen ($\mu\text{g-at/l}$) along section D, Gulf of Anadyr, August 1970	21
29. Vertical distribution of nitrite-nitrogen ($\mu\text{g-at/l}$) along section D, Gulf of Anadyr, August 1970	21
30. Vertical distribution of silicate-silicon ($\mu\text{g-at/l}$) along section D, Gulf of Anadyr, August 1970	22
31. Vertical distribution of temperature ($^{\circ}\text{C}$) along section E, Gulf of Anadyr, August 1970	23
32. Vertical distribution of salinity (‰) along section E, Gulf of Anadyr, August 1970	23
33. Vertical distribution of dissolved oxygen (ml/l) along section E, Gulf of Anadyr, August 1970	23
34. Vertical distribution of phosphate-phosphorus ($\mu\text{g-at/l}$) along section E, Gulf of Anadyr, August 1970	23
35. Vertical distribution of nitrate-nitrogen ($\mu\text{g-at/l}$) along section E, Gulf of Anadyr, August 1970	24
36. Vertical distribution of nitrite-nitrogen ($\mu\text{g-at/l}$) along section E, Gulf of Anadyr, August 1970	24
37. Vertical distribution of silicate-silicon ($\mu\text{g-at/l}$) along section E, Gulf of Anadyr, August 1970	24
38. Horizontal distribution of sea surface temperature ($^{\circ}\text{C}$) in the Gulf of Anadyr, August 1970	25

Figure	Page
39. Horizontal distribution of sea surface salinity (‰) in the Gulf of Anadyr, August 1970	26
40. Horizontal distribution of temperature (°C) at 15 meters in the Gulf of Anadyr, August 1970	27
41. Horizontal distribution of salinity (‰) at 15 meters in the Gulf of Anadyr, August 1970	28
42. Horizontal distribution of temperature (°C) at 30 meters in the Gulf of Anadyr, August 1970	29
43. Horizontal distribution of salinity (‰) at 30 meters in the Gulf of Anadyr, August 1970	30
44. Horizontal distribution of temperature (°C) at 50 meters in the Gulf of Anadyr, August 1970	31
45. Horizontal distribution of salinity (‰) at 50 meters in the Gulf of Anadyr, August 1970	32
46. Temperature (°C) versus depth at station 7 and 32 in the Gulf of Anadyr, August 1970	33
47. Salinity (‰) versus depth at station 7 and 32 in the Gulf of Anadyr, August 1970	34
48. Temperature (°C) versus depth at station 21 and 31 in the Gulf of Anadyr, August 1970	35
49. Salinity (‰) versus depth at station 21 and 31 in the Gulf of Anadyr, August 1970	36
50. Temperature-salinity diagram for station 7 and 32 in the Gulf of Anadyr, August 1970	37
51. Temperature-salinity diagram for station 21 and 31 in the Gulf of Anadyr, August 1970	38
52. Horizontal distribution of density (σ_t) at 50 meters in the Gulf of Anadyr, August 1970	39
53. Horizontal distribution of dissolved oxygen (ml/l) at 50 meters in the Gulf of Anadyr, August 1970	40

Oceanographic Survey of the Gulf of Anadyr

2-16 August 1970

Gary L. Hufford¹ and David M. Husby²

INTRODUCTION

The Gulf of Anadyr has been hypothesized as a possible source of Bering Sea Deep Shelf Water (-1.7 to 0.0°C , 32.3 to 33.0‰), found in the northern Bering Sea and Bering Strait (Ratmanov, 1937; Arsen'yev, 1967). To determine if the Gulf of Anadyr is the source, the Coast Guard Oceanographic Unit conducted an investigation of the Gulf from the icebreaker USCGC NORTHWIND (WAGB-282) during August 1970. This report contains the oceanographic data and preliminary analysis from that cruise.

METHODS

The USCGC NORTHWIND operated in the Gulf of Anadyr from 2 August through 16 August 1970. A total of 34 oceanographic stations were occupied in water depths less than 100 meters (figs. 1 and 2). At each station, Nansen bottle casts were made to obtain measurements of temperature and water samples for the determination of salinity, dissolved oxygen, and inorganic nutrients. At five of these stations, anchored current meter observations were also made for periods of at least 25 hours.

Water temperature was measured with paired deep-sea reversing thermometers. Salinity was determined using a Bissett-Berman Model 6220 inductive salinometer. The conductivity values obtained were converted to

salinity by use of the International Oceanographic Tables published jointly by UNESCO and the National Institute of Oceanography of Great Britain (UNESCO, 1966). The dissolved oxygen content was determined by a modified Winkler method using a starch indicator to determine the titration endpoint.

Two samples of sea water were drawn from each Nansen bottle into 125 ml polyethylene bottles and immediately frozen in the ship's freezer. The frozen samples were consigned to the Department of Oceanography, University of Washington, for determination of concentrations of inorganic phosphate, nitrate, nitrite, and silicate. A Technicon Auto-analyzer was used to process the samples.

In order to determine bottom circulation in the Gulf of Anadyr, direct current measurements were obtained at anchor stations 31-34 using a Hydro Products Model 502 current meter lowered to within 5 meters of the bottom. This instrument records internally on a strip chart the current speed, current direction and water temperature. At station 30, a Marine Advisors current meter with a deck readout was used to monitor current speed and direction every 15 minutes. The current data are being worked up at the University of Washington and will not be presented in this report.

DISTRIBUTION OF TEMPERATURE AND SALINITY

In summer, the Gulf of Anadyr is generally characterized by a two-layered water structure. The only exception is an intermediate layer usually found only in the southeast section of the Gulf. Arsen'yev (1967) states that in the winter a cold, relatively high salinity water

¹ U.S. Coast Guard Oceanographic Unit, Building 159-E, Washington Navy Yard, Washington, D.C. 20390.

² U.S. Coast Guard Oceanographic Unit. Present address: Department of Oceanography, University of Washington, Seattle, Wash. 98105.

mass occupies the entire water column, and then during spring and summer, a two-layered structure is formed as a result of heating in the surface layers and an influx of warmer North Pacific water.

Analyses of the temperature and salinity distributions (figs. 3, 4, 10, 11, 17, 18, 24, 25, 31, and 32) from the 1970 survey revealed the presence of the two-layered structure reported in past investigations (Arsen'yev, 1967). The surface layers were separated from the bottom waters by a very strong seasonal thermocline.

The surface waters of the Gulf of Anadyr during 1970 can be separated into three types: western surface water, eastern surface water, and southeastern warm water (figs. 38-41). Western surface water (0-10m, west of 178°W) appears to be influenced to a considerable extent by effluent from the Anadyr River, showing surface salinities of less than 29.5‰ (figs. 4, 39). Temperatures ranged from less than 5.0 to 6.5°C (fig. 38). Effluent from the Anadyr River appears to flow south towards Cape Navarin (fig. 39).

Southeastern warm water was observed from the surface to 10 meters in the southeastern part of the Gulf of Anadyr (figs. 38-39, 3-4). This water was characterized by relatively high temperatures ($>8^{\circ}\text{C}$) and relatively low salinities ($<31.0\text{‰}$). The low salinity indicates that the source of the intrusion may have been a westward extension of the Alaskan Coastal Water (Saur, et al., 1954), but more data are needed to determine this with certainty.

Eastern surface water (0 to 20 meters depth) was characterized by a temperature and salinity range of 7.0 to 7.4°C and 31.0 to 31.5‰, respectively (figs. 10-11, 17-18, 38-39).

The bottom waters of the two-layered structure in the Gulf of Anadyr can be separated into three different water masses: two cold masses separated by a warmer one (fig. 44). In the northwest section of the Gulf (figs. 31-32), a pocket of very cold (-1.0 to -1.6°C), high salinity ($>34.0\text{‰}$) water was found near the mouth of Holy Cross Bay. Winter freezing could produce this cold water mass, but probably not in the Gulf because of the relatively high salinity of the mass. Data from the USCGC NORTHWIND taken in February 1968 (unpublished) in the Gulf of Anadyr

showed temperatures and salinities of -1.5 to -1.8°C and 32.2 to 33.4‰ for the greater part of the Gulf. Near Holy Cross Bay, salinities to 34.2‰ were observed. This deep bay (>100 meters) is characterized by a low freshwater input and a shallow sill depth. These factors along with evaporation could produce higher salinity in the bay than in the Gulf. Winter freezing would produce a cold high salinity water mass isolated in the bay where it would remain until enough was formed to spill over the sill or until passed over the sill by seicheing.

The second mass of cold water was observed in the southeastern section of the Gulf of Anadyr (figs. 3-4). This water mass had a temperature range the same as the cold water pocket near Holy Cross Bay but with lower salinities (32.2 to 32.5‰). The low temperatures again suggest winter formation, probably in the open Gulf.

A warmer (0 to 1.0°C), relatively saline (32.5 to 33.0‰) bottom water mass was found near the middle of the Gulf (figs. 44-45). This water mass occupies the water column from 30 meters to bottom (fig. 10). Origin of the mass has been suggested to be an intrusion of deeper water from the western Bering Sea (Ratmanov, 1937). Arsen'yev (1967) has described a current entering the Gulf of Anadyr near Cape Navarin from the open sea with the temperature and salinity characteristics of 2 to 7°C and 32.5 to 33‰.

The water characteristics of three of the stations (7, 17, 21) that were reoccupied during the cruise (32, 33, 31) were found to change significantly (figs. 46-49), providing information on the rate of change due to advection in the region. At station 7, there was an increase in temperature and salinity from just below the surface to the bottom (figs. 46, 47). This was probably due to the penetration of the warm saline water from the western Bering Sea flowing into the Gulf. At station 21 an increase in temperature and a large decrease in salinity was observed in the top 20 meters of the water column after 3 days (figs. 48-49). This change is probably due to effluent from the Anadyr River with its low salinity mixing with the surface waters.

The water masses present in the Gulf of Anadyr during the summer are affected by such factors as seasonal heating and cooling.

wind mixing, advection, and continental runoff. The presence in the summer of the cold bottom water masses which are probably a residue of winter water, suggests weak warming of the region and weak circulation in the Gulf which prevents extensive mixing.

DISTRIBUTION OF DISSOLVED OXYGEN AND NUTRIENTS

The Gulf of Anadyr has a uniform vertical and horizontal distribution of oxygen and nutrients in the spring as a result of vigorous vertical circulation in the fall and winter (Mokievskaya, 1956). With the formation of a two-layer system due to warming and advection of warm North Pacific water into the Gulf, an intense phytoplankton bloom occurs in June in the surface waters depleting the nutrients and increasing the oxygen concentration to supersaturation in many places in the Gulf (Zenkevitch, 1963). The Anadyr phytoplankton are mainly Arctic or Arctic-boreal, the boreal forms being predominant only in the surface layer in the summer (Zenkevitch, 1963).

The dissolved oxygen distribution in the Gulf of Anadyr during August 1970 is shown in Figures 5, 12, 19, 26, and 33. The degree of saturation for all the oxygen data was calculated from the solubility of oxygen in sea water given by Green and Carritt (1967). The surface waters had saturation values near or greater than 100% except near the Anadyr River where saturations down to 70% were observed. The maximum saturation values (>100%) were found just above or at the thermocline. The supersaturation at the surface may be caused by rapid surface heating which occurs in the Gulf under calm summer conditions, as well as by phytoplankton activity. The maximum supersaturation values at the thermocline are probably caused by primary production. Fourteen vertical plankton tows were made in the Gulf and the samples revealed large concentrations of phytoplankton.

The three bottom water masses in the Gulf of Anadyr can be distinguished by their dissolved oxygen content (fig. 53). The oxygen content of the cold bottom water in the south-east section of the Gulf ranged from 6.1 to 7.8 ml/l with saturations of 70 to 90%. The

high saturation values suggest recent contact of the water with the surface. The dissolved oxygen content of the cold bottom water near Holy Cross Bay ranged from 4.2 to 5.5 ml/l with saturation values of 51 to 64%. The low values support the hypothesis that the cold water was trapped and has escaped from the isolated bay. The warm bottom water separating the two cold bottom water masses exhibited dissolved oxygen values of 6.1 to 6.7 ml/l with saturations of 77 to 87%.

The general distribution of nutrients in the Gulf of Anadyr during August 1970 resembled those distributions observed previously (Mokievskaya, 1956), although none of the previous investigations provided as much detail as the CGC NORTHWIND survey. The observed distributions of phosphate, nitrate, nitrite, and silicate in the Gulf are shown in Figures 6-9, 13-16, 20-23, 27-30, and 34-37.

The surface concentrations of nutrients were much lower than those of the bottom waters. Phosphate and nitrate concentrations were often so low as to suggest nutrient limitation of phytoplankton production. Silicate concentrations in the surface waters were also low but almost always greater than 3.0 $\mu\text{g-at/l}$. The near-surface nutrient concentrations near the Anadyr River Plume (Stations 8, 9, 22, 23) were high and indicate that the river is an important source of nutrients in the western Gulf of Anadyr. All the nutrients increased in concentration as the Plume was approached. Silicate showed the greatest increase.

