

# INDIAN OCEAN EXPEDITION

Volume 5  
Hydrographic Data



National Science Foundation • Washington, D.C.

**GEOSECS**  
**INDIAN OCEAN EXPEDITION**

Volume 5  
**HYDROGRAPHIC DATA**  
**1977-1978**

By  
Ray F. Weiss, Wallace S. Broecker, Harmon Craig, Derek Spencer

Sponsored by  
International Decade of Ocean Exploration  
National Science Foundation

June 1983

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ARNOLD E. BAINBRIDGE  
December 16, 1930—February 27, 1979

In memory of friendship and the pleasure of his company,  
in recognition of his many contributions to the GEOSECS  
program:

This book, which is primarily the result of his efforts, is  
gratefully and affectionately dedicated by his colleagues and  
shipmates.



## Foreword

The GEOSECS Program was conceived by a handful of far-sighted geochemists and physical oceanographers in 1967. They successfully organized their scientific colleagues, developed a solid scientific and logistics plan, and carried out preliminary field work so that the Program was ready to begin simultaneously with the initiation of the International Decade of Ocean Exploration in 1970.

The members of that original GEOSECS panel were as follows:

Wallace S. Broecker, *Lamont-Doherty Geological Observatory*  
Harmon Craig, *Scripps Institution of Oceanography*  
H. Gote Ostlund, *University of Miami*  
P. Kilho Park, *Oregon State University*  
Joseph L. Reid, *Scripps Institution of Oceanography*  
Derek W. Spencer, *Woods Hole Oceanographic Institution*  
Henry M. Stommel, *Massachusetts Institute of Technology*  
Taro Takahashi, *Lamont-Doherty Geological Observatory*  
Karl K. Turekian, *Yale University*  
Herbert L. Volchok, *Atomic Energy Commission*

The objective of the program was "the study of the geochemical properties of the ocean with respect to large-scale circulations problems." The goals for measurement accuracies, which the scientists set for themselves, were so rigorous that each shipboard and shoreside laboratory measurement was at the very forefront of the technology. Nevertheless, within the eighteen months between the start of the program in January 1971 and the start of the Atlantic transect in July 1972, the shipboard sampling and analytical tools were designed, constructed, and installed,

and the shoreside laboratory construction and improvements were completed. The analytical goals were met or exceeded in all cases.

The responsibilities for upgrading the shoreside laboratories were assumed by the individual scientist at each institution. But, the responsibility for the shipboard equipment rested entirely with one man, Mr. Arnold E. Bainbridge of the Scripps Institution of Oceanography. The oceanographic community owes Mr. Bainbridge and his highly skilled technicians who formed GEOSECS Operations Group a debt of gratitude for their heroic efforts in preparation of the ships for the work to be done at sea, and for the excellence of the shipboard sampling and analyses.

These Atlas volumes were compiled by Mr. Bainbridge and the other GEOSECS scientists with the same care that typifies the collection and analyses of samples. They are now ready to take their place in oceanographic literature along with the volumes of the CHALLENGER and METEOR.

The National Science Foundation and, in particular, the International Decade of Ocean Exploration, is privileged to have played a role in this historic venture.

*Feenan D. Jennings*  
Head, International Decade  
of Ocean Exploration  
National Science Foundation  
Washington, D.C.  
May 1976

# Acknowledgements

The idea of carrying out a cooperative ocean-wide survey of radioisotopes and geochemical tracers in the sea originated with Henry Stommel; he, George Veronis, and Klaus Wyrski have provided advice, encouragement, and strong support throughout the GEOSECS program.

With the exception of some early planning grants, funding for the program has been provided by the National Science Foundation Office of International Decade of Ocean Exploration. Feenan Jennings, head of the NSF-IDOE office from 1971 to 1978, provided leadership, wisdom and advice that played a crucial role in the success of GEOSECS. During the formative years of the program, funds were provided for planning by the National Science Foundation (Oceanography Section) and the U.S. Atomic Energy Commission (now Department of Energy). The assistance of Drs. Hugh McClellan and Charles Osterberg of these agencies is acknowledged with many thanks.

Three test and calibration cruises were a very important part of the development of GEOSECS. During these early preparations, the GEOSECS Operations Group was ably assisted by John Goddard of LDGO, and Susan Kadar and Peter Sachs of WHOI. Shale Niskin of General Oceanics, Inc. provided designs, equipment, and cheerful assistance at sea on three cruises. Credit for the development of the equipment used on the test cruises and the major expeditions goes to many people. The principal role was taken by Arnold Bainbridge, Project Director of the GEOSECS Operations Group. He personally supervised many aspects of instrument development and data flow from acquisition to final corrected and calibrated results. In all this work he was assisted by Rick Ackermann, electronics engineer; Tom Digre and Jack Spiegelberg, computer programmers, Bob Williams and Arnold Mantyla, chief analysts, Len Cunningham, chief marine technician, and Fred Dixon, development technician. These individuals, together with the other GOG staff members, developed the most modern, versatile and efficient seagoing data and sampling system ever used for geochemical and hydrographic studies of the ocean.

The GEOSECS Indian Ocean Expedition was carried out aboard R/V MELVILLE as part of SIO's Indomed Expedition, which was coordinated by Arnold E. Bainbridge. Captains Albert Arsenault (Legs 3-5) and Geoffrey C. Clark (Legs 6 and 7) and the crew of the MELVILLE contributed significantly to all aspects of the seagoing operation. Major credit for the Indian Ocean shipboard data belongs to the technicians and analysts of GOG (listed below) who worked with great skill and dedication throughout this voyage.

During the Atlantic and Pacific expeditions, Phyllis Laking of WHOI served as Administrative Assistant to the Executive Committee. She handled proposals, organized meetings, filed the quarterly reports, and shouldered the most onerous burdens of the administrative program. For the Indian Ocean expedition, these responsibilities were assumed by Barbara Stickney of RSMAS. Ms. Laking and Ms. Stickney were aided in their efforts by Ellen Coxe of LDGO; Sandra Tacoma, Kris Stewart, and Cathy Carrol of SIO; and Bruna Williams and Harry Grow of GOG.

Drs. P. M. Fye and W. Nierenberg, Directors of WHOI and SIO respectively, strongly encouraged the development of the GEOSECS proposal and contributed to the solution of many problems in planning and execution. Special praise goes to the staffs of Nimitz Marine Facilities at SIO and the Port Office and Shop Facilities at WHOI. Without the efforts and dedication of all these people and many others at both institutions, the GEOSECS shipboard work would have been much more difficult.

W. S. Broecker, LDGO  
H. Craig, SIO  
D. W. Spencer, WHOI  
H. G. Ostlund, RSMAS  
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Geochemical Ocean Sections Study

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Jacob C. Colbert	Randall M. Ragan
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## Introduction

These atlas volumes contain the record of the oceanographic measurements made during the Geochemical Ocean Sections Study (GEOSECS), a program of the International Decade of Ocean Exploration (IDOE), 1970-1980. The Geochemical Ocean Sections Study, or "GEOSECS" as the program has become known, was conceived as a cooperative multi-national and multi-institutional study of the oceans, based on the concept of a global survey of radioisotopes and other geochemical tracers accompanied by high-precision measurements of temperature, salinity, and density in both continuous and discrete-sample profiles.

The work reported in these atlas volumes includes the shipboard measurements made on the United States expeditions in the Atlantic, Pacific, and Indian Oceans, and the laboratory measurements performed on samples collected by these expeditions of scientists from the United States and other countries. The U.S. shipboard program was carried out on the Woods Hole Oceanographic Institution ship R/V KNORR and the Scripps Institution of Oceanography ship R/V MELVILLE, during three expeditions which were at sea for a total of 24 months. The Atlantic field work was done on R/V KNORR during the nine-month period from July 1972, to April 1973. Shortly afterwards, the Pacific expedition was carried out on R/V MELVILLE during the ten months from August 1973 to June 1974, and the five-month Indian Ocean expedition was carried out on the MELVILLE from December 1977 to April 1978.

In addition to the U.S. Atlantic, Pacific, and Indian Ocean expeditions, scientists from West Germany and Japan have carried out associated GEOSECS studies aboard the German vessel METEOR in the Atlantic and the Japanese ship HAKUHÓ-MARU in the Pacific and Indian Oceans. The results of these allied investigations are being published separately and are not included in these volumes.