A strong seasonal thermocline acts as a barrier to recirculation of the nutrients in the shallow gulf. Below the thermocline, nutrient concentrations were many times greater than in the surface waters ($\text{PO}_4 > 1.20$, $\text{NO}_3 > 10.0$, $\text{SiO}_3 > 20.0 \mu\text{g-at l}$). Source of the high nutrient content of the bottom waters may be advection of Pacific water into the Gulf of Anadyr from the southwestern Bering Sea. This water is characterized by high nutrient concentrations (especially nitrate and silicate) and is known to flow into the gulf (Arsen'yev, 1967) near the bottom the entire year.

The two cold bottom water masses in the Gulf of Anadyr show slightly different nutrient concentrations, reflecting the different sources suggested above. The nutrient concentrations in the cold bottom water near Holy Cross Bay

are slightly higher and don't show the variability that the other cold bottom water exhibits in the southeastern section of the gulf. This

may be due to the long residence time of the cold bottom water in Holy Cross Bay before it enters the Gulf of Anadyr.

REFERENCES

- Arsen'yev, V. S. (1967). The currents and water masses of the Bering Sea, *Izdatel'stvo "Nauka"*, Moscow, English Transl., 135 pp.
- Green, E. J. and D. E. Carritt (1967). New tables for oxygen saturation of sea water, *Jour. Mar. Res.*, 25(2), 140-147.
- Mokievskaya, V. (1956). Some data on the chemistry of the biogen elements in the Bering Sea, *Tr. IOAN*, in Russian, 17.
- Ratmanov, G. E. (1937). Kgedrologiy Beringova i Chukotskovo morei, *Gosudarstv. Gidroloy, inst. Issled. mor. SSSR*. No. 25, 10-174.
- Saur, J. F. T., J. P. Tully, and E. C. LaFond (1954). Oceanographic cruise to the Bering and Chukchi Seas, Summer 1949. Part IV: Physical oceanographic studies, Vol. 1, *Descriptive Report USN Electron. Lab. Res. Rcpt.*, 416, 31 pp.
- UNESCO (1966). International oceanographic tables, *UNESCO Office of Oceanography*, Paris, 118 pp.
- Zenkevitch, L. (1963). *Biology of the seas of the USSR*, Interscience, New York, 955 pp.

Figure 1. Location of stations and sections in the Gulf of Anadyr during August 2-16, 1970.

Figure 2. Gulf of Anadyr general bottom topography. Depths in meters.

Figure 3. Vertical distribution of temperature ($^{\circ}\text{C}$) along section A, Gulf of Anadyr, August 1970. Contour interval is 1.0°C except for the -1.5°C isotherm which outlines the core of the cold bottom water and the 7.5°C isotherm.

Figure 4. Vertical distribution of salinity (‰) along section A, Gulf of Anadyr, August 1970. Contour interval is 0.5‰ .

Figure 5. Vertical distribution of dissolved oxygen (ml/l) along section A, Gulf of Anadyr, August 1970. Contour interval is 1.0 ml/l.

Figure 6. Vertical distribution of phosphate-phosphorus ($\mu\text{g-at/l}$) along section A, Gulf of Anadyr, August 1972. Contour interval is 0.2 $\mu\text{g-at/l}$.

Figure 7. Vertical distribution of nitrate-nitrogen ($\mu\text{g-at/l}$) along section A, Gulf of Anadyr, August 1970. Contour interval is $2.0 \mu\text{g-at/l}$.

Figure 8. Vertical distribution of nitrite-nitrogen ($\mu\text{g-at/l}$) along section A, Gulf of Anadyr, August 1970. Contour interval is $0.1 \mu\text{g-at/l}$.

Figure 9. Vertical distribution of silicate-silicon ($\mu\text{g-at/l}$) along section A, Gulf of Anadyr, August 1970. Contour intervals are $5.0\mu\text{g-at/l}$ from 0 to 20 $\mu\text{g-at/l}$ and 10 $\mu\text{g-at/l}$ from 20 to 60 $\mu\text{g-at/l}$ except the 1 $\mu\text{g-at/l}$ isopleth which outlines area of high nutrient utilization.

Figure 10. Vertical distribution of temperature ($^{\circ}\text{C}$) along section B, Gulf of Anadyr, August 1970. Contour interval is 1.0°C except for the -1.5°C isotherm which outlines the core of the cold bottom water.

Figure 11. Vertical distribution salinity (‰) along section B, Gulf of Anadyr, August 1970. Contour interval is 0.5‰.

Figure 12. Vertical distribution of dissolved oxygen (ml/l) along section B, Gulf of Anadyr, August 1970. Contour interval is 1.0 ml/l.

Figure 13. Vertical distribution of phosphate-phosphorus ($\mu\text{g-at/l}$) along section B, Gulf of Anadyr, August 1970. Contour interval is $0.2 \mu\text{g-at/l}$.

Figure 14. Vertical distribution of nitrate-nitrogen ($\mu\text{g-at/l}$) along section B, Gulf of Anadyr, August 1970. Contour interval is $2.0 \mu\text{g-at/l}$.

Figure 15. Vertical distribution of nitrite-nitrogen ($\mu\text{g-at/l}$) along section B, Gulf of Anadyr, August 1970. Contour interval is $0.1 \mu\text{g-at/l}$.

Figure 16. Vertical distribution of silicate-silicon ($\mu\text{g-at/l}$) along section B, Gulf of Anadyr, August 1970. Contour intervals are $5.0 \mu\text{g-at/l}$ from 0 to $20 \mu\text{g-at/l}$ and $10.0 \mu\text{g-at/l}$ from 20 to $70 \mu\text{g-at/l}$.

Figure 17. Vertical distribution of temperature ($^{\circ}\text{C}$) along section C, Gulf of Anadyr, August 1970. Contour interval is 1.0°C except for the -1.5°C isotherm which outlines the core of cold bottom water.

Figure 18. Vertical distribution of salinity (‰) along section C, Gulf of Anadyr, August 1970. Contour interval is 0.50‰.

Figure 19. Vertical distribution of dissolved oxygen (ml/l) along section C, Gulf of Anadyr, August 1970. Contour interval is 1.0 ml/l.

Figure 20. Vertical distribution of phosphate-phosphorus ($\mu\text{g-at/l}$) along section C, Gulf of Anadyr, August 1970. Contour interval is $0.2 \mu\text{g-at/l}$.

Figure 21. Vertical distribution of nitrate-nitrogen ($\mu\text{g-at/l}$) along section C, Gulf of Anadyr, August 1970. Contour interval is $2.0 \mu\text{g-at/l}$.

Figure 22. Vertical distribution of nitrite-nitrogen ($\mu\text{g-at/l}$) along section C, Gulf of Anadyr, August 1970. Contour interval is $0.1 \mu\text{g-at/l}$.

Figure 23. Vertical distribution of silicate-silicon ($\mu\text{g-at/l}$) along section C, Gulf of Anadyr, August 1970. Contour intervals are $5.0 \mu\text{g-at/l}$ from 0 to $20.0 \mu\text{g-at/l}$ and $10 \mu\text{g-at/l}$ from 20 to $50 \mu\text{g-at/l}$.

Figure 24. Vertical distribution of temperature ($^{\circ}\text{C}$) along section D, Gulf of Anadyr, August 1970. Contour interval is 1.0°C .

Figure 25. Vertical distribution of salinity (‰) along section D, Gulf of Anadyr, August 1970. Contour interval is 0.5‰ .

Figure 26. Vertical distribution of dissolved oxygen (ml/l) along section D, Gulf of Anadyr, August 1970. Contour interval is 1.0 ml/l.

Figure 27. Vertical distribution of phosphate-phosphorus ($\mu\text{g-at/l}$) along section D, Gulf of Anadyr 1970. Contour interval is 0.2 $\mu\text{g-at/l}$.

Figure 28. Vertical distribution of nitrate-nitrogen ($\mu\text{g-at/l}$) along section D, Gulf of Anadyr, August 1970. Contour interval is $2.0 \mu\text{g-at/l}$.

Figure 29. Vertical distribution of nitrite-nitrogen ($\mu\text{g-at/l}$) along section D, Gulf of Anadyr, August 1970. Contour interval is $0.1 \mu\text{g-at/l}$.

Figure 30. Vertical distribution of silicate-silicon ($\mu\text{g-at/l}$) along section D, Gulf of Anadyr, August 1970. Contour interval is $10.0 \mu\text{g-at/l}$.

Figure 31. Vertical distribution of temperature ($^{\circ}\text{C}$) along section E, Gulf of Anadyr, August 1970. Contour interval is 1.0°C .

Figure 32. Vertical distribution of salinity (‰) along section E, Gulf of Anadyr, August 1970. Contour interval is 0.5‰ .

Figure 33. Vertical distribution of dissolved oxygen (ml/l) along section E, Gulf of Anadyr, August 1970. Contour interval is 1.0 ml/l .

Figure 34. Vertical distribution of phosphate-phosphorus ($\mu\text{g-at/l}$) along section E, Gulf of Anadyr, August 1970. Contour interval is $0.2 \mu\text{g-at/l}$.

Figure 35. Vertical distribution of nitrate-nitrogen ($\mu\text{g-at/l}$) along section E, Gulf of Anadyr, August 1970. Contour interval is $2.0 \mu\text{g-at/l}$.

Figure 36. Vertical distribution of nitrite-nitrogen ($\mu\text{g-at/l}$) along section E, Gulf of Anadyr, August 1970. Contour interval is $0.1 \mu\text{g-at/l}$.

Figure 37. Vertical distribution of silicate-silicon ($\mu\text{g-at/l}$) along section E, Gulf of Anadyr, August 1970. Contour interval is $10.0 \mu\text{g-at/l}$.

Figure 38. Horizontal distribution of sea surface temperature ($^{\circ}\text{C}$) in the Gulf of Anadyr, August 1970. Contour interval is 0.5°C .

Figure 39. Horizontal distribution of sea surface salinity (‰) in the Gulf of Anadyr, August 1970. Contour interval is 0.5‰.

Figure 40. Horizontal distribution of temperature ($^{\circ}\text{C}$) at 15 meters in the Gulf of Anadyr, August 1970. Contour interval is 1.0 $^{\circ}\text{C}$ except for the 7.5 $^{\circ}\text{C}$ contour.

Figure 41. Horizontal distribution of salinity (‰) at 15 meters in the Gulf of Anadyr, August 1970. Contour interval is 0.5‰ .

Figure 42. Horizontal distribution of temperature ($^{\circ}\text{C}$) at 30 meters in the Gulf of Anadyr, August 1970.
Contour interval is 0.5°C .

Figure 43. Horizontal distribution of salinity (‰) at 30 meters in the Gulf of Anadyr, August 1970.
Contour interval is 0.5‰.

Figure 44, Horizontal distribution of temperature ($^{\circ}\text{C}$) at 50 meters in the Gulf of Anadyr, August 1970.
Contour interval is 0.5°C .

Figure 45. Horizontal distribution of salinity (‰) at 50 meters in the Gulf of Anadyr, August 1970. Contour interval is 0.5‰ except the 32.3‰ contour which outlines a cold bottom water mass.

Figure 46. Temperature (°C) versus depth (m) at stations 7 and 32 in the Gulf of Anadyr, August 1970.

Figure 47. Salinity (‰) versus depth (m) at stations 7 and 32 in the Gulf of Anadyr, August 1970.

Figure 48. Temperature (°C) versus depth (m) at stations 21 and 31 in the Gulf of Anadyr, August 1970.

Figure 49. Salinity (‰) versus depth (m) at stations 21 and 31 in the Gulf of Anadyr, August 1970.

TEMPERATURE °C

Figure 51. Temperature (°C)-salinity (‰) diagram for stations 21 and 31 in the Gulf of Anadyr, August 1970.

Figure 52. Horizontal distribution of density (σ_t) at 50 meters in the Gulf of Anadyr, August 1970.
Contour interval is 0.2.

Figure 53. Horizontal distribution of dissolved oxygen (ml/l) at 50 meters in the Gulf of Anadyr, August 1970. Contour interval is 0.5 ml/l.

APPENDIX

OCEANOGRAPHIC DATA

Codes Utilized

A complete description of the codes utilized in the tabulation of oceanographic station data can be found in National Oceanographic Data Center publication M-2, *Processing Physical and Chemical Data from Oceanographic Stations*. (Rev. August 1964, supplement issued May 1966.)

To facilitate use of the oceanographic station data listing, entry headings which are not self-explanatory are described below.

Depth to Bottom	Corrected or uncorrected sounding in meters.
Max. Depth of Samples	Depth of deepest sample to nearest multiple of one hundred meters.
Wave Observations	
DIR	Rounded to nearest multiple of 10 degrees.
HTG	In increments of $\frac{1}{2}$ m. Sum of 5 meters plus increments of $\frac{1}{2}$ m if 50 is added to direction.
PER	If numerals 2 through 9 are entered, period in seconds is twice the numeric entry or $2 \times$ (numeric entry) + 1. For other entries see WMO Code 3155.
SEA	Sea state according to WMO Code 3700.
Weather Code	If preceded by X, weather according to WMO Code 4501. If a two-digit entry, weather according to WMO Code 4677.
Cloud Code	
Type	Cloud type according to WMO Code 0500.
Amount	Cloud amount in eights. Entry of the numeral 9 indicates cloud amount could not be estimated.
Water	
Color Code	Color according to Forel-Ule scale.
Trans	Transparency in whole meters as determined by secchi disc.
Wind	
Dir	Rounded to nearest multiple of 10 degrees.
Speed or Force	If preceded by letter S, wind speed in knots; if preceded by letter F, wind force according to Beaufort scale.
Barometer	Barometric pressure given in tens, units, and tenths of millibars.
Air Temp. °C	Air temperature to tenths of a degree centigrade.
Vis. Code	Visibility according to WMO Code 4300.
No. obs. depths	Number of observed levels associated with the station.
Messenger time	Entered in hours and tenths of an hour GMT. For Nansen casts, indicates time of release of messenger applicable to the observational level. For STD casts, indicates the starting time of lowering the sensor.
Card type	OBS designates observed levels. STD indicates the values at this standard level were interpolated by a modified 3-point LaGrange formula.
Depth (m)	Depth to nearest meter. A postscript T indicates depth was obtained thermometrically; Z indicates uncorrected "wire out" depth. Postscript Q indicates value was marked doubtful by originator; P indicates value was considered doubtful by NODC. Postscripts P and Q retain this meaning throughout the following entries.

T°C	Temperature to hundredths of a degree centigrade.
S ‰	Salinity in parts-per-thousand.
SIGMA-T	Entered to hundredths.
Specific-volume	Multiply entry by 10^{-7} to obtain specific-volume anomaly in cubic centimeters per gram.
$\Sigma \Delta$ Dyn. M $\times 10^3$	Multiply entry by 10^{-3} to obtain anomaly of dynamic depth in dynamic meters referenced to the sea surface.
Sound Velocity	Sound velocity according to Wilson formula, entered to tenths of a meter per second.
O ₂ ml/l	Dissolved oxygen in milliliters per liter entered to hundredths.
PO ₄ -P μ g-at/l	Inorganic phosphate in microgram-atoms per liter entered to hundredths.
Total-P μ g-at/l	Total phosphorus in microgram-atoms per liter entered to hundredths.
NO ₂ -N μ g-at/l	Nitrite-nitrogen in microgram-atoms per liter entered to hundredths.
NO ₃ -N μ g-at/l	Nitrate-nitrogen in microgram-atoms per liter entered to tenths.
SiO ₄ -Si μ g-at/l	Silicate-silicon in microgram-atoms per liter entered to whole units.
pH	Entered to hundredths.

Appendix. Oceanographic data from stations taken by USCGC NORTHWIND, August 1970.

REFERENCE CITY CODE	SHIP ID. NO.	SHIP CODE	LATITUDE ° 1/10	LONGITUDE ° 1/10	DEPTH METER	MARSOEN SQUARE	STATION TIME (GMT)					YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'MPL'S	WAVE OBSERVATIONS				WEA- THER CODE	CLOUD CODES		NOOC STATION NUMBER																																																				
							10"	1"	MO	OAT	HR.1/10		CRUISE NO.	STATION NUMBER			DIR.	HGT	PER	SEA		TYPE	AMT																																																					
311695	NW	63018N	171320W	234	31	08	02	231	1970	GAS	001	0048	1	31	2	2				X1	0	1	0001																																																					
<table><tr><th colspan="4">WATER</th><th colspan="4">WIND</th><th colspan="4">AIR TEMP. °C</th><th rowspan="2">VIS. CODE</th><th rowspan="2">NO. OBS. DEPTHS</th><th rowspan="2">SPECIAL OBSERVATIONS</th></tr><tr><th>COLOR CODE</th><th>TRANS. (m)</th><th>DIR.</th><th>SPEED OR FORCE</th><th>BARO-METER (mba)</th><th>DRY BULB</th><th>WET BULB</th><th>WIND</th><th>DRY BULB</th><th>WET BULB</th><th>WIND</th></tr><tr><td></td><td></td><td></td><td>31</td><td>515</td><td>181</td><td>087</td><td>007</td><td>08</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr></table>																									WATER				WIND				AIR TEMP. °C				VIS. CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS	COLOR CODE	TRANS. (m)	DIR.	SPEED OR FORCE	BARO-METER (mba)	DRY BULB	WET BULB	WIND	DRY BULB	WET BULB	WIND				31	515	181	087	007	08																	
WATER				WIND				AIR TEMP. °C				VIS. CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS																																																														
COLOR CODE	TRANS. (m)	DIR.	SPEED OR FORCE	BARO-METER (mba)	DRY BULB	WET BULB	WIND	DRY BULB	WET BULB	WIND																																																																		
			31	515	181	087	007	08																																																																				
MESSAGE TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T	SPECIFIC VOLUME ANOMALY-210?	Σ Δ σ DYN. M. x 10 ³	SOUND VELOCITY	O ₂ ml/l	PO ₄ -P μg - ml/l	TOTAL-P μg - ml/l	NO ₂ -N μg - ml/l	NO ₃ -N μg - ml/l	SiO ₄ -Si μg - ml/l	pH	S C																																																											
231		STD	0000	0825	3091	2406	0038648	0000	14786	694																																																																		
		OBS	0000	0825	30914	2406			14786	694																																																																		
231		OBS	0005	0830	30913	2405			14789	700	044			001	TRC	003																																																												
		STD	0010	0815	3092	2407	0038507	0038	14784	700	055			001	000	003																																																												
231		OBS	0010	0815	30916	2407			14784	700	057			001	TRC	003																																																												
231		OBS	0015	0309	31418	2505			14584	672	064			001	TRC	003																																																												
		STD	0020	0183	3175	2541	0025779	0070	14534	774																																																																		
231		OBS	0020		31753					974	068			001	000	003																																																												
231		OBS	0025	0123	32044	2508			14512	773	126			023	018	013																																																												
		STD	0030	0129	3213	2575	0022575	0094	14517	720																																																																		
231		OBS	0030	0129	32130	2575			14517	720	137			025	017	015																																																												
231		OBS	0040	0120	32185	2580			14515	738	138			022	011	014																																																												

REFERENCE		SHIP CODE	LATITUDE ° 1/10	LONGITUDE ° 1/10	DEPTH METER	M/RSOEN SQUARE	STATION TIME (GMT)					YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'MPL'S	WAVE OBSERVATIONS				WEA- THER CODE	CLOUD CODES		NOOC STATION NUMBER																																								
CITY CODE	ID. NO.						10"	1"	MO	DAY	HR.1/10		CRUISE NO.	STATION NUMBER			DIR.	HGT	PER	SEA		TYPE	AMT																																									
311695		Nd	63008N	172400W		254	32	08	03	035	1970	GAS	002	0053	1	33	0	2		X1	0	2		0002																																								
<table><tr><th colspan="4">WATER</th><th colspan="4">WIND</th><th colspan="4">AIR TEMP. °C</th><th rowspan="2">VIS. CODE</th><th rowspan="2">NO. OBS. DEPTHS</th><th rowspan="2">SPECIAL OBSERVATIONS</th></tr><tr><th>COLOR CODE</th><th>TRANS. (m)</th><th>DIR.</th><th>SPEED OR FORCE</th><th>BARO-METER (mba)</th><th>DRY BULB</th><th>WET BULB</th><th>WIND</th><th>DRY BULB</th><th>WET BULB</th></tr><tr><td></td><td></td><td></td><td>33</td><td>508</td><td>211</td><td>098</td><td>084</td><td>7</td><td>09</td><td></td><td></td><td></td><td></td><td></td></tr></table>																									WATER				WIND				AIR TEMP. °C				VIS. CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS	COLOR CODE	TRANS. (m)	DIR.	SPEED OR FORCE	BARO-METER (mba)	DRY BULB	WET BULB	WIND	DRY BULB	WET BULB				33	508	211	098	084	7	09					
WATER				WIND				AIR TEMP. °C				VIS. CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS																																																		
COLOR CODE	TRANS. (m)	DIR.	SPEED OR FORCE	BARO-METER (mba)	DRY BULB	WET BULB	WIND	DRY BULB	WET BULB																																																							
			33	508	211	098	084	7	09																																																							
MESSAGE TIME HR 1/10	CAST OF NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T	SPECIFIC VOLUME ANOMALY-210?	Σ Δ σ DYN. M. x 10 ³	SOUND VELOCITY	O ₂ ml/l	PO ₄ -P μg - ml/l	TOTAL-P μg - ml/l	NO ₂ -N μg - ml/l	NO ₃ -N μg - ml/l	SiO ₄ -Si μg - ml/l	pH	S C																																															
		STD	0000	0850	3103	2411	0038148	0000	14737	697																																																						
035		OBS	0000	0850	31027	2411			14757	697	044			001	000	003																																																
035		OBS	0005	0857	31028	2410			14800	690	052			001	000	003																																																
		STD	0010	0817	3102	2415	0037777	0038	14780	700																																																						
035		OBS	0010	0817	31017	2415			14780	700	055			001	000	003																																																
035		OBS	0015	0756	31042	2420			14779	692	055			001	000	003																																																
		STD	0020	0293	3137	2502	0029494	0071	14577	767																																																						
035		OBS	0020	0293	31367	2502			14577	767	061			001	000	003																																																
035		OBS	0025	-0064	31590	2541			14420	950	070			004	000	003																																																
		STD	0030	-0142	3183	2562	0025721	0098	14388	763																																																						
035		OBS	0030	-0142	31833	2562			14388	763	131			023	039	017																																																
035		OBS	0040	-0153	31931	2574			14380	700	157			020	053	024																																																
		STD	0050	-0148	3198	2574	0022543	0144	14390	774																																																						
035		OBS	0050	-0148	31982	2574			14390	774	136			025	043	016																																																

REFERENCE CITY CODE	SHIP ID. NO.	SHIP CODE	LATITUDE ° 1/10	LONGITUDE ° 1/10	DEPTH METER	M/RSOEN SQUARE	STATION TIME (GMT)					YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'MPL'S	WAVE OBSERVATIONS				WEA- THER CODE	CLOUD CODES		NOOC STATION NUMBER																																									
							10"	1"	MO	OAT	HR.1/10		CRUISE NO.	STATION NUMBER			DIR.	HGT	PER	SEA		TYPE	AMT																																										
311695		Nw	6300 N	17347 W	254	33	08	03	086	1970	GAS	003	0062	1	31	2	2			X2	6	8		0003																																									
<table><tr><th colspan="4">WATER</th><th colspan="4">WIND</th><th colspan="4">AIR TEMP. °C</th><th rowspan="2">VIS. CODE</th><th rowspan="2">NO. OBS. DEPTHS</th><th rowspan="2">SPECIAL OBSERVATIONS</th></tr><tr><th>COLOR CODE</th><th>TRANS. (m)</th><th>DIR.</th><th>SPEED OR FORCE</th><th>BARO-METER (mba)</th><th>DRY BULB</th><th>WET BULB</th><th>WIND</th><th>DRY BULB</th><th>WET BULB</th><th>WIND</th></tr><tr><td></td><td></td><td></td><td>19</td><td>547</td><td>220</td><td>090</td><td>082</td><td>0</td><td>09</td><td></td><td></td><td></td><td></td><td></td></tr></table>																									WATER				WIND				AIR TEMP. °C				VIS. CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS	COLOR CODE	TRANS. (m)	DIR.	SPEED OR FORCE	BARO-METER (mba)	DRY BULB	WET BULB	WIND	DRY BULB	WET BULB	WIND				19	547	220	090	082	0	09					
WATER				WIND				AIR TEMP. °C				VIS. CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS																																																			
COLOR CODE	TRANS. (m)	DIR.	SPEED OR FORCE	BARO-METER (mba)	DRY BULB	WET BULB	WIND	DRY BULB	WET BULB	WIND																																																							
			19	547	220	090	082	0	09																																																								
MESSAGE TIME HR 1/10	CAST OF NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T	SPECIFIC VOLUME ANOMALY-210?	Σ Δ σ DYN. M. x 10 ³	SOUND VELOCITY	O ₂ ml/l	PO ₄ -P μg - ml/l	TOTAL-P μg - ml/l	NO ₂ -N μg - ml/l	NO ₃ -N μg - ml/l	SiO ₄ -Si μg - ml/l	pH	S C																																																
		STD	0000	0820	3062	2384	0040755	0000	14780	708																																																							
065		OBS	0000	0820	30621	2384			14780	708	035			001	001	003																																																	
060		OBS	0005	0822	30622	2383			14762	708	036			000	000	003																																																	
		STD	0010	0743	3054	2388	0040324	0040	14751	713																																																							
060		OBS	0010	0743	30545	2388			14751	713	040			000	000	004																																																	
066		OBS	0015	0724	31732	2483			14700	1064	052			000	000	003																																																	
		STD	0020	-0116	3197	2573	0022753	0072	14400	763																																																							
066		OBS	0020	-0116	31968	2573			14400	765	000			011	000	001																																																	
065		OBS	0025	-0143	32070	2521			14390	700	082			028	041	002																																																	
		STD	0030	-0162	3211	2565	0021554	0094	14382	713																																																							
065		OBS	0030	-0162	32110	2565			14382	713	170			025	112	015																																																	
060		OBS	0040	-0159	32145	2560			14380	607	197			016	127	027																																																	
		STD	0050	-0166	3221	2593	0020738	0130	14365	658																																																							
060		OBS	0050	-0166	32212	2593			14365	658	201			016	118	031																																																	