The GEOSECS program began with the recognition by Henry Stommel that the full potential of geochemical tracers for the study of circulation and mixing processes in the world oceans could only be realized by a large-scale collaborative effort in which simultaneous studies of the most significant properties were made over large sections of the oceans. A preliminary meeting involving Dr. Stommel, Drs. W.S. Broecker, H. Craig, and K. K. Turekian was held at Woods Hole in July of 1968 for the purpose of planning such a program. Shortly afterwards, P. Kilho Park, J. L. Reid, and H. G. Ostlund were added to this group and an initial proposal for a geochemical expedition was prepared. In the following year, the group was

enlarged to a formal Scientific Advisory Committee by the addition of Drs. D. W. Spencer, T. Takahashi, and H. Volchok. Arnold Bainbridge was selected as Project Director of the GEOSECS Operations Group with the responsibility for shipboard operations and data processing.

During this initial phase of the program, the National Science Foundation and the Office of Naval Research supported several testing and intercalibration seagoing efforts in order to establish the feasibility of the proposed program. The "GEOSECS I" station in the Pacific off Baja California was occupied for a week of testing and equipment trials in September 1969 on Scripps R/V WASHINGTON; and "GEOSECS II", an Atlantic station off Bermuda, was occupied by R/V KNORR in August 1970. A full-scale dress rehearsal was then run on Leg 15 of SIO's Antipode Expedition in the southwest Pacific, aboard R/V MELVILLE in August 1971. On this expedition, the deep-water CTD developed by Neil Brown of WHOI was used successfully for the first time to depths of 5000 meters, and the combination of precise geochemical and hydrographic data with continuous CTD profiling resulted in the discovery of a major oceanographic feature—the benthic front, or density discontinuity, between the Pacific Deep Water and the Antarctic Bottom Water.

Antipode Expedition Leg 15, and two further trials—the GOGO I and GOGO II reoccupations of the GEOSECS I station in November 1971 and April 1972—set the basic style of the GEOSECS shipboard sampling and hydrographic program for the future expeditions. For hydrographic measurements and "normal-sized" water samples, Shale Niskin of General Oceanics had developed the rosette sampler, which holds 12 thirty-liter nonmetallic sampling bottles with reversing thermometers. The rosettes were equipped by A.E. Bainbridge and the GEOSECS Operations Group (GOG) with modified versions of the Neil Brown CTD, new dissolved-oxygen probes and nephelometers. A new hydrographic winch with conducting wire for CTD, rosette triggering, and other signals, was constructed and used with the rosettes.

For large volume water samples, required for the measurements of  $^{14}\text{C}$ ,  $^{226}\text{Ra}$ , and other radionuclides, nine 270-liter Gerard-Ewing samplers, developed at LDGO, were constructed from stainless steel and used as multiple sampling devices on the trawl wire. During the Atlantic and Pacific expeditions, large-volume near-surface water sampling was also done with a "seasucker," a pumping system designed for obtaining large quantities of water from depths down to about 350 meters. During 1971 and early 1972,



necessary improvements were made to the shorebased laboratory facilities needed for the analysis of the expedition samples.

The final selection of tracers and of participating laboratories was made by the Scientific Advisory Committee, and was based on three criteria established at the inception of the GEOSECS program:

- 1) Demonstration of a significant and reliably measurable variability in the oceanic concentration of a proposed tracer, a variability which would be correlated with circulation, mixing, and non-conservative processes.
- 2) Selection of a target sampling and analytical precision for each proposed tracer, and demonstration that such precision could be routinely achieved.
- 3) In almost all cases, the participation of more than one laboratory for the analysis of each tracer, with intercalibrations at selected stations as a continuing control on the quality of the data.

A list of the components selected as tracers which met the above criteria follows.

1) *Long-lived radioisotopes*

The three nuclides in this category are the oceanic "timekeepers":  $^{14}\text{C}$  (radiocarbon),  $^{226}\text{Ra}$ , and  $^{32}\text{Si}$ . Two of these components,  $^{14}\text{C}$  and  $^{32}\text{Si}$ , have naturally-occurring stable isotopic species for calibration of non-conservative effects, but  $^{226}\text{Ra}$  does not. Hence barium was included as a trace element component for analysis because of its possible role as a chemical analogue for radium.

2) *Short-lived radioisotopes*

The initial selection of tracers in this category included  $^3\text{H}$  (tritium),  $^{228}\text{Ra}$ , and  $^{222}\text{Rn}$ , the latter extracted from surface and bottom waters, and measured at sea because of its short half-life. The fission-product isotopes,  $^{90}\text{Sr}$  and  $^{137}\text{Cs}$ , were included for study at selected depths and locations in order to compare the distribution of these tracers to tritium. Later additions to this list included  $^{210}\text{Pb}$ , after the discovery of the large disequilibrium between  $^{210}\text{Pb}$ , and  $^{226}\text{Ra}$  in deep waters, and  $^{210}\text{Po}$  and  $^{228}\text{Th}$  for further studies of the effects of particulate scavenging.

3) *Stable isotopes*

These tracers included D/H and  $^{18}\text{O}/^{16}\text{O}$  ratios in seawater,  $^{18}\text{O}$  in dissolved oxygen, phosphate, and sulphate,  $^{13}\text{C}$  in dissolved inorganic carbon, and  $^{13}\text{C}$  and  $^{18}\text{O}$  in atmospheric  $\text{CO}_2$ .

4) *Dissolved gases*

Primary emphasis in this program was on the distribution of  $^3\text{He}$  in seawater, because the injection of "excess  $^3\text{He}$ " into deep water on oceanic rises provides a unique deep-sea tracer for circulation and mixing.  $^4\text{He}$  and Ne concentrations were also measured, for calibration of the atmospheric  $^3\text{He}$  component. In near-surface waters, the association of  $^3\text{H}$  and  $^3\text{He}$  provided a unique new parent-daughter isotopic pair for circulation studies. During the Atlantic and Pacific expeditions, a shipboard measurement program for dissolved  $\text{N}_2$  and Ar was also included in the program for further control on the atmospheric "air-injection" component in deep water.

5) *Trace elements*

As noted above, the most important of these is barium, which can be measured mass spectrometrically with very high precision. Other trace elements included Sr, Cu, Ni, and other heavy metals.

6) *Particulates*

In addition to mineralogical and chemical studies on particulate material filtered from surface and deep water, thorium isotopes,  $^{210}\text{Pb}$ ,  $^{226}\text{Ra}$ ,  $^{239}\text{Pu}$ , and  $^{14}\text{C}$  in particulates, were analyzed in order to provide information on rates of settling of suspended material and on the chemistry of the scavenging processes associated with particles.

A complete list of the institutions participating in the analytical programs and the components studied by each is included in Table 1.

The regular GEOSECS expedition work began with the departure of R/V KNORR from Woods Hole on July 18, 1972, for the nine-leg Atlantic expedition. At this time, the program was directed by an Executive Committee consisting of W. S. Broecker, H. Craig, D. W. Spencer (appointed

Table 1—Major Participating Institutions, Principal Investigators, and Scientific Programs (Indian Ocean Expedition)