REFERENCE	SHIP CODE	LATITUDE 1/10	LONGITUDE 1/10	DRIFT NODE	MARSDEN SQUARE	STATION TIME (GMT)				YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'PL'S	WAVE OBSERVATIONS				WEA- THER CODE	CLOUD CODES		NODC STATION NUMBER
						10"	1"	MO	DAY	HR./10	CRUISE NO.	STATION NUMBER			DIR	HGT	PER	SEA		TYPE	AMT	

WATER		WIND		BARO- METER		AIR TEMP. °C		VIS. CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS
COLOR CODE	TRANS. (m)	DIR.	SPEED OR FORCE	(mb)	DRY BULB	WET BULB				
		21	517	210	082	075	8	10		

MESSAGE TIME HR 1/10	CARD NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T	SPECIFIC VOLUME ANOMALY-σ _t °	Σ Δ D DYN. M. x 10 ³	SOUND VELOCITY	O ₂ ml/l	PO ₂ -P μg - at/l	TOTAL-P μg - at/l	NO ₃ -N μg - at/l	NO ₃ -N μg - at/l	SiO ₄ -Si μg - at/l	pH	S CODE
	STO	0000	0830	3088	2403	0038939	0000	14787	694								
132	OBS	0000	0830	30884	2403			14787	694	033			001	000	006		
132	OBS	0005	0834	30887	2402			14790	693	041			002	000	006		
	STO	0010	0833	3089	2402	0038980	0039	14790	694								
132	OBS	0010	0833	30886	2402			14790	694	043			000	000	006		
132	OBS	0015	0660	31558	2479			14732	740	039			000	000	009		
	STO	0020	0501	3163	2503	0029378	0073	14669	789								
132	OBS	0020	0501	31633	2503			14669	789	035			001	000	007		
132	OBS	0025	-0070	32163	2587			14425	1227	034			001	TRC	001		
	STO	0030	-0137	3221	2593	0020841	0098	14395	1004								
132	OBS	10030	-0137	32210	2593			14395	1004	075			013	051	001		
132	OBS	0040		32254					741	154			011	148	009		
	STO	0050	-0164	3229	2600	0020159	0139	14387	631								
132	OBS	10050	-0164	32286	2600			14387	631	226			008	151	044		
132	OBS	0060	-0164	32316	2602			14389	636	232			008	146	046		

REFERENCE	SHIP CODE	LATITUDE 1/10	LONGITUDE 1/10	DRIFT NODE	MARSDEN SQUARE	STATION TIME (GMT)				YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'PL'S	WAVE OBSERVATIONS				WEA- THER CODE	CLOUD CODES		NODC STATION NUMBER
						10"	1"	MO	DAY	HR./10	CRUISE NO.	STATION NUMBER			DIR	HGT	PER	SEA		TYPE	AMT	

WATER		WIND		BARO- METER (mb)	AIR TEMP. °C		VIS. CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS
COLOR CODE	TRANS. (m)	DIR.	SPEED OR FORCE		DRY BULB	WET BULB			
		12	15	143	081	076	3	10	

MESSAGE TIME HR 1/10	CARD NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T	SPECIFIC VOLUME ANOMALY-σ _t °	Σ Δ D DYN. M. x 10 ³	SOUND VELOCITY	O ₂ ml/l	PO ₂ -P μg - at/l	TOTAL-P μg - at/l	NO ₃ -N μg - at/l	NO ₃ -N μg - at/l	SiO ₄ -Si μg - at/l	pH	S CODE
	STO	0000	0839	3082	2397	0039521	0000	14790	689								
175	OBS	0000	0839	30823	2397			14790	689	035			000	000	005		
175	OBS	0005	0844	30837	2397			14793	692	040			001	TRC	005		
	STO	0010	0842	3083	2397	0039498	0039	14793	697								
175	OBS	0010	0842	30833	2397			14793	697	042			000	TRC	006		
175	OBS	0015	0715					729	040				000	TRC	006		
	STO	0020	0431	3156	2505	0029220	0073	14639	872								
175	OBS	0020	0431	31562	2505			14639	872	040			001	TRC	006		
175	OBS	0025	0046	32075	2575			14477	1078	040			000	TRC	002		
	STO	0030	-0128	3216	2589	0021231	0099	14399	970								
175	OBS	10030	-0128	32162	2589			14399	970	065			017	035	TRC		
175	OBS	0040	-0163	32190	2592			14384	776	133			014	146	001		
	STO	0050	-0163	3222	2594	0020693	0141	14383	731								
175	OBS	10050	-0163	32217	2594			14383	731	181			010	175	024		
175	OBS	0060	-0152	32289	2599			14394	632	241			007	176	051		

REFERENCE	SHIP CODE	LATITUDE 1/10	LONGITUDE 1/10	DRIFT NODE	MARSDEN SQUARE	STATION TIME (GMT)				YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'PL'S	WAVE OBSERVATIONS				WEA- THER CODE	CLOUD CODES		NODC STATION NUMBER
						10"	1"	MO	DAY	HR./10	CRUISE NO.	STATION NUMBER			DIR	HGT	PER	SEA		TYPE	AMT	

WATER		WIND		BARO- METER (mb)	AIR TEMP. °C		VIS. CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS
COLOR CODE	TRANS. (m)	DIR.	SPEED OR FORCE		DRY BULB	WET BULB			
		15	S 15	014	077	094	6	11	

MESSAGE TIME HR 1/10	CARD NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T	SPECIFIC VOLUME ANOMALY-σ _t °	Σ Δ D DYN. M. x 10 ³	SOUND VELOCITY	O ₂ ml/l	PO ₂ -P μg - at/l	TOTAL-P μg - at/l	NO ₃ -N μg - at/l	NO ₃ -N μg - at/l	SiO ₄ -Si μg - at/l	pH	S CODE
	STO	0000	0756	3135	2449	0034494	0000	14765	708								
234	OBS	0000	0755	31347	2449			14765	708	026			001	000	006		
234	OBS	0003	0758	31344	2449			14760		029			001	000	006		
234	OBS	0007	0757	31344	2449			14760	713	030			000	000	006		
	STO	0010	0747	3138	2453	0034134	0034	14763	720								
234	OBS	0010	0747	31381	2453			14763	720	029			000	000	006		
234	OBS	0014	0740	31445	2462			14754	733	030			001	TRC	007		
	STO	0020	0679	3143	2466	0034353	0067	14738	736								
234	OBS	0021	0672	31422	2466			14738	733	030			000	TRC	006		
234	OBS	0026	-0051	31948	2509			14432	988	030			001	TRC	007		
	STO	0030	-0075	3203	2576	0022377	0093	14422	980								
234	OBS	0035	-0123	32178	2590			14402	947	032			001	TRC	007		
234	OBS	10043	-0160	32220	2594			14354	703	112			010	007	005		
	STO	0050	-0161	3225	2597	0020441	0136	14358	706								
234	OBS	0051	-0159							172			010	165	029		
234	OBS	0054	-0159	32266	2599			14430	771	165			014	159	023		

REFERENCE		SHIP CODE	LATITUDE 1/10	LONGITUDE 1/10	DEPTH METER	MARS DEN		STATION TIME (GMT)				YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'PL'S	WAVE OBSERVATIONS				WEA- THER CODE	CLOUD CODES		NODC STATION NUMBER
CERT CODE	ID. NO.					10"	1"	MO	DAY	HR./10	CRUISE NO.		STATION NUMBER	DIR			HGT	PER	SEA	TYPE		AMT		
311695	NW	62538N	178252W	234	28	08	04	055	1970	GAS	007	0084	1	20	3	2			X1	6	6	0007		
						WATER		WIND		BARO- METER		AIR TEMP. °C		VIS. CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS								
						COLOR CODE	TRANS. (m)	DIR.	SPEED OR FORCE	(mb)	DRY BULB	WET BULB												
									28	512	987	079	087	7	12									
MESSAGE TIME HR 1/10	CARD NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T	SPECIFIC VOLUME ANOMALY-σ _t	Σ Δ σ DYN. M. x 10 ³	SOUND VELOCITY	O ₂ ml/l	PO ₄ -P μg - at/l	TOTAL-P μg - at/l	NO ₃ -N μg - at/l	NO ₃ -N μg - at/l	SiO ₄ -Si μg - at/l	pH	SC							
		STD	0000	0713	3196	2503	0029363	0000	14756	761														
065		OBS	0000	0713	31960	2503			14756	761	030		001	000	004									
065		OBS	0005	0717	31959	2503			14758	770	042		000	000	004									
065		OBS	0009	0717	31960	2503			14759	754	046		002	TRC	004									
		STD	0010	0717	3196	2503	0024434	0029	14759	755														
065		OBS	0014	0715	31953	2502			14759	759	046		000	TRC	004									
065		OBS	0018	0711	31954	2503			14758	761	047		001	TRC	004									
		STD	0020	0594	3195	2518	0028003	0058	14712	774														
065		OBS	0023	0345	31951	2544			14608	855	123		001	001	006									
065		OBS	0027	-0127	32118	2585			14398	1048	149		005	015	011									
		STD	0030	-0117	3216	2588	0021232	0082	14404	944														
065		OBS	0037	-0093	32340	2602			14419	752			007	155	041									
065		OBS	T0046	0032	32700	2626			14453	813			006	227	058									
		STD	0050	0036	3272	2628	0017538	0121	14480	812														
065		OBS	0055	0041									006	247	064									
065		OBS	0064	0049	32781	2631			14495	810			011	253	062									
065		OBS	T0069	0054	32792	2632			14496	810			006	252	063									

REFERENCE CITY ID. NO.	SHIP CODE	LATITUDE * 1/10	LONGITUDE * 1/10	DEPTH METER	MARS DEN SQUARE		STATION TIME (GMT)			YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'PL'S	WAVE OBSERVATIONS				WEA- THER CODE	CLOUD CODES		NODC STATION NUMBER	
					10"	1"	MO	DAY	HR./10		CRUISE NO.	STATION NUMBER			DIR.	HGT	PER	SEA		TYPE	AMT		
311695	NW	6300 N	179310W	234	28	04	04	105	1970	GAS	008	0084	1	17	2	3			X1	4	1		0008
					WATER		WIND		BARO- METER (mb)		AIR TEMP. °C		VIS. CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS								
					COLOR CODE	TRANS. (m)	DIR.	SPEED OR FORCE	DRY BULB	WET BULB													
								30	510	034	088	073	7	10									
MESSAGE TIME HR 1/10	CARD NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T	SPECIFIC VOLUME ANOMALY-σ _t	Σ Δ σ DYN. M. x 10 ³	SOUND VELOCITY	O ₂ ml/l	PO ₄ -P μg - at/l	TOTAL-P μg - at/l	NO ₃ -N μg - at/l	NO ₃ -N μg - at/l	SiO ₄ -Si μg - at/l	pH	SC						
		STD	0000	0759	2944	2299	0048796	0000	14741	766													
109		OBS	0000	0759	29438	2299			14741	766	080		003	002	012								
109		OBS	0005	0765					772	090			003	002	011								
		STD	0010	0763	2976	2324	0046422	0047	14740	790													
109		OBS	0010	0763	29764	2324			14748	790	071		002	002	007								
109		OBS	0015	0506	32740	2590			14685	873	128		004	003	011								
		STD	0020	0301	3296	2628	0017469	0079	14602	737													
109		OBS	0020	0301	32965	2628			14602	737			019	018	033								
109		OBS	0025	0156	33043	2647			14554	668			012	238	052								
		STD	0030	0180	3321	2658	0014669	0095	14554	662													
109		OBS	T0030	0180	33214	2658			14554	662			011	281	065								
109		OBS	0040	0179	33216	2658			14555	662			008	276	066								
		STD	0050	0180	3322	2659	0014619	0124	14558	656													
109		OBS	0050	0180	33221	2659			14558	656			012	273	066								
109		OBS	T0060	0181	33219	2658			14560	626			012	276	064								

REFERENCE CITY CODE	SHIP CODE	LATITUDE ° 1/10	LONGITUDE ° 1/10	DEPTH METER	MARS DEN SQUARE		STATION TIME (GMT)			YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'PL'S	WAVE OBSERVATIONS			WEA- THER CODE	CLOUD CODES		NODC STATION NUMBER					
					10"	1"	MO	DAY	HR./10		CRUISE NO.	STATION NUMBER			DIR	HGT	PER		SEA	TYPE		AMT				
311695	NW	63300N	18000 W	234	20	04	04	154	1970	GAS	009	0029	1	34	2	3		X1	2	2		0009				
					WATER		WIND		AIR TEMP. °C		BARO- METER (mb)		AIR TEMP. °C		VIS. CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS									
					COLOR CODE	TRANSL (m)	DIR.	SPEED OR FORCE	DRY BULB	WET BULB																
								23	515	024	079	061	8	06												
MESSAGE TIME HR 1/10	CARD NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T	SPECIFIC VOLUME ANOMALY- σ_t	$\Sigma \Delta \sigma$ DYN. M. $\times 10^3$	SOUND VELOCITY	O ₂ ml/l	PO ₄ -P $\mu\text{g} - \text{at/l}$	TOTAL-P $\mu\text{g} - \text{at/l}$	NO ₃ -N $\mu\text{g} - \text{at/l}$	NO ₃ -N $\mu\text{g} - \text{at/l}$	SiO ₄ -Si $\mu\text{g} - \text{at/l}$	pH	SC									
		STD	0000	0483	3050	2416	0037684	0000	14643	706																
154		OBS	0000	0483	30504	2416			14643	706	109		017	073	025											
154		OBS	0005	0481	30520	2417			14643	710	122		014	072	026											
		STD	0010	0261	3272	2612	0019021	0028	14580	657																
154		OBS	0010	0261	32717	2612			14580	657	191		018	165	042											
154		OBS	0015	0250	32802	2620			14577	652	199		017	169	043											
		STD	0020	0219	3296	2635	0016867	0046	14566	638																
154		OBS	0020	0219	32960	2635			14566	638	208		019	191	048											
154		OBS	T0025	0197	33019	2641			14558	612	223		017	180	050											

REFERENCE	SHIP	LATITUDE	LONGITUDE	WAVE	STATION TIME	YEAR	ORIGINATOR'S	DEPTH	MAX. DEPTH	WAVE	WEA-	CLOUD	NOCC
CRUISE	NO.	1/10	1/10	1/10	MO	DAY	CRUISE	TO	OF	OBS.	THE	CODES	STATION
NO.	NO.						NO.	BOTTOM	SAMPLES	PER	CODE	TYPE	NUMBER

WATER		WIND		BARO- METER (Inches)	AIR TEMP. °C		VIS. CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS
COLOR CODE	TRANS. (m)	DIR.	SPEED OR FORCE		DRY BULB	WET BULB			
		05	509	600	607	077	K	41	

REFERENCE CTRY CODE	SHIP CODE	LATITUDE 1/10	LONGITUDE 1/10	DATE INDEX	MARDEN SQUARE		STATION TIME (GMT)			YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'AMPLE'S	WAVE OBSERVATIONS			WEA- THER CODE	CLOUD CODES		NODC STATION NUMBER	
					10"	1"	MO	DAY	HR./10		CRUISE NO.	STATION NUMBER			DIR.	HGT PER	SEA		TYPE	AMT		
311695	NW	63300N	175236W	234	35	08	05	060	1970	GAS	013	0000	1	24	2	2		X1	3	6		0013
					WATER		WIND		BARO- METER (mb)	AIR TEMP. °C		VIS CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS								
		COLOR CODE	TRANS. (m)	DIR.	SPEED OF FORCE	DRY BULB	WET BULB															
							32		S20	962	077	067	8	11								
MESSAGE TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T		SPECIFIC VOLUME ANOMALY-20°		Σ Δ D DYN. M. X 10 ³	SOUND VELOCITY	O ₂ ml/l	PO ₄ -P μg - ml/l	TOTAL-P μg - ml/l	NO ₂ -N μg - ml/l	NO ₃ -N μg - ml/l	SiO ₄ -Si μg - ml/l	pH	STATION NUMBER			
		STD	0000	0740	3144	2459		0033622		0000	14760	707										
060	08S	0000	0740	31436	2459						14760	707	020			000	000	007				
060	08S	0005	0744	31432	2458						14762	710	023			000	000	007				
	STD	0010	0741	3143	2458		0033079		0033	14761	708											
060	08S	0010	0741	31432	2458						14761	708	023			000	000	007				
060	08S	0015	0742	31437	2458						14763	710	023			000	000	007				
	STD	0020	0732	3144	2460		0033510		0067	14760	712											
060	08S	0020	0732	31440	2460						14760	712	024			000	000	007				
060	08S	0025	0564	31626	2493						14704	750	024			000	000	007				
	STD	0030	-0059	3215	2585		0021554		0094	14431	1214											
060	08S	0030	-0059	32147	2585						14431	1214	029			003	001	TRC				
060	08S	0040	-0152	32220	2594						14390	828	140			010	138	006				
	STD	0050	-0152	3227	2598		0020315		0136	14392	760											
060	08S	T0050	-0152	32271	2598						14392	760	179			008	163	032				
060	08S	0060	-0080	32401	2607						14427	666	220			011	171	049				
060	08S	T0065	-0064	32492	2613						14439	251				010	184	055				

REFERENCE		SHIP CODE	LATITUDE 1/10	LONGITUDE 1/10	DATE INDEX	MARDEN SQUARE		STATION TIME (GMT)		YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'AMPLE'S	WAVE OBSERVATIONS			WEA- THER CODE	CLOUD CODES		NODC STATION NUMBER			
CTRY CODE	ID. NO.					10"	1"	MO	DAY		HR./10	CRUISE NO.			STATION NUMBER	DIR.	HGT PER		SEA	TYPE		AMT		
311695	NW	63300N	174200W	234	34	08	05	094	1970	GAS	014	0077	1	30	2	2		X1	6	7	0014			
						WATER		WIND		BARO- METER (mb)	AIR TEMP. °C		VIS CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS									
						COLOR CODE	TRANS. (m)	DIR.	SPEED OF FORCE		DRY BULB	WET BULB												
								31	S13	981	080	071	7	11										
MESSAGE TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T	SPECIFIC VOLUME ANOMALY-20°		Σ Δ D DYN. M. x 10 ³	SOUND VELOCITY	O ₂ ml/l	PO ₄ -P μg - ml/l	TOTAL-P μg - ml/l	NO ₂ -N μg - ml/l	NO ₃ -N μg - ml/l	SiO ₄ -Si μg - ml/l	pH							
		STD	0000	0680	3155	2475	0032023		0000	14737	750													
094	08S	0000	0680	31548	2475					14737	750	030		001	001	009								
094	08S	0005	0684	31548	2475					14740	754	034		000	TRC	008								
		STD	0010	0684	3154	2474	0032180		0032	14740	749													
094	08S	0010	0684	31530	2474					14740	749	034		004	000	009								
094	08S	0015	0683	31540	2475					14741	747	033		001	000	008								
		STD	0020	0684	3155	2475	0032073		0004	14742	751													
094	08S	0020	0684	31552	2475					14742	751	032		001	000	008								
094	08S	0025	0047	32110	2576					14476	430	072		010	042	006								
		STD	0030	-0154	3222	2594	0020712		0090	14307	804													
094	08S	0030	-0154	32221	2594					14307	804	132		012	120	013								
094	08S	0040	-0163	32266	2596					14305	771	177		011	161	030								
		STD	0050	-0162	3232	2602	0019915		0131	14308	787													
094	08S	T0050	-0162	32320	2602					14308	787	004		011	161	030								
094	08S	0060	-0143	32437	2611					14301	706	200		010	152	039								
094	08S	T0070	-0167	32703	2633					14305	477	259		009	102	077								

REFERENCE	SHIP		LATITUDE	LONGITUDE	DATE	MARDEN	STATION TIME			YEAR	ORIGINATOR'S		DEPTH	MAX. DEPTH	WAVE			WEA-	CLOUD		NODC										
	CODE	NO.					CODE	NO.	MO		DAY	HR./10			CRUISE	STATION	OBSERVATIONS					DR.	HGT	PER	SEA	THER	CODES	TYPE	AMT		STATION
311695	NW	0330	N	173110	W	234	33	08	05	134	1970	GAS	013	0055	1	30	2		X4	5	7		0015								
		WATER		WIND		BARO-		AIR TEMP. °C		VIS	NO.	SPECIAL																			
		COLOR	TRANS.	DIR.	SPEED	METER	DRY	WET	CODE			OBS.	DEPTHS	OBSERVATIONS																	
		CODE	(m)		OF	(mb)	BULB	BULB																							
					29	S15	010	075	064	7	10																				
MESSAGE	TIME	CAST	CARD	DEPTH (m)	T °C	S ‰	SIGMA-T	SPECIFIC VOLUME	Σ Δ D	SOUND	O ₂ ml/l	PO ₄ -P	TOTAL-P	NO ₂ -N	NO ₃ -N	SiO ₄ -Si	pH	STATION													
HR 1/10		NO.	TYPE					ANOMALY-20°	DYN. M. x 10 ³	VELOCITY		μg - ml/l	μg - ml/l	μg - ml/l	μg - ml/l	μg - ml/l		NUMBER													
			STD	0000	0757	3105	2420	0030720	0000	14701	701																				
134			08S	0000	0757	31050	2426			14701	701	035		000	000	007															
134			08S	0005	0757	31051	2420			14703	703	040		000	000	007															
			STD	0010	0010	3189	2562	0023770	0030	14456	1062																				
134			08S	0010	0010	31893	2562			14450	1062	062		001	000	003															
134			08S	0015	-0059	32166	2588			14410	1141	039		001	TRC	001															
			STD	0020	-0125	3222	2593	0020795	0052	14399	1000																				
134			08S	0020	-0125	32220	2593			14399	1000	050		012	TRC	001															
134			08S	0025	-0150	32236	2595			14360	853	123		017	090	005															
			STD	0030	-0160	3225	2597	0020430	0073	14301	005																				
134			08S	T0030	-0160	32254	2597			14301		182		013	153	015															
134			08S	0040	-0170	32288	2600			14302	730	194		011	123	025															
			STD	0050	-0160	3244	2612	0019010	0112	14308	002																				
134			08S	0050	-0160	32437	2612			14305	002	210		011	109	030															
134			08S	T0055	-0160	32473	2615			14305	020	257		012	099	048															

REFERENCE CTRY CODE	ID. NO.	SHIP CODE	LATITUDE 1/10	LONGITUDE 1/10	HAZEN INDIC	MARSDEN SQUARE	STATION TIME (GMT)	YEAR	ORIGINATOR'S CRUISE NO.	STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPL'S	WAVE OBSERVATIONS	WEA- THER CODE	CLOUD CODES	NODC STATION NUMBER

MESSAGE TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T	SPECIFIC VOLUME ANOMALY- σ_{θ}	$\Sigma \Delta \sigma$ DYN. M. $\times 10^3$	SOUND VELOCITY	O ₂ ml/l	PO ₄ -P $\mu\text{g} \cdot \text{at/l}$	TOTAL-P $\mu\text{g} \cdot \text{at/l}$	NO ₂ -N $\mu\text{g} \cdot \text{at/l}$	NO ₃ -N $\mu\text{g} \cdot \text{at/l}$	SiO ₄ -Si $\mu\text{g} \cdot \text{at/l}$	pH	SCC
		STD	0000	0707	3102	2430	0035320	0000	14741	714							
177		OBS	0000	0707	31019	2430			14741	714				001	000	004	
177		OBS	0005	0710	31035	2429			14743	710	047			000	TRC	004	
		STD	0010	0710	3100	2429	0030400	0030	14744	715							
177		OBS	0010	0710	31005	2429			14744	715	050			001	TRC	004	
177		OBS	0015	0689	31032	2434			14737	713	057			000	TRC	004	
		STD	0020	0050	3105	2550	0024321	0000	14740	700							
177		OBS	0020	0050	31848	2550			14740	700	111			010	020	014	
177		OBS	0025	-0009	32002	2574			14725	754	129			015	020	016	
		STD	0030	-0070	3200	2574	0022631	0030	14724	790							
177		OBS	T0030	-0070	32001	2574			14724	790	131			015	026	016	
177		OBS	T0035	-0056	32002	2573			14731								

REFERENCE CTRY CODE	ID. NO.	SHIP CODE	LATITUDE 1/10	LONGITUDE 1/10	HAZEN INDIC	MARSDEN SQUARE	STATION TIME (GMT)	YEAR	ORIGINATOR'S CRUISE NO.	STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPL'S	WAVE OBSERVATIONS	WEA- THER CODE	CLOUD CODES	NODC STATION NUMBER

MESSAGE TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T	SPECIFIC VOLUME ANOMALY- σ_{θ}	$\Sigma \Delta \sigma$ DYN. M. $\times 10^3$	SOUND VELOCITY	O ₂ ml/l	PO ₄ -P $\mu\text{g} \cdot \text{at/l}$	TOTAL-P $\mu\text{g} \cdot \text{at/l}$	NO ₂ -N $\mu\text{g} \cdot \text{at/l}$	NO ₃ -N $\mu\text{g} \cdot \text{at/l}$	SiO ₄ -Si $\mu\text{g} \cdot \text{at/l}$	pH	SCC
		STD	0000	0730	3118	2440	0035375	0000	14752	719							
023		OBS	0000	0730	31184	2440			14752	719	023			000	TRC	006	
023		OBS	0005	0732	31183	2440			14754	710	023			001	TRC	006	
		STD	0010	0725	3125	2446	0034851	0035	14753	720							
023		OBS	0010	0725	31247	2446			14753	720	022			002	TRC	006	
023		OBS	0015	0712	31365	2457			14750	718	021			002	TRC	006	
		STD	0020	0626	3168	2492	0030418	0007	14721	800							
023		OBS	0020	0626	31679	2492			14721	800	020			000	000	006	
023		OBS	0025	-0061	32151	2586			14420	1187	037			002	TRC	005	
		STD	0030	-0128	3218	2590	0021059	0033	14399	1038							
023		OBS	0030	-0128	32184	2590			14399	1038	082			009	043	007	
023		OBS	0040	-0148	32272	2598			14393	802	172			014	141	033	