INSTITUTION	PRINCIPAL INVESTIGATORS	SCIENTIFIC PROGRAMS
Lamont-Doherty Geological Observatory of Columbia University	P. Biscaye,	Suspended particulates
	P. Santschi, W. S. Broecker,	$^{222}\text{Rn}$ , $^{226}\text{Ra}$
	T. Takahashi	Carbonate Chemistry
Louisiana State University	L.-H. Chan, J.S. Hanor	Ba
Massachusetts Institute of Technology	J. M. Edmond	Trace elements
McMaster University Hamilton, Ontario, Canada	W. B. Clarke	$^3\text{He}$ , He, Ne
Physical Research Laboratory Ahmedabad, India	S. Krishnaswami, D. Lal, B. L. K. Somayajulu	$^{32}\text{Si}$ , J-Underway, Deep Pump
Scripps Institution of Oceanography University of California, San Diego	J. Lupton, H. Craig	$^3\text{He}$ , rare gases, stable isotopes
	Y.-C. Chung, H. Craig, R. Finkel	$^{226}\text{Ra}$ , particulate $^{210}\text{Pb}$ , soluble & particulate $^{210}\text{Po}$ , $^{222}\text{Rn}$
	C. D. Keeling	$\text{pCO}_2/\Sigma\text{CO}_2$
Scripps Institution of Oceanography University of California, San Diego GEOSECS Operations Group	A. E. Bainbridge, R. T. Williams	Salinity, nutrients, $\text{O}_2$ , CTD, $\Sigma\text{CO}_2$ (titration), alkalinity
University of Hawaii	P. Kroopnick	$^{13}\text{C}$ ( $\Sigma\text{CO}_2$ ), $^{18}\text{O}$ (dissolved $\text{O}_2$ )
University of Miami	H. G. Ostlund	$^{14}\text{C}$ , $^3\text{H}$
University of South Carolina	W. S. Moore	$^{226}\text{Ra}$
University of Southern California	T.-L. Ku	$^{226}\text{Ra}$
University of Washington	M. Stuiver	$^{14}\text{C}$
Woods Hole Oceanographic Institution	D. W. Spencer, P. G. Brewer	$^{210}\text{Pb}$ , $^{210}\text{Po}$ tracers
	W. Jenkins	He isotopes, Ne
Yale	K. Turekian	$^{210}\text{Pb}$ , $^{210}\text{Po}$

in 1970), together with a Scientific Advisory Committee consisting of these three together with A. Gordon, H. G. Ostlund, P. K. Park, J. L. Reid, H. Stommel, T. Takahashi, K. K. Turekian, H. Volchok, and K. Wyrski. The Atlantic expedition, coordinated by D. W. Spencer of Woods Hole, lasted nine months. The KNORR returned to WHOI on April 4, 1973, after having occupied 116 Atlantic stations from  $75^\circ\text{N}$  in the Greenland Sea to  $61^\circ\text{S}$  in the Drake Passage. More than 10,000 water samples, ranging in size from small glass ampoules to 100-liter plastic drums, were stored in the Woods Hole "GEOSECS Water Library" facility, and winch, vans, computer, and the complete inventory of deck gear and analytical equipment were immediately transferred to the Scripps Institution of Oceanography for the Pacific expedition work on R/V MELVILLE.

The Pacific expedition work began at Scripps on August 22, 1973. Administrative changes at this time included the addition of H. G. Ostlund to the GEOSECS Executive Committee, and of J. Edmond to the Scientific Advisory Committee. H. Craig was the Expedition Coordinator for the ten-leg Pacific expedition, which ended on June 10, 1974, after occupying 147 Pacific stations.

Following the Pacific work, there was a three and one-half year delay in seagoing work while the shorebased laboratories in the U.S. and other countries concentrated on the analysis of Atlantic and Pacific samples. In 1974, P. E. Biscaye, P. G. Brewer, and R. F. Weiss joined the Scientific Advisory Committee to help prepare the Indian Ocean program. The Indian Ocean expedition work began with R/V MELVILLE leaving Alexandria, Egypt, on 15 December 1977 following a short test leg from Rota, Spain. A. E. Bainbridge acted as Expedition Coordinator for this expedition which ended in Mauritius on 24 April 1978.

The scientific program on the GEOSECS expeditions changed only slightly from its inception on the Atlantic legs in 1972-73. The shipboard analytical program included the standard hydrographic parameters, temperature, salinity, oxygen, and nutrients (nitrate, phosphate, and silica), together with total dissolved inorganic carbon measured by two techniques: titration (which also gave alkalinity), and during the Atlantic and Pacific expeditions, shipboard gas chromatography. Ancillary shipboard programs included the measurement of radon activity in surface mixed layer and bottom water profiles, and measurement of atmospheric and surface water  $\text{CO}_2$  partial pressure using an infrared analyzer. In addition to these discrete parameters, continuous profiles of temperature, salinity, dissolved oxygen, and particulate concentration by nephelometry,

were obtained on station in real time, using the probes mounted on the sampling rosette.

Particulate samples were collected in several ways. Water samples from the thirty-liter rosette samplers were filtered to provide small particulate sample profiles for U.S. investigators. Continuous filtration of surface water (the "J-underway program") was carried out to provide large-volume surface particulate samples throughout the oceans. In the Pacific and Indian Oceans, deep-water particulate profiles were obtained by pumping up to 5000 liters of water through battery-operated filtration units suspended on the wire. These large-scale particulate sampling programs were instituted by the Physical Research Laboratory of Ahmedabad, India. Additional particulate profiles were also obtained for  $^{210}\text{Pb}$  analysis in the Pacific and Indian Oceans, by filtering water aboard ship.

The GEOSECS station plan in the Atlantic and Pacific consisted of both "large volume" and "small volume" stations. At both types of stations, profiles of discrete water samples were collected in thirty-liter nonmetallic sampling bottles, using a pair of sampling rosettes on the conducting hydrographic wire for each rosette cast. At "large volume" stations, additional sampling included use of the 270-liter Gerard barrels to collect the large volume water samples for  $^{14}\text{C}$ ,  $^{228}\text{Ra}$ , and other radioisotope studies. Some stations included shallow Niskin bottle casts with bottles attached to the wire at predetermined intervals, and additional CTD casts were made at a few supplementary station locations in areas of special interest. In the Atlantic work, the rosette casts were supplemented by metal Nansen bottle casts for duplicate temperature and salinity profiles, but this practice was discontinued at the end of the Atlantic expedition.

For the Indian Ocean expedition, the station plan was modified to include "large volume" sampling at most stations, and the number of casts at "large volume" stations was reduced. Each of these "large volume" stations typically consisted of a "deep rosette" cast which occasionally included a bottom radon profile, a "shallow rosette" cast, and three 9-bottle Gerard barrel casts. Thus, the "large volume" stations typically provided profiles of 44 thirty-liter samples and 27 270-liter samples. The number of casts at "small volume" stations was also for the Indian Ocean, and the fraction of "small volume" stations was reduced from roughly one-half to roughly one-fifth of the total. These "small volume" stations consisted of a single "deep rosette" cast which provided a CTD profile and a profile of 22 thirty-liter samples.

In general, the first cast made at a station was a "bottom rosette" or

"deep rosette" cast, so that the actual hydrographic structure of the entire water column could be displayed by the shipboard computer system at the beginning of station work. The scientist at the data console controlled the lowering rate of the rosette package by voice communication with the winch operator, while observing a set of profiles and plots on the four CRT displays in the control room. Thus the temperature, salinity, dissolved oxygen, density, and light scattering profiles, together with plots such as potential temperature vs. salinity, could be studied as the sensor package was lowered. During this time, the discrete sampling scheme relative to the various significant features of the water mass structure was laid out. Discrete sampling was then carried out during the ascent of the rosette system by manual triggering of rosette bottles at the desired depths. For the Pacific and Indian Ocean expeditions, the exact position of the rosette package on each profile or property plot was continually indicated on the displays. In this way, it was possible to obtain accurate core properties and precise gradients for the geochemical parameters being mapped, and at the same time, to adjust the sampling density according to the gradients in temperature, salinity, density, dissolved oxygen or particulate concentration, as desired. This "real-time" sampling system has been a major benefit to the GEOSECS program, and has allowed sharp discontinuities and other local features within the water column to be sampled in great detail.

"An ocean is forever asking questions," wrote Edwin Arlington Robinson, "and writing them aloud along the shore." The data presented in these volumes may answer some old questions, and pose new ones yet unasked, but they will surely contribute new dimensions to our understanding of the intricate chemical and physical processes which govern the distribution of geochemical parameters in the sea.