REFERENCE CTRY CODE	ID. NO.	SHIP CODE	LATITUDE 1/10	LONGITUDE 1/10	HAZEN INDIC	MARSDEN SQUARE	STATION TIME (GMT)	YEAR	ORIGINATOR'S CRUISE NO.	STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPL'S	WAVE OBSERVATIONS	WEA- THER CODE	CLOUD CODES	NODC STATION NUMBER

MESSAGE TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T	SPECIFIC VOLUME ANOMALY- σ_{θ}	$\Sigma \Delta \sigma$ DYN. M. $\times 10^3$	SOUND VELOCITY	O ₂ ml/l	PO ₄ -P $\mu\text{g} \cdot \text{at/l}$	TOTAL-P $\mu\text{g} \cdot \text{at/l}$	NO ₂ -N $\mu\text{g} \cdot \text{at/l}$	NO ₃ -N $\mu\text{g} \cdot \text{at/l}$	SiO ₄ -Si $\mu\text{g} \cdot \text{at/l}$	pH	SCC
		STD	0000	0729	3100	2426	0036739	0000	14750	716							
063		OBS	0000	0729	31000	2420			14750	716	017			002	000	006	
063		OBS	0005	0732	30997	2425			14751	712	019			001	000	005	
063		OBS	0009	0732	30998	2425			14752	710	020			000	000	006	
		STD	0010	0732	3100	2425	0036790	0036	14752	711							
063		OBS	0014	0731	31002	2426			14753	714	021			001	000	005	
063		OBS	0019	0730	31009	2426			14753	711	022			000	000	006	
		STD	0020	0673	3116	2446	0034842	0072	14733	747							
063		OBS	0024	0418	31680	2516			14635	886	025			001	000	006	
063		OBS	T0029	0033	32096	2577			14473	1045	035			001	000	009	
		STD	0030	0016	3211	2580	0022095	0101	14465	1023							
063		OBS	0038	-0084	32237	2593			14422	898	117			012	076	020	
063		OBS	0043	-0111	32286	2598			14411	863	135			014	094	025	

MISSING TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S %	SIGMA-T	SPECIFIC VOLUME ANOMALY- $\Delta\rho$	$\frac{\Delta\rho}{\rho}$ OTFL. $\times 10^3$	SOUND VELOCITY	O ₂ ml/l	PO ₄ -P $\mu\text{g} \cdot \text{dl}^{-1}$	TOTAL-P $\mu\text{g} \cdot \text{dl}^{-1}$	NO ₃ -N $\mu\text{g} \cdot \text{dl}^{-1}$	NO ₃ -N $\mu\text{g} \cdot \text{dl}^{-1}$	SiO ₄ -Si $\mu\text{g} \cdot \text{dl}^{-1}$	pH
		STD	0000	0706	3105	2433	0030048	0000	14741	716						
099		OBS	0000	0706	31054	2433			14741	716	021		001	000	006	
099		OBS	0005	0712	31054	2432			14744	719	022		000	000	006	
		STD	0010	0708	3107	2434	0035950	0036	14744	721						
099		OBS	0010	0708	31071	2434			14744	721	024		001	000	006	
099		OBS	0015	0706	31106	2437			14744	722	024		000	000	006	
		STD	0020	0517	3139	2482	0031375	0069	14672	821						
099		OBS	0020	0517	31390	2482			14672	821	026		001	000	006	
099		OBS	0025	-0022	32058	2577			14446	1072	041		000	000	007	
		STD	0030	-0102	3212	2585	0021614	0096	14410	1106						
099		OBS	T0030	-0102	32121	2585			14410	1106	047		000	TRC	006	
099		OBS	0040	-0158	32191	2592			14387	777	157		010	129	019	
		STD	0050	-0167	3223	2595	0020602	0136	14385	771						
099		OBS	0050	-0167	32230	2595			14385	771	178		022	141	035	
099		OBS	T0055	-0166	32248	2596			14386	772	182		015	145	036	

MESSING TIME HR 1/10	CAS NO.	CARD TYPE	DEPTH (m)	T °C	S %	SIGMA-T	SPECIFIC VOLUME ANOMALY-SIB*	$\frac{\Delta \rho}{\rho}$ OTH. M. $\times 10^3$	SOUND VELOCITY	O ₂ ml/l	PO ₂ -P $\mu\text{g} \cdot \text{at/l}$	TOTAL-P $\mu\text{g} \cdot \text{at/l}$	NO ₂ -N $\mu\text{g} \cdot \text{at/l}$	NO ₃ -H $\mu\text{g} \cdot \text{at/l}$	SiO ₂ -Si $\mu\text{g} \cdot \text{at/l}$	pH
143		STD	0000	0506	3217	2536	0026250	0000	14708	840						
143		OBS	0000	0506	3217	2536			14708	840	043		001	000	003	
143		OBS	0005	0579	32254	2543			14707	854	061		002	TRC	005	
143		STD	0010	0535	3241	2561	0023893	0025	14692	856						
143		OBS	0010	0535	3241	2561			14692	856	058		002	TRC	008	
143		OBS	0015	0520	32477	2568			14687	838	039		004	013	009	
143		STD	0020	0489	3254	2576	0022423	0048	14676	805						
143		OBS	0020	0469	32542	2576			14676	805	081		012	030	015	
143		OBS	0025	0260	32906	2626			14593	736	153		017	136	033	
143		STD	0030	0218	3303	2641	0016291	0067	14569	650						
143		OBS	T0030	0218	33035	2641			14569	650	202		020	200	047	
143		OBS	0040	0115	33027	2647			14524	651	220		009	248	057	
143		STD	0050	0107	3302	2648	0015039	0099	14522	651						
143		OBS	T0050	0107	33024	2648			14522	651	238		013	251	058	

MESSAGE TIME HR 1/10	CAS NO.	CARD TYPE	DEPTH (m)	T °C	S %	SIGMA-T	SPECIFIC VOLUME ANOMALY- σ_t	$\Delta \sigma$ DTN. M. $\times 10^3$	SOUND VELOCITY	O ₂ ml/l	PO ₂ -P $\mu g - \text{at/l}$	TOTAL-P $\mu g - \text{at/l}$	NO ₂ -N $\mu g - \text{at/l}$	NO ₃ -N $\mu g - \text{at/l}$	SiO ₂ -Si $\mu g - \text{at/l}$	pH
172		STD	0000	0470	3233	2562	0023784	0000	14602	673						
172		0BS	0000	0470	32333	2562			14602	873	005		002	001	005	
172		0BS	0005	0476	32334	2561			14605	880	051		001	002	005	
172		STD	0010	0470	3234	2562	0023774	0023	14604	881						
172		0BS	0010	0470	32336	2562			14604	881	055		000	002	004	
172		0BS	0015	0424	32367	2569			14606	840	066		002	008	008	
172		STD	0020	0351	3240	2575	0022509	0046	14633	806						
172		0BS	0020	0351	32403	2575			14635	806	083		007	033	013	
172		0BS	0025	0200	32817	2625			14557	680	179		015	179	038	
172		STD	0030	0151	3301	2644	0015973	0000	14539	541						
172		0BS	T0030	0151	33015	2644			14539	641	211		014	216	045	
172		0BS	0040	0138	33022	2645			14535	637	240		016	230	056	
172		STD	0050	0139	3302	2646	0015843	0038	14537	626						
172		0BS	T0050	0139	33023	2646			14537	626	237		015	227	056	

REFERENCE	SHIP CODE	LATITUDE ° 1/10	LONGITUDE ° 1/10	DRIFT INDICATOR	MARSDEN SQUARE		STATION TIME (GMT)			YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'MPL'S	WAVE OBSERVATIONS			WEA- THER CODE	CLOUD CODES		NOOC STATION NUMBER
					10"	1"	MO	DAY	HR.1/10		CRUISE NO.	STATION NUMBER			DIR.	HGT	PER	SEA	TYPE	AMT	

MESSAGE TIME HR 1/10	CAS NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T	SPECIFIC VOLUME ANOMALY- σ_{θ}	$\Sigma \Delta \theta$ DYN. M. x 10 ³	SOUND VELOCITY	O ₂ ml/l	PO ₄ -P µg · at/l	TOTAL-P µg · at/l	NO ₂ -N µg · at/l	NO ₃ -N µg · at/l	SiO ₄ -Si µg · at/l	pH	S C
		STD	0000	0566	3001	2366	0042475	0000	14079	727							
212		OBS	0000	0566	30009	2360			14079	727	081		013	041	019		
212		OBS	0005	0568	30011	2360			14081	731	099		011	045	019		
		STD	0010	0526	3088	2441	0035319	0036	14068	716							
212		OBS	0010	0526	30877	2441			14068	716	114		012	055	019		
212		OBS	0015	0145	32596	2643			14533	505	223		019	173	037		
		STD	0020	0146	3300	2643	0013067	0064	14535	505							
212		OBS	0020	0146	32599	2643			14535	505	231		019	175	037		
212		OBS	0025	0144	32997	2643			14534	503	238		020	170	037		
		STD	0030	0144	3300	2643	0016077	0080	14535	503							
212		OBS	T0030	0144	32597	2643			14535	503	234		021	171	038		
212		OBS	T0040	0144	32596	2643			14537	502	235		021	167	037		

REFERENCE	SHIP CODE	LATITUDE ° 1/10	LONGITUDE ° 1/10	DRIFT INDICATOR	MARSDEN SQUARE		STATION TIME (GMT)			YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'MPL'S	WAVE OBSERVATIONS			WEA- THER CODE	CLOUD CODES		NOOC STATION NUMBER
					10"	1"	MO	DAY	HR.1/10		CRUISE NO.	STATION NUMBER			DIR.	HGT	PER	SEA	TYPE	AMT	

MESSAGE TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T	SPECIFIC VOLUME ANOMALY- σ_{θ}	$\Sigma \Delta \theta$ DYN. M. $\times 10^3$	SOUND VELOCITY	O ₂ ml/l	PO ₄ -P $\mu\text{g} \cdot \text{at/l}$	TOTAL-P $\mu\text{g} \cdot \text{at/l}$	NO ₂ -N $\mu\text{g} \cdot \text{at/l}$	NO ₃ -N $\mu\text{g} \cdot \text{at/l}$	SiO ₄ -Si $\mu\text{g} \cdot \text{at/l}$	pH	S C
		STD	0000	0568	3101	2445	0034939	0000	14693	800							
009		OBS	0000	0568	31015	2445			14093	800	061		003	002	007		
009		OBS	0005	0565	31017	2445			14693	798	056		002	001	005		
		STD	0010	0355	3176	2528	0027053	0031	14007	724							
009		OBS	0010	0355	31757	2528			14607	724	105		013	040	013		
009		OBS	0015	0324	31922	2543			14537	715	117		014	048	015		
		STD	0020	-0013	3332	2678	0012730	0050	14467	659							
009		OBS	0020	-0013	33324	2678			14467	639	200		019	088	033		
009		OBS	0025	-0160	33563	2735			14408	608	238		041	141	058		

REFERENCE	SHIP CODE	LATITUDE ° 1/10	LONGITUDE ° 1/10	DRIFT INDICATOR	MARSDEN SQUARE		STATION TIME (GMT)			YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'MPL'S	WAVE OBSERVATIONS			WEA- THER CODE	CLOUD CODES		NOOC STATION NUMBER
					10"	1"	MO	DAY	HR.1/10		CRUISE NO.	STATION NUMBER			DIR.	HGT	PER	SEA	TYPE	AMT	

MESSAGE TIME HR 1/10	CAS NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T	SPECIFIC VOLUME ANOMALY- σ_t	$\Sigma \Delta \theta$ DYN. M. $\times 10^3$	SOUND VELOCITY	O ₂ ml/l	PO ₄ -P $\mu\text{g} \cdot \text{at/l}$	TOTAL-P $\mu\text{g} \cdot \text{at/l}$	NO ₂ -N $\mu\text{g} \cdot \text{at/l}$	NO ₃ -N $\mu\text{g} \cdot \text{at/l}$	SiO ₄ -Si $\mu\text{g} \cdot \text{at/l}$	pH
		STD	0000	0607	3113	2451	0034312	0000	14702	856						
042		OBS	0000	0607	31128	2451			14702	850	059		003	001	007	
042		OBS	0005	0535	31263	2470			14676	813	067		007	008	007	
		STD	0010	0376	3189	2536	0026219	0030	14618	740						
042		OBS	0010	0376	31892	2536			14618	740	132		012	075	014	
042		OBS	0015	0316	32140	2561			14597	693	161		012	079	016	
		STD	0020	0239	3252	2598	0020381	0053	14569	645						
042		OBS	0020	0239	32516	2598			14509	645	190		014	095	017	
042		OBS	0025	0122	33008	2645			14525	622	237		017	138	029	
		STD	0030	0120	3301	2646	0015813	0071	14525	617						
042		OBS	T0030	0120	33012	2646			14525	617	241		018	136	030	
042		OBS	0035	-0091	33675	2710			14438	560	257		021	118	046	
042		OBS	T0040	-0133	33845	2725			14422	581	269		024	113	055	