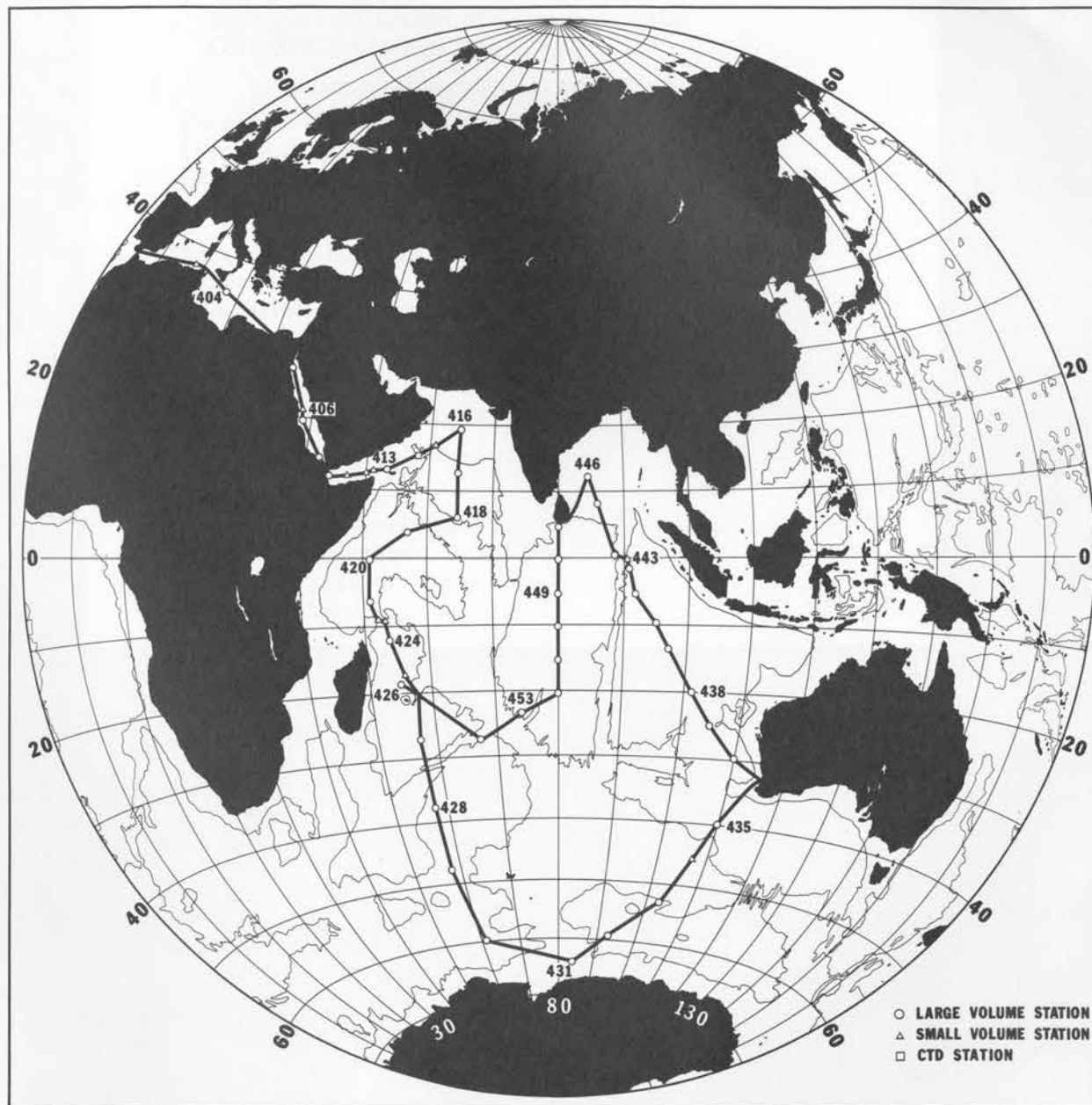
*Harmon Craig*  
for GEOSECS Executive Committee

## GEOSECS Indian Ocean Expedition Itinerary of R/V MELVILLE

	DEPART	ARRIVE
LEG 3	Rota, Spain 4 December 1977	Alexandria, Egypt 12 December 1977
LEG 4	Alexandria, Egypt 16 December 1977	Port Louis, Mauritius 23 January 1978
LEG 5	Port Louis, Mauritius 28 January 1978	Fremantle, Australia 25 February 1978
LEG 6	Fremantle, Australia 7 March 1978	Colombo, Sri Lanka 31 March 1978
LEG 7	Colombo, Sri Lanka 4 April 1978	Port Louis, Mauritius 24 April 1978

The GEOSECS Indian Ocean Expedition was part of an 18 leg oceanographic expedition, INDOMED, organized by Scripps Institution of Oceanography and carried out aboard R/V Melville. For ease of reference, the GEOSECS Indian Ocean leg numbers are consistent with those of the major expedition.

# TRACK OF R/V MELVILLE, GEOSECS INDIAN OCEAN EXPEDITION, 1977-78



The 4 kilometer isobath shown on this Lambert equal area projection was reproduced from Plate 1, Volume 6 of this atlas series. Other isobaths and the bathymetric data sources appear in that volume.

## Leg 3

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# STATION AND CAST DESCRIPTION