REFERENCE CRST CODE	SHIP NO.	SNIP CODE	LATITUDE ° 1/10	LONGITUDE ° 1/10	STATION TIME (GMT)	WASSEN SQUARE		STATION TIME (GMT)		YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'AMPL'S	WAVE OBSERVATIONS				WEATHER CODE	CLOUD CODES		NODC STATION NUMBER																												
						10°	1°	MO	DAY		HR./10	CRUISE NO.			STATION NUMBER	DIR.	HGT	PER		SEA	TYPE		AMT																											
311695	NW		6430 N	17741 W	234	47	05	07	075	1970	GAS	025	0055	1	07	1	4		X1	4	2		0025																											
<table><tr><th colspan="2">WATER</th><th colspan="2">WIND</th><th rowspan="2">BARO- METER (mb)</th><th colspan="2">AIR TEMP. °C</th><th rowspan="2">VIS. CODE</th><th rowspan="2">NO. OBS. DEPTHS</th><th rowspan="2">SPECIAL OBSERVATIONS</th></tr><tr><th>COLOR CODE</th><th>TRANS. (m)</th><th>DIR.</th><th>SPEED OR FORCE</th><th>DRY BULB</th><th>WET BULB</th></tr><tr><td></td><td></td><td></td><td>34</td><td>505</td><td>043</td><td>075</td><td>059</td><td>3</td><td>09</td><td></td></tr></table>																								WATER		WIND		BARO- METER (mb)	AIR TEMP. °C		VIS. CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS	COLOR CODE	TRANS. (m)	DIR.	SPEED OR FORCE	DRY BULB	WET BULB				34	505	043	075	059	3	09	
WATER		WIND		BARO- METER (mb)	AIR TEMP. °C		VIS. CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS																																									
COLOR CODE	TRANS. (m)	DIR.	SPEED OR FORCE		DRY BULB	WET BULB																																												
			34	505	043	075	059	3	09																																									

MESSAGE TIME OF HR 1/10	CARD NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T	SPECIFIC VOLUME ANOMALY- σ_t	$\Sigma \Delta \sigma$ DYN. M. $\times 10^3$	SOUND VELOCITY	O ₂ ml/l	PO ₄ -P $\mu\text{g} - \text{dl/l}$	TOTAL-P $\mu\text{g} - \text{dl/l}$	NO ₂ -N $\mu\text{g} - \text{dl/l}$	NO ₃ -N $\mu\text{g} - \text{dl/l}$	SiO ₄ -Si $\mu\text{g} - \text{dl/l}$	pH	STATION
		STD	0000	0614	3221	2530	0020207	0000	14720	049							
075	005	0000	0614	32205	2530				14720	049							
075	005	0005	0610	32218	2530				14721	005	033		000	000	005		
		STD	0010	0566	3221	2539	0025970	0026	14710	020							
075	005	0010	0566	32210	2539				14710	020	033		000	000	005		
075	005	0015	0571	32220	2542				14705	001	042		000	003	007		
		STD	0020	0370	3252	2587	0021457	0049	14520	744							
075	005	0020	0370	32517	2587				14520	744	109		009	005	022		
075	005	0025	0121	32770	2627				14521	070	203		012	179	044		
		STD	0030	0070	3288	2638	0010578	0063	14503	055							
075	005	T0030	0070	32878	2638				14503	055	224		010	207	052		
075	005	0040	0107	32562	2643				14520	022	242		018	210	055		
		STD	0050	0125	3301	2645	0015077	0101	14530	591							
075	005	T0050	0125	33007	2645				14530	591	200		017	204	057		

REFERENCE CITY CODE	SHIP CODE	LATITUDE ° 1/10	LONGITUDE ° 1/10	OUT BOAT	W/RSOEN SQUARE	STATION TIME (GMT)		YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF SMP'L'S	WAVE OBSERVATIONS		WEA- THER CODE	CLOUD CODES	NODC STATION NUMBER																										
						MO	DAY		HR./10	CRUISE NO.			STATION NUMBER	DR.				HGT PER SEA	TYPE	AMT																							
311695	NW	6431 N	17705 W	234	47	05	07 106	1970	GAS	025	0055	1	11	0 4	X1	00	0026																										
<table><tr><th colspan="2">WATER</th><th colspan="2">WIND</th><th rowspan="2">BARO- METER (mb)</th><th colspan="2">AIR TEMP. °C</th><th rowspan="2">VIS. CODE</th><th rowspan="2">NO. OBS. DEPTHS</th><th rowspan="2">SPECIAL OBSERVATIONS</th></tr><tr><th>COLOR CODE</th><th>TRANS. (m)</th><th>DR.</th><th>SPEED OR FORCE</th><th>DRY BULB</th><th>WET BULB</th></tr><tr><td></td><td></td><td></td><td>34</td><td>505</td><td>040</td><td>075</td><td>001</td><td>09</td><td></td></tr></table>																		WATER		WIND		BARO- METER (mb)	AIR TEMP. °C		VIS. CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS	COLOR CODE	TRANS. (m)	DR.	SPEED OR FORCE	DRY BULB	WET BULB				34	505	040	075	001	09	
WATER		WIND		BARO- METER (mb)	AIR TEMP. °C		VIS. CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS																																		
COLOR CODE	TRANS. (m)	DR.	SPEED OR FORCE		DRY BULB	WET BULB																																					
			34	505	040	075	001	09																																			

MESSAGE TIME OF HR 1/10	CARD NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T	SPECIFIC VOLUME ANOMALY- σ_t	$\Sigma \Delta \sigma$ DYN. M. $\times 10^3$	SOUND VELOCITY	O ₂ ml/l	PO ₄ -P $\mu\text{g} - \text{dl/l}$	TOTAL-P $\mu\text{g} - \text{dl/l}$	NO ₂ -N $\mu\text{g} - \text{dl/l}$	NO ₃ -N $\mu\text{g} - \text{dl/l}$	SiO ₄ -Si $\mu\text{g} - \text{dl/l}$	pH	STATION
		STD	0000	0674	3161	2401	0031523	0000	14730	735							
106	005	0000	0674	31606	2481				14730	735	018		000	000	006		
106	005	0005	0675	31631	2482				14737	742	020		000	000	005		
		STD	0010	0648	3172	2493	0030327	0030	14728	705							
106	005	0010	0648	31725	2493				14728	705	023		000	000	006		
106	005	0015	0567	32010	2523				14706	822	026		000	000	005		
		STD	0020	0583	3219	2538	0020553	0059	14710	840							
106	005	0020	0583	32195	2538				14710	840	031		000	000	006		
106	005	0025	0557	32258	2546				14701	807	045		001	006	010		
		STD	0030	0257	3269	2611	0019172	0061	14581	742							
106	005	0030	0257	32694	2611				14581	742	117		009	078	026		
106	005	0040	0116	32540	2641				14524	054	215		012	185	052		
		STD	0050	0105	3298	2645	0015928	0116	14521	624							
106	005	T0050	0105	32984	2645				14521	624	239		011	192	056		

REFERENCE <small>CRUISE NO.</small>	SHIP CODE	LATITUDE ° 1/10	LONGITUDE ° 1/10	WASSEN SQUARE	STATION TIME (GMT)		YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF SAMPL'S	WAVE OBSERVATIONS				WEA- THER CODE	CLOUD CODES		NODC STATION NUMBER																										
					MO	DAY		HR./10	CRUISE NO.			STATION NUMBER	DR.	HGT	PER		SEA	TYPE		AMT																									
311695	NW	6430 N	17007 W	234	40	00	07 137	1970	GAS	027	0055	1	11	1	4	X1	6	7	0027																										
<table><tr><th colspan="2">WATER</th><th colspan="2">WIND</th><th rowspan="2">BARO- METER (mb)</th><th colspan="2">AIR TEMP. °C</th><th rowspan="2">VIS. CODE</th><th rowspan="2">NO. OBS. DEPTHS</th><th rowspan="2">SPECIAL OBSERVATIONS</th></tr><tr><th>COLOR CODE</th><th>TRANS. (m)</th><th>DIR.</th><th>SPEED OR FORCE</th><th>DRY BULB</th><th>WET BULB</th></tr><tr><td></td><td></td><td></td><td>30</td><td>502</td><td>044</td><td>080</td><td>0</td><td>09</td><td></td></tr></table>																				WATER		WIND		BARO- METER (mb)	AIR TEMP. °C		VIS. CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS	COLOR CODE	TRANS. (m)	DIR.	SPEED OR FORCE	DRY BULB	WET BULB				30	502	044	080	0	09	
WATER		WIND		BARO- METER (mb)	AIR TEMP. °C		VIS. CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS																																				
COLOR CODE	TRANS. (m)	DIR.	SPEED OR FORCE		DRY BULB	WET BULB																																							
			30	502	044	080	0	09																																					

MESSAGE TIME OF HR 1/10	CARD NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T	SPECIFIC VOLUME ANOMALY- σ_t	$\Sigma \Delta \sigma$ DYN. M. $\times 10^3$	SOUND VELOCITY	O ₂ ml/l	PO ₄ -P $\mu\text{g} - \text{dl/l}$	TOTAL-P $\mu\text{g} - \text{dl/l}$	NO ₂ -N $\mu\text{g} - \text{dl/l}$	NO ₃ -N $\mu\text{g} - \text{dl/l}$	SiO ₄ -Si $\mu\text{g} - \text{dl/l}$	pH	STATION
		STD	0000	0752	3154	2465	0032586	0000	14760	720							
137	005	0000	0752	31542	2465				14760	720	014		000	000	005		
137	005	0005	0747	31544	2460				14704	724	016		000	000	005		
		STD	0010	0691	3157	2470	0031980	0032	14744	735							
137	005	0010	0691	31574	2470				14744	735	017		000	000	005		
137	005	0015	0603	31578	2477				14741	736	017		000	000	005		
		STD	0020	0538	3173	2507	0024017	0063	14686	811							
137	005	0020	0530	31734	2507				14686	811	024		000	TRC	006		
137	005	0025	0015	32273	2592				14466	935	090		008	015	017		
		STD	0030	0130	3278	2626	0017650	0086	14526	1021							
137	005	T0030	0130	32778	2626				14526	1021	087		008	015	006		
137	005	0040	0061	32557	2644				14503	588	243		011	182	057		
		STD	0050	0081	3255	2643	0010034	0120	14510	580							
137	005	T0050	0081	32552	2643				14510	580	247		014	181	057		

REFERENCE		SHIP CODE	LATITUDE " 1/10	LONGITUDE " 1/10	WATSON SQUARE	STATION TIME (GMT)	YEAR	ORIGINATOR'S		DEPTH BOTTOM	MAR. DEPTH OF S'AMPL'S	WAVE OBSERVATIONS				WEATHER CODE	CLOUD CODES		NODC STATION NUMBER
CRUISE CODE	IO. NO.							CRUISE NO.	STATION NUMBER			DIR.	HGT	PER	SEA		TYPE	AMT	
311695	NW		6500 N	17657 W	234	56 08 07 181	1970	GAS	020	0026	1	17	1	3	X1	3	5	0028	
WATER		WIND		BARO-METER (mb)	AIR TEMP. °C		VIS. CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS										
COLOR CODE	TRANS. (m)	DIR.	SPEED OR FORCE		DRY BULB	WET BULB													
		04	506	049	078	004	7	06											

MESSAGE TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T	SPECIFIC VOLUME ANOMALY-2107	$\Sigma \Delta \sigma$ DYN. M. $\times 10^3$	SOUND VELOCITY	O ₂ ml/l	PO ₄ -P $\mu\text{g} - \text{at/l}$	TOTAL-P $\mu\text{g} - \text{at/l}$	NO ₂ -N $\mu\text{g} - \text{at/l}$	NO ₃ -N $\mu\text{g} - \text{at/l}$	SiO ₄ -Si $\mu\text{g} - \text{at/l}$	pH	1 °C
		STD	0000	0734	3113	2435	0035839	0000	14753	720							
181		OBS	0005	0734	31129	2435			14753	720	028		000	000	006		
181		OBS	0005	0740	31141	2435			14750	720	027		000	000	005		
		STD	0010	0737	3113	2435	0035842	0035	14756	722							
181		OBS	0010	0737	31135	2435			14756	722	026		000	000	006		
181		OBS	0015	0736	31130	2435			14750	720	025		000	000	005		
		STD	0020	0676	3127	2454	0034052	0070	14735	715							
181		OBS	0020	0676	31274	2454			14735	715	030		000	000	006		
181		OBS	0025	0356	32313	2571			14615	777	071		000	000	008		