## GEOSECS INDIAN OCEAN R/V MELVILLE

LEG	STATION	CAST	DATE	CAST TYPE	LATITUDE	LONGITUDE	TIME GMT	BOTTOM DEPTH	MAX DEPTH	REMARKS	LEG	STATION	CAST	DATE	CAST TYPE	LATITUDE	LONGITUDE	TIME GMT	BOTTOM DEPTH	MAX DEPTH	REMARKS
3	402	1	6 DEC 77	SPE	37DEG 7.9MIN N	30DEG 5.0MIN E	1155	2710		* TEST OF MARKEY WINCH	4	420	1	10 JAN 78	ROS	0DEG 3.0MIN S	50DEG 55.8MIN E	0740			* DEEP ROSETTE (ABORTED)
3	403	1	7 DEC 77	ROS	37DEG 41.6MIN N	80DEG 5.5MIN E	1238	2757	1992	* SINGLE ROSETTE Q CAST	4	420	2	10 JAN 78	ROS	0DEG 3.4MIN S	50DEG 55.6MIN E	1005	5102	5070	* DEEP ROSETTE, RADON
3	404	1	9 DEC 77	ROS	35DEG 35.9MIN N	170DEG 15.2MIN E	0737	4030	4019	* DOUBLE ROSETTE	4	420	3	10 JAN 78	GER	0DEG 3.9MIN S	50DEG 52.6MIN E	1552	5058	5035	* DEEP GERARD, C-14, RA-228
3	404	2	9 DEC 77	GER	35DEG 36.6MIN N	170DEG 19.2MIN E	1420	4051	3917	* 9 BARREL C14	4	420	4	10 JAN 78	ROS	0DEG 3.0MIN S	50DEG 52.8MIN E	1942	5057	2086	* SHALLOW ROSETTE
3	404	3	9 DEC 77	PMP	35DEG 36.6MIN N	170DEG 19.9MIN E	1700		5	* BOW PUMP C14 SAMPLE	4	420	5	11 JAN 78	GER	0DEG 3.0MIN S	50DEG 50.8MIN E	0025	5090	1541	* SHALLOW GERARD, C-14, RA-228
4	405	1	19 DEC 77	ROS	27DEG 16.0MIN N	34DEG 31.0MIN E	1340	1171	1038	* DEEP ROSETTE	4	420	6	11 JAN 78	GER	0DEG 2.6MIN S	50DEG 48.8MIN E	0421	4847	4807	* DEEP GERARD, RA-228
4	405	2	19 DEC 77	GER	27DEG 14.0MIN N	34DEG 28.6MIN E	1845	1181	996	* DEEP GERARD	4	420	7	11 JAN 78	BAG	0DEG 5.0MIN S	50DEG 45.9MIN E	0945		4795	* BAG, SI-32
4	405	3	19 DEC 77	PMP	27DEG 15.0MIN N	34DEG 28.6MIN E	1845		5	* BOW PUMP, PC02	4	420	8	10 JAN 78	SPE	0DEG 3.6MIN S	50DEG 52.6MIN E	1400		0	* SURFACE RA-228 FIBER
4	405	4	19 DEC 77	SPE	27DEG 16.0MIN N	34DEG 31.0MIN E	1433		0	* PLANKTON NET TOW	4	420	9	11 JAN 78	SPE	0DEG 2.6MIN S	50DEG 48.8MIN E	0720		0	* PLANKTON NET TOW
4	406	1	21 DEC 77	NIS	21DEG 21.4MIN N	38DEG 7.2MIN E				* 1 NISKIN, PINGER (ABORTED)	4	421	1	13 JAN 78	ROS	60DEG 9.2MIN S	50DEG 54.7MIN E	1120	4875	4837	* DEEP ROSETTE
4	406	2	21 DEC 77	NIS	21DEG 21.0MIN N	38DEG 5.1MIN E	1249			* WEIGHT TEST, PINGER, 1 NISKIN	4	421	2	13 JAN 78	GER	60DEG 8.9MIN S	50DEG 54.9MIN E	1624	4799	4752	* DEEP GERARD, C-14
4	406	3	21 DEC 77	NIS	21DEG 20.8MIN N	38DEG 5.0MIN E	1615	2159	2127	* DEEP NISKIN ATLANTIS II BRINE	4	421	3	13 JAN 78	ROS	60DEG 10.7MIN S	50DEG 54.3MIN E	2100		1835	* SHALLOW ROSETTE
4	407	1	22 DEC 77	ROS	190DEG 55.5MIN N	38DEG 29.9MIN E	0504	1719	1665	* DEEP ROSETTE	4	421	4	14 JAN 78	GER	60DEG 11.3MIN S	50DEG 53.7MIN E	0105	4812	1694	* SHALLOW GERARD, C-14
4	407	2	22 DEC 77	GER	190DEG 57.1MIN N	38DEG 29.7MIN E	1040	1957	1788	* DEEP GERARD, C-14, RA-228	4	421	5	14 JAN 78	GER	60DEG 11.9MIN S	50DEG 53.5MIN E	0225	4812	19	* SURFACE GERARD, C-14
4	407	3	22 DEC 77	GER	190DEG 57.3MIN N	38DEG 28.7MIN E	1315	1957	242	* SHALLOW GERARD, C-14, RA-228	4	421	6	14 JAN 78	GER	60DEG 13.1MIN S	50DEG 53.2MIN E	0421	4732	4689	* DEEP GERARD, RA-228
4	407	4	22 DEC 77	SPE	190DEG 55.5MIN N	38DEG 29.9MIN E	0515		0	* PLANKTON NET TOW	4	421	7	14 JAN 78	SPE	60DEG 13.1MIN S	50DEG 53.2MIN E	0650		0	* SURFACE RA-228 FIBER
4	408	1	24 DEC 77	ROS	14DEG 42.7MIN N	42DEG 10.3MIN E	0627	590	587	* DEEP SINGLE ROSETTE, RADON	4	421	8	13 JAN 78	SPE	60DEG 9.2MIN S	50DEG 54.7MIN E	1050		0	* PLANKTON NET TOW
4	408	2	24 DEC 77	GER	14DEG 42.3MIN N	42DEG 10.5MIN E	0923	597	578	* DEEP GERARD, C-14, RA-228	4	422	1	15 JAN 78	ROS	80DEG 49.9MIN S	52DEG 14.4MIN E	0006	4165	4144	* DEEP ROSETTE, BOTTOM RADON
4	408	3	24 DEC 77	SPE	14DEG 42.3MIN N	42DEG 10.5MIN E	0950		0	* PLANKTON NET TOW	4	422	2	15 JAN 78	SPE	80DEG 49.9MIN S	52DEG 14.4MIN E	0310		0	* SURFACE RA-228 FIBER
4	409	1	25 DEC 77	ROS	12DEG 10.2MIN N	43DEG 57.1MIN E	0427	516	501	* DEEP SINGLE ROSETTE	4	422	3	15 JAN 78	SPE	90DEG 1.6MIN S	53DEG 15.2MIN E	1101	5159	5136	* DEEP ROSETTE, RADON
4	409	2	25 DEC 77	GER	12DEG 7.3MIN N	43DEG 55.5MIN E	0756	687	580	* DEEP GERARD, C-14, RA-228	4	423	1	16 JAN 78	ROS	120DEG 18.4MIN S	53DEG 41.4MIN E	1038	4676	4659	* DEEP ROSETTE, RADON
4	409	3	25 DEC 77	SPE	12DEG 7.3MIN N	43DEG 55.5MIN E	0745		0	* PLANKTON NET TOW	4	423	2	16 JAN 78	GER	120DEG 17.1MIN S	53DEG 38.9MIN E	1514	4662	4581	* DEEP GERARD, C-14, RA-228
4	410	1	26 DEC 77	NSD	12DEG 18.4MIN N	46DEG 58.8MIN E	0209	2358	2342	* CTD + 7 NISKINS	4	424	3	16 JAN 78	ROS	120DEG 18.1MIN S	53DEG 39.6MIN E	1841	4302	2090	* SHALLOW ROSETTE
4	410	2	26 DEC 77	SPE	12DEG 18.4MIN N	46DEG 58.8MIN E			0	* BUCKET TRITIUM	4	424	4	16 JAN 78	GER	120DEG 18.3MIN S	53DEG 40.0MIN E	2208	4302	1392	* SHALLOW GERARD, C-14
4	411	1	26 DEC 77	NSD	12DEG 45.3MIN N	50DEG 3.2MIN E	2129	2452	2392	* CTD + 11 NISKINS	4	424	5	17 JAN 78	GER	120DEG 18.3MIN S	53DEG 40.7MIN E	0113	4478	4443	* DEEP GERARD, RA-228
4	411	2	26 DEC 77	SPE	12DEG 45.3MIN N	50DEG 3.2MIN E	2230		0	* PLANKTON NET TOW	4	424	6	17 JAN 78	SPE	120DEG 18.3MIN S	53DEG 40.7MIN E	0400		0	* SURFACE RA-228 FIBER
4	412	1	27 DEC 77	NSD	13DEG 12.7MIN N	51DEG 7.5MIN E	0852	3276	3204	* CTD + 11 NISKINS	4	424	7	17 JAN 78	SPE	120DEG 18.4MIN S	53DEG 41.4MIN E	1145		0	* PLANKTON NET TOW
4	412	2	27 DEC 77	SPE	13DEG 12.7MIN N	51DEG 7.5MIN E	0755		0	* PLANKTON NET TOW	4	425	1	18 JAN 78	ROS	170DEG 18.0MIN S	55DEG 51.0MIN E	1244	4535	4459	* DEEP ROSETTE
4	412	3	27 DEC 77	SPE	13DEG 12.7MIN N	51DEG 7.5MIN E			0	* BUCKET TRITIUM	4	425	2	18 JAN 78	NIS	170DEG 16.3MIN S	55DEG 51.9MIN E	1612		597	* SHALLOW NISKIN
4	413	1	27 DEC 77	ROS	13DEG 21.9MIN N	53DEG 16.0MIN E	2318	2815	2793	* DEEP ROSETTE	4	426	3	18 JAN 78	SPE	170DEG 19.0MIN S	55DEG 51.0MIN E			0	* SURFACE RA-228 FIBER
4	413	2	28 DEC 77	GER	13DEG 21.4MIN N	53DEG 16.3MIN E	0356	2809	2715	* DEEP GERARD, C-14, RA-228	4	426	4	21 JAN 78	GER	180DEG 54.4MIN S	54DEG 47.5MIN E	1800	4760	4694	* CTD, 4 NISKIN CHECKS
4	413	3	28 DEC 77	ROS	13DEG 21.7MIN N	53DEG 16.9MIN E	0735		0	* DEEP ROSETTE (ABORTED)	4	426	5	21 JAN 78	GER	180DEG 54.0MIN S	54DEG 47.5MIN E	2255	4728	4585	* DEEP GERARD, C-14
4	413	4	28 DEC 77	GER	13DEG 21.8MIN N	53DEG 17.0MIN E	1019	2789	448	* SHALLOW GERARD, C-14, RA-228	4	426	6	21 JAN 78	SPE	180DEG 54.0MIN S	54DEG 47.5MIN E	0317	4737	1437	* SHALLOW GERARD, C-14
4	413	5	28 DEC 77	NIS	13DEG 21.1MIN N	53DEG 17.8MIN E	1219	2786	2753	* DEEP NISKIN	4	426	7	21 JAN 78	SPE	180DEG 54.0MIN S	54DEG 47.5MIN E	0425		0	* SURFACE RA-228 FIBER
4	413	6	28 DEC 77	SPE	13DEG 21.9MIN N	53DEG 16.0MIN E	0000		0	* PLANKTON NET TOW	5	427	1	30 JAN 78	ROS	270DEG 4.2MIN S	56DEG 58.1MIN E	0312	5101	5043	* DEEP ROSETTE
4	414	1	29 DEC 77	CTD	150DEG 45.0MIN N	58DEG 4.9MIN E	2058	3744	2476	* CTD, NO CHECK SAMPLES	5	427	2	30 JAN 78	GER	270DEG 5.5MIN S	56DEG 56.4MIN E	0835	5099	5066	* DEEP GERARD, C-14
4	414	2	29 DEC 77	SPE	150DEG 45.0MIN N	58DEG 4.9MIN E	2050		0	* PLANKTON NET TOW	5	427	3	30 JAN 78	ROS	270DEG 5.0MIN S	56DEG 59.0MIN E	1240	5051	1665	* SHALLOW ROSETTE
4	415	1	30 DEC 77	ROS	170DEG 14.5MIN N	60DEG 41.2MIN E	1646	3948	3933	* Q CAST + RADON	5	427	4	30 JAN 78	GER	270DEG 5.5MIN S	56DEG 59.3MIN E	1620	5065	1747	* SHALLOW GERARD, C-14
4	415	2	30 DEC 77	SPE	170DEG 14.5MIN N	60DEG 41.2MIN E	1900		0	* SURFACE RA-228 FIBER	5	427	5	30 JAN 78	GER	270DEG 4.7MIN S	57DEG 1.0MIN E	1958	5169	5036	* DEEP GERARD, RA-228
4	415	3	30 DEC 77	SPE	170DEG 14.5MIN N	60DEG 41.2MIN E	1625		0	* PLANKTON NET TOW	5	427	6	30 JAN 78	SPE	270DEG 4.7MIN S	57DEG 1.0MIN E	2350		0	* SURFACE RA-228 FIBER
4	416	1	31 DEC 77	ROS	190DEG 45.5MIN N	64DEG 37.0MIN E	2016	3208	3156	* DEEP ROSETTE	5	428	1	2 FEB 78	ROS	370DEG 45.5MIN S	57DEG 37.7MIN E	1030			* DEEP ROSETTE (ABORTED)
4	416	2	1 JAN 78	GER	190DEG 43.3MIN N	64DEG 37.1MIN E	0116	3208	3140	* DEEP GERARD, C-14	5	428	2	2 FEB 78	CTD	370DEG 45.5MIN S	57DEG 37.7MIN E	1330			* CTD W/3 CHECK SAMPLES (ABORT)
4	416	3	1 JAN 78	GER	190DEG 42.9MIN N	64DEG 36.5MIN E	0429	3209	823	* SHALLOW GERARD, C-14, RA-228	5	428	3	2 FEB 78	GER	370DEG 46.5MIN S	57DEG 37.4MIN E	1707		1739	* SHALLOW GERARD, C-14
4	416	4	1 JAN 78	SPE	190DEG 42.7MIN N	64DEG 35.7MIN E	0600		0	* SURFACE RA-228 FIBER	5	428	4	2 FEB 78	ROS	370DEG 46.3MIN S	57DEG 35.9MIN E	2118	5340	5323	* DEEP ROSETTE, RADON
4	416	5	1 JAN 78	GER	190DEG 42.7MIN N	64DEG 35.2MIN E	0554	3209	475	* SHALLOW GERARD (REPEAT)	5	428	5	3 FEB 78	GER	370DEG 47.7MIN S	57DEG 35.2MIN E	0316	5383	5325	* DEEP GERARD, C-14
4	416	6	31 DEC 77	SPE	190DEG 45.5MIN N	64DEG 37.0MIN E	2110		0	* PLANKTON NET TOW	5	428	6	3 FEB 78	ROS	370DEG 49.7MIN S	57DEG 36.8MIN E	0745	5232	1728	* SHALLOW ROSETTE
4	417	1	2 JAN 78	ROS	120DEG 58.3MIN N	64DEG 28.8MIN E	1928	4117	4102	* DEEP ROSETTE, RADON	5	428	7	3 FEB 78	BAG	370DEG 53.1MIN S	57DEG 41.0MIN E	1615		5236	* SI-32 BAGS
4	417	2	3 JAN 78	GER	120DEG 58.8MIN N	64DEG 27.8MIN E	0031	4108	4035	* DEEP GERARD, C-14	5	428	8	3 FEB 78	SPE	370DEG 52.6MIN S	57DEG 39.7MIN E	1410		0	* SURFACE RA-228 FIBERS
4	417	3	3 JAN 78	ROS	120DEG 59.0MIN N	64DEG 26.9MIN E	0353	4117	1838	* SHALLOW ROSETTE	5	428	9	2 FEB 78	SPE	370DEG 45.5MIN S	57DEG 37.7MIN E	1025		0	* PLANKTON NET TOW
4	417	4	3 JAN 78	GER	120DEG 59.2MIN N	64DEG 25.4MIN E	0748	4117	1045	* SHALLOW GERARD, C-14	5	429	1	6 FEB 78	ROS	470DEG 40.1MIN S	57DEG 51.7MIN E	1142	4586	4563	* DEEP ROSETTE, RADON
4	417	5	2 JAN 78	SPE	120DEG 59.4MIN N	64DEG 25.3MIN E	2230		0	* SURFACE RA-228 FIBER	5	429	2	6 FEB 78	GER	470DEG 39.9MIN S	57DEG 52.2MIN E	1625	4578	4562	* DEEP GERARD, C-14
4	417	6	3 JAN 78	GER	120DEG 59.2MIN N	64DEG 25.5MIN E	1049	4114	4072	* DEEP GERARD, RA-228	5	429	3	6 FEB 78	ROS	470DEG 39.7MIN S	57DEG 53.6MIN E	2022	4435	1759	* SHALLOW ROSETTE
4	417	7	2 JAN 78	SPE	120DEG 58.3MIN N	64DEG 28.8MIN E	1815		0	* PLANKTON NET TOW	5	429	4	6 FEB 78	GER	470DEG 38.5MIN S	57DEG 54.2MIN E	2352		1765	* SHALLOW GERARD, C-14
4	418	1	5 JAN 78	ROS	60DEG 11.2MIN N	64DEG 25.3MIN E	0309	4695	4640	* DEEP ROSETTE	5	429	5	7 FEB 78	SPE	470DEG 38.5MIN S	57DEG 54.2MIN E	0115		0	* SURFACE RA-228 FIBERS
4	418	2	5 JAN 78	GER	60DEG 11.5MIN N	64DEG 23.5MIN E	0801	4698	4634	* DEEP GERARD, C-14	5	430	6	7 FEB 78	SPE	470DEG 40.1MIN S	57DEG 51.7MIN E	1010		0	* PLANKTON NET TOW
4	418	3	5 JAN 78	ROS	60DEG 12.6MIN N	64DEG 23.6MIN E	1147	4438	1589	* SHALLOW ROSETTE	5	430	7	7 FEB 78	GER	590DE					