REFERENCE		SHIP CODE	LATITUDE ° 1/10	LONGITUDE ° 1/10	OBS. HOUR	WATSON SQUARE		STATION TIME (GMT)		YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAR. DEPTH OF S'AMPL'S	WAVE OBSERVATIONS				WEATHER CODE	CLOUD CODES		NOCC STATION NUMBER																										
CRUISE CODE	ID. NO.					10"	1"	MO	DAY		HR	1/10			CRUISE NO.	STATION NUMBER	DIR.	HGT		PER	SEA		TYPE	AMT																								
311695	NW	6500 N	17746 W	234	57	08	07	213	1970	GAS	029	0036	1	17	1	2		11	3	2		0029																										
<table><tr><th colspan="2">WATER</th><th colspan="2">WIND</th><th rowspan="2">BARO- METER (mb)</th><th colspan="2">AIR TEMP. °C</th><th rowspan="2">VIS. CODE</th><th rowspan="2">NO. OBS. DEPTHS</th><th rowspan="2">SPECIAL OBSERVATIONS</th></tr><tr><th>COLOR CODE</th><th>TRANS. (m)</th><th>DIR.</th><th>SPEED OR FORCE</th><th>DRY BULB</th><th>WET BULB</th></tr><tr><td></td><td></td><td>08</td><td>505</td><td>001</td><td>084</td><td>071</td><td>8</td><td>10</td><td></td></tr></table>																							WATER		WIND		BARO- METER (mb)	AIR TEMP. °C		VIS. CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS	COLOR CODE	TRANS. (m)	DIR.	SPEED OR FORCE	DRY BULB	WET BULB			08	505	001	084	071	8	10	
WATER		WIND		BARO- METER (mb)	AIR TEMP. °C		VIS. CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS																																							
COLOR CODE	TRANS. (m)	DIR.	SPEED OR FORCE		DRY BULB	WET BULB																																										
		08	505	001	084	071	8	10																																								

MESSAGE TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T	SPECIFIC VOLUME ANOMALY-2107	$\Sigma \Delta \sigma$ DYN. M. $\times 10^3$	SOUND VELOCITY	O ₂ ml/l	PO ₄ -P $\mu\text{g} - \text{at/l}$	TOTAL-P $\mu\text{g} - \text{at/l}$	NO ₂ -N $\mu\text{g} - \text{at/l}$	NO ₃ -N $\mu\text{g} - \text{at/l}$	SiO ₄ -Si $\mu\text{g} - \text{at/l}$	pH	1 °C
		STD	0000	0730	3150	2465	0033040	0000	14750	787							
213		OBS	0000	0730	31496	2465			14756	787	016		000	000	002		
213		OBS	0005	0718	31484	2465			14752	787	020		000	000	003		
		STD	0010	0663	3148	2472	0032315	0032	14731	814							
213		OBS	0010	0663	31483	2472			14731	814	027		000	000	003		
213		OBS	0015	0479	32161	2547			14666	768	051		000	001	005		
		STD	0020	0191	3292	2634	0016947	0057	14553	583							
213		OBS	0020	0191	32923	2634			14553	583	180		027	044	010		
213		OBS	0025	0131	33038	2647			14529	532	202		017	127	016		
		STD	0030	0132	3307	2650	0015461	0073	14531	509							
213		OBS	0030	0132	33068	2650			14531	509	208		015	137	011		
213		OBS	0040	-0030	33352	2682			14400	648	188		017	053	022		
		STD	0050	-0166	3414	2750	0005917	0094	14412	541							
213		OBS	0050	-0166	34142	2750			14412	541	263		022	116	065		
213		OBS	0055	-0167	34142	2750			14412	530	207		023	113	059		

REFERENCE		SHIP CODE	LATITUDE ° 1/10	LONGITUDE ° 1/10	WATSON SQUARE	STATION TIME (GMT)		YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAR. DEPTH OF S'AMPL'S	WAVE OBSERVATIONS				WEATHER CODE	CLOUD CODES		NOCC STATION NUMBER
CRUISE NO.	IO. NO.					MO	DAY		HR.1/10	CRUISE NO.			STATION NUMBER	DIR.	HGT	PER		SEA	TYPE	
311695	NW	6500 N	17842 W	234	58 08 08 021	1970	GAS	030	0000	1	23	0	2		X1	8	1		0030	
WATER		WIND		BARO-METER (mb)	AIR TEMP. °C		VIS. CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS											
COLOR CODE	TRANS. (m)	DIR.	SPEED OR FORCE		DRY BULB	WET BULB														
		23	509	075	064	070	8	09												

MESSAGE TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T	SPECIFIC VOLUME ANOMALY-2107	$\Sigma \Delta \sigma$ DYN. M. $\times 10^3$	SOUND VELOCITY	O ₂ ml/l	PO ₄ -P $\mu\text{g} - \text{at/l}$	TOTAL-P $\mu\text{g} - \text{at/l}$	NO ₂ -N $\mu\text{g} - \text{at/l}$	NO ₃ -N $\mu\text{g} - \text{at/l}$	SiO ₄ -Si $\mu\text{g} - \text{at/l}$	pH	1 °C
		STD	0000	0753	3112	2426	0036084	0000	14776	786							
021		OBS	0000	0753	31119	2426			14776	786	013		000	001	001		
021		OBS	0005	0749	31123	2433			14760	804	016		000	001	001		
		STD	0010	0715	3118	2442	0035187	0035	14748	830							
021		OBS	0010	0715	31185	2442			14748	830	021		000	001	001		
021		OBS	0015	0487	31595	2533			14667	812	058		000	001	004		
		STD	0020	0161	3259	2641	0016267	0061	14541	573							
021		OBS	0020	0161	32586	2641			14541	573	172		046	001	003		
021		OBS	0025	0136	33019	2645			14531	527	211		020	130	008		
		STD	0030	0120	3305	2649	0015487	0077	14525	516							
021		OBS	0030	0120	33054	2649			14525	516	219		019	149	022		
021		OBS	0040	0026	33308	2675			14489		265		027	129	038		
		STD	0050	-0163	3355	2734	0007377	0100	14411	432							
021		OBS	0050	-0163	33552	2734			14411	432	200		034	125	058		

U.S. Coast Guard Oceanographic Reports (CG 373 Series)

- CG 373-1 (AD 440388). Gladfelter, W. H. (1964). Oceanographic Cruise USCGC NORTHWIND, Bering and Chukchi Seas, July-September 1962.
- CG 373-2 (AD 667824). Morse, R. M. and J. W. McGary (1964). Oceanographic Observations at North Atlantic Ocean Station ECHO, 35°N, 48°W, January-February 1963.
- CG 373-3 (AD 601671). McGary, J. W. and R. M. Morse (1964). Oceanographic Observations at North Atlantic Ocean Station DELTA, 44°N, 41°W, March-April 1963.
- CG 373-4 (AD 454851). Kollmeyer, R. C., J. W. McGary, and R. M. Morse (1964). Oceanographic Observations, Tropical Atlantic Ocean, EQUALANT II, August 1963.
- CG 373-5 (AD 454852). Franceschetti, A. P., D. A. McGill, N. Corwin, and Elazar Uchupi (1964). Oceanographic Observations Kennedy Channel, Kane Basin, Smith Sound and Baffin Bay, Summer 1963.
- CG 373-6 (AD 465779). Gladfelter, W. H. and L. A. Codispoti (1965). Oceanographic Cruise USCGC NORTHWIND, Chukchi, East Siberian, and Laptev Seas, August-September 1963.
- CG 373-7 (AD 467887). McGary, J. W. (1965). Oceanographic Observations at North Atlantic Ocean Station BRAVO, January-April 1964.
- CG 373-8 (AD 667825). Husby, D. M. (1966). Oceanographic Observations at North Atlantic Ocean Station CHARLIE, June 1964-January 1965.
- CG 373-9 (AD 667637). Husby, D. M. (1967). Oceanographic Observations at North Atlantic Ocean Station BRAVO, August 1964-August 1965.
- CG 373-10 (AD 468177). Kollmeyer, R. C., R. M. O'Hagan, R. M. Morse, D. A. McGill, and N. Corwin (1965). Oceanography of the Grand Banks region and the Labrador Sea in 1964.
- CG 373-11 (AD 667827). Kollmeyer, R. C., T. C. Wolford, and R. M. Morse (1966). Oceanography of the Grand Banks Region of Newfoundland in 1965.
- CG 373-12 (AD 667826). Kollmeyer, R. C., D. A. McGill, and N. Corwin (1967). Oceanography of the Labrador Sea in the vicinity of Hudson Straits in 1965.
- CG 373-13 (PB 189277). Wolford, T. C. (1966). Oceanography of the Grand Banks Region and the Labrador Sea in 1966.
- CG 373-14 (AD 667636). Husby, D. M. (1968). Oceanographic Observations North Atlantic Ocean Station BRAVO, October 1965-September 1966.
- CG 373-15 (AD 670066). Husby, D. M. (1968). Oceanographic Observations at North Pacific Ocean Station VICTOR, December 1964-August 1965.
- CG 373-16 (AD 681144). Palfrey, K. M. (1968). Oceanography of Baffin Bay and Nares Strait in the summer of 1966.
- CG 373-17 (AD 691475). Husby, D. M. (1968). Oceanographic observations at North Atlantic Ocean Station CHARLIE, May 1966-March 1967.
- CG 373-18 (AD 676723). Husby, D. M. (1968). Oceanographic observations at North Pacific Ocean Station NOVEMBER, July 1966-February 1967.
- CG 373-19 (AD 693453). Morgan, C. W. (1968). Oceanography of the Grand Banks Region of Newfoundland in 1967.
- CG 373-20 (AD 692967). Shuhly, J. L. (1969). Oceanographic observations at North Atlantic Ocean Station BRAVO, October 1966-October 1967.
- CG 373-21 (AD 693459). Shuhly, J. L. (1968). Oceanographic observations at North Atlantic Ocean Station ECHO, October 1966-October 1967.
- CG 373-22 (AD 692873). Stanley, D. J. and G. Kelling (1968). Smithsonian geological investigation of Wilmington Submarine Canyon, USCGC ROCKAWAY, December 1967.
- CG 373-23 (AD 692874). Husby, D. M. (1968). Oceanographic observations at North Atlantic Ocean Station DELTA, July 1966-August 1967.
- CG 373-24 (PB 189278). Husby, D. M. (1969). Report of Oceanographic Cruise, USCGC NORTHWIND, Northern Bering Sea-Bering Strait-Chukchi Sea, July 1967.
- CG 373-25 (AD 695438). Garcia, A. W. (1969). Oceanographic Results of Kara Barents Sea Survey 1967.
- CG 373-26 (PB 189179). Husby, D. M. (1969). Oceanographic observations North Pacific Ocean Station NOVEMBER, March 1967-March 1968.
- CG 373-27 (PB 189180). Shuhly, J. L. (1969). Oceanographic observations North Pacific Ocean Station VICTOR, October 1966-October 1967, and Husby, D. M. (1969). Seasonal Variation of Oceanographic Conditions from Ocean Station VICTOR to the Coast of Japan along 34°N latitude, January 1966-October 1967.
- CG 373-28 (PB 195835). Elder, R. B. Oceanographic observations between Iceland and Scotland, July-November 1965.
- CG 373-29 (AD 862933). Chase, J. Associate Scientist, Woods Hole Oceanographic Institution Woods Hole, Mass. Oceanographic Observations East Coast of the United States, 1966.

- CG 373-30 (PB 195893). Elder, R. B. and J. M. Seabrooke (1970). Oceanography of the Weddell Sea, 1968.
- CG 373-31 (PB 192289). Hufford, G. L. and J. M. Seabrooke (1970). Oceanography of the Weddell Sea (IWSOE), February-March 1969.
- CG 373-32 (PB 192290). Husby, D. M. (1970). Oceanographic Observations North Atlantic Standard Monitoring Sections 1964-66.
- CG 373-33 (PB 192672). Hufford, G. L. and E. J. Tennyson, Jr. (1970). Distribution of Nutrients in the Weddell Sea, February-March 1968 and February-March 1969.
- CG 373-34 (5). Ingham, M. C. and R. B. Elder Oceanic Conditions Off Northeastern Brazil, February-March and October-November 1966.
- CG 373-35 (5). Whitcomb, V. L. Oceanography of the Mid-Atlantic Bight in Support of ICNAF, September-December 1967.
- CG 373-36 (AD 772452). Turner, R. The Significance of Color Bending in the Upper Layers of Kara Sea Sediments.
- CG 373-37 (PB 198355). Muench, Tidmarch, Moynihan, Tennyson, and Thereau. Oceanographic Observations in Baffin Bay during 1968.
- CG 373-38 (5). Chase, J. Oceanographic Observations Along the East Coast of the United States, January-December 1967.
- CG 373-39 (5). Anderson, H. S. and Moynihan, M. J. Oceanography of the Grand Banks Region and the Labrador Sea, April-June and October 1968.
- CG 373-40 (5). Husby, D. M. Oceanographic Investigations in the Northern Bering Sea and Bering Strait, June-July 1968.
- CG 373-41 (5). Anderson, H. S. The Labrador Current Between Hamilton Inlet and the Strait of Belle Isle, July 1968.
- CG 373-42 (5). Husby, D. M. and Hufford, G. L. Oceanographic Investigation of the Northern Bering Sea and Bering Strait, 8-21 June 1969.
- CG 373-43 (5). Robe, Q. Oceanographic Observations, North Atlantic Standard Monitoring Sections A1-A4, 1967 and 1968.
- CG 373-44 (5). Muench, Moynihan, M. J. Oceanographic Observations in Baffin Bay during 1969.
- () Accession number to be used when ordering publications from:
 Department of Commerce
 Operations Division
 National Technical Information Service
 Springfield, Va. 22151

532-AA

Woods Hole Oceanographic Institution
ATLAS - GAZETTEER COLLECTION