## STATION AND CAST DESCRIPTION

GEOSECS INDIAN OCEAN R/V MELVILLE

LEG	STATION	CAST	DATE	CAST TYPE	LATITUDE	LONGITUDE	TIME GMT	BOTTOM DEPTH	MAX DEPTH	REMARKS	LEG	STATION	CAST	DATE	CAST TYPE	LATITUDE	LONGITUDE	TIME GMT	BOTTOM DEPTH	MAX DEPTH	REMARKS
5	432	5	16 FEB 78	GER	59DEG 19.0MIN S	92DEG 41.9MIN E	1010	4221	4193	* DEEP GERARD, C-14, RA-228	6	445	1	26 MAR 78	ROS	8DEG 31.4MIN N	86DEG 2.5MIN E	1400	3659	3642	* DEEP ROSETTE, RADON
5	432	6	16 FEB 78	SPE	59DEG 19.0MIN S	92DEG 42.0MIN E	1245		0	* SURFACE RA-228 FIBERS	6	445	2	26 MAR 78	GER	8DEG 33.6MIN N	86DEG 2.1MIN E	1743	3641	3617	* DEEP GERARD, C-14
5	432	7	16 FEB 78	SPE	59DEG 20.5MIN S	92DEG 38.9MIN E	0100		0	* PLANKTON NET TOW	6	445	3	26 MAR 78	ROS	8DEG 33.8MIN N	86DEG 3.1MIN E	2023	3659	1525	* SHALLOW ROSETTE
5	433	1	18 FEB 78	ROS	53DEG 0.9MIN S	103DEG 1.5MIN E	1151	3808	3770	* DEEP ROSETTE	6	445	4	26 MAR 78	GER	8DEG 36.1MIN N	86DEG 3.0MIN E	2302	3659	1245	* SHALLOW GERARD, C-14
5	433	2	18 FEB 78	GER	53DEG 1.3MIN S	103DEG 2.0MIN E	1606	3898	2182	* DEEP GERARD, C-14	6	445	5	27 MAR 78	GER	8DEG 36.2MIN N	86DEG 3.0MIN E	0141	3648	3625	* DEEP GERARD, RA-228, RADON
5	433	3	18 FEB 78	GER	53DEG 1.5MIN S	103DEG 4.3MIN E	1826	3942	3749	* DEEP GERARD (REPEAT)	6	445	6	26 MAR 78	SPE	8DEG 36.1MIN N	86DEG 3.0MIN E	2240		0	* PLANKTON NET TOW
5	433	4	18 FEB 78	ROS	53DEG 1.6MIN S	103DEG 6.4MIN E	2103		1650	* SHALLOW ROSETTE	6	445	7	27 MAR 78	SPE	8DEG 36.2MIN N	86DEG 3.0MIN E	0220		0	* SURFACE RA-228 FIBERS
5	433	5	18 FEB 78	GER	53DEG 1.1MIN S	103DEG 6.8MIN E	2340	3820	1867	* SHALLOW GERARD, C-14	6	446	1	28 MAR 78	GER	12DEG 31.5MIN N	84DEG 30.7MIN E	0258	3316	3286	* DEEP GERARD, C-14, RADON
5	433	6	18 FEB 78	SPE	53DEG 0.9MIN S	103DEG 1.5MIN E	1120		0	* PLANKTON NET TOW	6	446	2	28 MAR 78	ROS	12DEG 29.9MIN N	84DEG 29.4MIN E	0608	3321	3308	* DEEP ROSETTE, RADON
5	433	7	18 FEB 78	SPE	53DEG 0.9MIN S	103DEG 1.5MIN E	1250		0	* SURFACE RA-228 FIBERS	6	446	3	28 MAR 78	GER	12DEG 28.6MIN N	84DEG 29.5MIN E	0856	3334	995	* SHALLOW GERARD, C-14
5	434	1	20 FEB 78	ROS	45DEG 38.3MIN S	107DEG 15.4MIN E	1901	3924	3894	* DEEP ROSETTE	6	446	4	28 MAR 78	ROS	12DEG 26.2MIN N	84DEG 28.3MIN E	1214	3338	1190	* SHALLOW ROSETTE
5	434	2	20 FEB 78	SPE	45DEG 38.3MIN S	107DEG 15.4MIN E	1850		0	* PLANKTON NET TOW	6	446	5	28 MAR 78	GER	12DEG 25.1MIN N	84DEG 28.2MIN E	1519	3340	2596	* DEEP GERARD, RA-228
5	435	1	22 FEB 78	ROS	39DEG 57.2MIN S	109DEG 58.3MIN E	0840	4636	4621	* DEEP ROSETTE, RADON	6	446	6	28 MAR 78	GER	12DEG 24.6MIN N	84DEG 28.2MIN E	1710	3330	3297	* DEEP GERARD (REPEAT-RA-228)
5	435	2	22 FEB 78	GER	39DEG 58.1MIN S	109DEG 59.0MIN E	1250	4699	4611	* DEEP GERARD, C-14, RA-228	6	446	7	28 MAR 78	ROS	12DEG 23.6MIN N	84DEG 27.2MIN E	2210		1993	* SHALLOW SINGLE ROSETTE, RADON
5	435	3	22 FEB 78	ROS	39DEG 58.6MIN S	109DEG 59.6MIN E	1615	4665	1768	* SHALLOW ROSETTE	6	446	8	28 MAR 78	SPE	12DEG 28.6MIN N	84DEG 29.5MIN E	0845		0	* PLANKTON NET TOW
5	435	4	22 FEB 78	GER	39DEG 57.8MIN S	108DEG 59.4MIN E	1901	4646	1672	* SHALLOW GERARD, C-14	6	446	9	28 MAR 78	SPE	12DEG 28.6MIN N	84DEG 27.2MIN E	2130		0	* SURFACE RA-228 FIBERS
5	435	5	22 FEB 78	GER	39DEG 57.2MIN S	110DEG 1.2MIN E	2201	4699	4556	* DEEP GERARD, RA-228	7	447	1	5 APR 78	ROS	4DEG 59.8MIN N	79DEG 57.2MIN E	0239	4198	4187	* DEEP ROSETTE, RADON
5	435	6	22 FEB 78	SPE	39DEG 57.2MIN S	110DEG 58.3MIN E	0920		0	* PLANKTON NET TOW	7	447	2	5 APR 78	GER	4DEG 58.1MIN N	79DEG 55.9MIN E	0719	4197	4158	* DEEP GERARD, C-14
5	435	7	23 FEB 78	SPE	39DEG 57.2MIN S	110DEG 1.2MIN E	0015		0	* SURFACE RA-228 FIBERS	7	447	3	5 APR 78	ROS	4DEG 56.5MIN N	79DEG 55.7MIN E	1048	4209	1498	* SHALLOW ROSETTE
6	436	1	8 MAR 78	ROS	29DEG 15.0MIN S	109DEG 58.1MIN E	1531	5572	5556	* DEEP ROSETTE, RADON	7	447	4	5 APR 78	GER	4DEG 56.7MIN N	79DEG 55.0MIN E	1341	4214	1196	* SHALLOW GERARD, C-14
6	436	2	8 MAR 78	GER	29DEG 15.1MIN S	109DEG 57.8MIN E	2101	5560	5485	* DEEP GERARD, C-14	7	447	5	5 APR 78	GER	4DEG 56.7MIN N	79DEG 55.0MIN E	1634	4194	4170	* DEEP GERARD, RA-228 FIBERS
6	436	3	9 MAR 78	ROS	29DEG 14.3MIN S	109DEG 58.1MIN E	0051	5560	2032	* SHALLOW ROSETTE	7	447	6	5 APR 78	SPE	4DEG 56.7MIN N	79DEG 55.0MIN E	1838		0	* SURFACE RA-228 FIBERS
6	436	4	9 MAR 78	GER	29DEG 14.1MIN S	109DEG 59.9MIN E	0409	5560	1492	* SHALLOW GERARD, C-14	7	447	7	5 APR 78	SPE	4DEG 59.8MIN N	79DEG 57.2MIN E	0330		0	* PLANKTON NET TOW
6	436	5	9 MAR 78	GER	29DEG 13.7MIN S	110DEG 1.7MIN E	0710	5560	3415	* DEEP GERARD (SPECIAL)	7	448	1	6 APR 78	ROS	0DEG 1.1MIN N	80DEG 3.3MIN E	2157	4651	4640	* DEEP ROSETTE, RADON
6	436	6	9 MAR 78	GER	29DEG 13.2MIN S	110DEG 3.7MIN E	1215	5560	5527	* DEEP GERARD, RA-228	7	448	2	7 APR 78	GER	0DEG 1.4MIN N	80DEG 4.2MIN E	0220	4644	4597	* DEEP GERARD, C-14, RADON
6	436	7	9 MAR 78	SPE	29DEG 13.6MIN S	110DEG 1.8MIN E	0830		0	* SURFACE RA-228 FIBERS	7	448	3	7 APR 78	ROS	0DEG 1.6MIN N	80DEG 4.6MIN E	0535	1884	1854	* SHALLOW ROSETTE
6	436	8	9 MAR 78	SPE	29DEG 14.3MIN S	109DEG 58.1MIN E	0050		0	* PLANKTON NET TOW	7	448	4	7 APR 78	GER	0DEG 1.3MIN N	80DEG 4.5MIN E	0816	4273	1590	* SHALLOW GERARD, C-14
6	437	1	11 MAR 78	ROS	24DEG 28.5MIN S	104DEG 55.8MIN E	0148	5698	1587	* SHALLOW ROSETTE	7	448	5	7 APR 78	GER	0DEG 1.4MIN N	80DEG 4.8MIN E	0949	4273	1	* SURFACE GERARD, C-14
6	437	2	11 MAR 78	GER	24DEG 28.4MIN S	104DEG 56.9MIN E	0429		719	* SHALLOW GERARD, C-14	7	448	6	7 APR 78	ROS	0DEG 2.2MIN N	80DEG 5.5MIN E	1044	4273	220	* SHALLOW ROSETTE, SURFACE RADON
6	437	3	11 MAR 78	ROS	24DEG 30.3MIN S	104DEG 58.5MIN E	0633		95	* SHALLOW ROSETTE, SURFACE RADON	7	448	7	7 APR 78	SPE	0DEG 1.1MIN N	80DEG 3.3MIN E	1135		0	* SURFACE RA-228 FIBERS
6	437	4	11 MAR 78	SPE	24DEG 30.3MIN S	104DEG 58.5MIN E	0700		0	* SURFACE RA-228 FIBERS	7	448	8	7 APR 78	SPE	0DEG 1.4MIN N	80DEG 4.2MIN E	0315		0	* PLANKTON NET TOW
6	437	5	11 MAR 78	SPE	24DEG 28.4MIN S	104DEG 56.9MIN E	0415		0	* PLANKTON NET TOW	7	449	1	8 APR 78	ROS	5DEG 0.4MIN S	79DEG 59.8MIN E	1511	5122	5107	* DEEP ROSETTE, RADON
6	438	1	12 MAR 78	ROS	19DEG 29.3MIN S	101DEG 17.5MIN E	1927	5842	5825	* DEEP ROSETTE, RADON	7	449	2	8 APR 78	GER	5DEG 0.4MIN S	80DEG 0.4MIN E	1936	5115	5089	* DEEP GERARD, C-14, RADON
6	438	2	13 MAR 78	GER	19DEG 28.0MIN S	101DEG 16.3MIN E	0126	5891	5717	* DEEP GERARD, C-14	7	449	3	8 APR 78	ROS	4DEG 59.7MIN S	80DEG 0.7MIN E	2249	5124	1836	* SHALLOW ROSETTE
6	438	3	13 MAR 78	ROS	19DEG 26.9MIN S	101DEG 15.1MIN E	0522		2378	* SHALLOW ROSETTE	7	449	4	9 APR 78	GER	4DEG 59.4MIN S	80DEG 1.6MIN E	0209	5124	1741	* SHALLOW GERARD, C-14
6	438	4	13 MAR 78	GER	19DEG 26.1MIN S	101DEG 12.0MIN E	0841		1494	* SHALLOW GERARD, C-14	7	449	5	9 APR 78	GER	4DEG 59.3MIN S	80DEG 1.0MIN E	0530	4878	4853	* DEEP GERARD, RA-228
6	438	5	13 MAR 78	GER	19DEG 25.4MIN S	101DEG 13.3MIN E	1158	5965	5787	* DEEP GERARD, RA-228	7	449	6	9 APR 78	GER	4DEG 59.0MIN S	80DEG 1.1MIN E	0922	5110	5082	* DEEP GERARD (REPEAT-RA-228)
6	438	6	13 MAR 78	SPE	19DEG 25.4MIN S	101DEG 13.3MIN E	1442		0	* SURFACE RA-228 FIBERS	7	449	7	9 APR 78	SPE	4DEG 59.0MIN S	80DEG 1.1MIN E	1000		0	* SURFACE RA-228 FIBERS
6	438	7	13 MAR 78	SPE	19DEG 28.0MIN S	101DEG 16.3MIN E	0300		0	* PLANKTON NET TOW	7	449	8	8 APR 78	SPE	5DEG 0.4MIN S	79DEG 59.8MIN E	1510		0	* PLANKTON NET TOW
6	439	1	15 MAR 78	ROS	13DEG 2.2MIN S	97DEG 8.9MIN E	1904	4699	1487	* SHALLOW ROSETTE	7	450	1	10 APR 78	ROS	10DEG 0.5MIN S	79DEG 59.2MIN E	1551	5347	5334	* DEEP ROSETTE, RADON
6	439	2	15 MAR 78	GER	13DEG 2.7MIN S	97DEG 7.5MIN E	2200	4699	1495	* SHALLOW GERARD, C-14	7	450	2	10 APR 78	GER	9DEG 58.1MIN S	79DEG 59.5MIN E	2028	5362	5325	* DEEP GERARD, C-14, RADON
6	439	3	15 MAR 78	SPE	13DEG 2.7MIN S	97DEG 7.5MIN E	2230		0	* PLANKTON NET TOW	7	450	3	10 APR 78	ROS	9DEG 57.6MIN S	79DEG 59.7MIN E	2359	1836	1836	* SHALLOW ROSETTE
6	440	1	17 MAR 78	ROS	9DEG 21.8MIN S	95DEG 1.7MIN E	0612	5255	5238	* DEEP ROSETTE, RADON	7	450	4	11 APR 78	GER	9DEG 56.9MIN S	79DEG 58.7MIN E	0256	1446	1446	* SHALLOW GERARD, C-14
6	440	2	17 MAR 78	GER	9DEG 20.4MIN S	94DEG 59.4MIN E	1057	5091	5063	* DEEP GERARD, C-14	7	450	5	11 APR 78	GER	9DEG 56.9MIN S	79DEG 58.7MIN E	0417	1746	1746	* SHALLOW GERARD (REPEAT-C-14)
6	440	3	17 MAR 78	ROS	9DEG 19.3MIN S	95DEG 0.3MIN E	1548		2081	* SHALLOW ROSETTE	7	450	6	11 APR 78	GER	9DEG 57.9MIN S	79DEG 59.2MIN E	0708	5359	5336	* DEEP GERARD, RA-228
6	440	4	17 MAR 78	GER	9DEG 18.0MIN S	95DEG 1.1MIN E	1906		1822	* SHALLOW GERARD, C-14	7	450	7	11 APR 78	PMP	9DEG 59.8MIN S	80DEG 5.7MIN E	1956		4920	* DEEP PUMP
6	440	5	18 MAR 78	PMP	9DEG 19.6MIN S	94DEG 53.7MIN E	0859		4500	* DEEP PUMP	7	450	8	11 APR 78	SPE	9DEG 57.9MIN S	79DEG 59.2MIN E	1015		0	* SURFACE RA-228 FIBERS
6	440	6	18 MAR 78	GER	9DEG 20.1MIN S	94DEG 54.1MIN E	1246	4912	4883	* DEEP GERARD, RA-228	7	450	9	10 APR 78	SPE	9DEG 57.9MIN S	79DEG 59.2MIN E	1800		0	* PLANKTON NET TOW
6	440	7	18 MAR 78	ROS	9DEG 20.5MIN S	94DEG 53.2MIN E	1553		57	* SHALLOW ROSETTE, SURFACE RADON	7	451	1	13 APR 78	ROS	14DEG 59.2MIN S	79DEG 57.6MIN E	0320	5016	5001	* DEEP ROSETTE, RADON
6	440	8	17 MAR 78	SPE	9DEG 18.0MIN S	95DEG 1.1MIN E	1833		0	* SURFACE RA-228 FIBERS	7	451	2	13 APR 78	GER	14DEG 59.3MIN S	79DEG 56.5MIN E	0738	4905	4874	* DEEP GERARD, C-14
6	440	9	17 MAR 78	SPE	9DEG 21.8MIN S	95DEG 1.7MIN E															

PRECISION OF GEOSECS  
SHIPBOARD DATA

## Preface

The utility of any set of data depends, ultimately, on the precision with which that data has been measured. An important part of the GEOSECS program is the acquisition of precisely determined profiles of salinity, temperature, dissolved oxygen, nutrients, total carbon dioxide and alkalinity. Most of these constituents have been determined at about 45 depths at 113 stations in the Atlantic Ocean, 144 stations in the Pacific Ocean and 51 stations in the Indian Ocean. Prior to the expeditions, targets had been set for the precisions that should be attained, generally less than 1.5% coefficient of variation (c.v.) for the nutrients, less than 0.5% c.v. for dissolved oxygen, less than 0.2% c.v. for alkalinity, less than 0.5% c.v. for total carbon dioxide, less than 0.003‰ standard deviation (s.d.) for salinity and less than 0.005°C s.d. for temperature. These targets represented realistic limits that could be approached during routine operations using the best methods available.

## HYDROGRAPHIC, NUTRIENT, AND OXYGEN DATA

During the GEOSECS expeditions three methods of obtaining precision estimates were attempted:

### 1. Replicate sampling at a single depth

At one or more depths during a cast, two Niskin bottles were tripped at the same depth. The analysts, unaware of this duplication, analyzed the duplicates as separate samples. Assuming that the error is independent of the level of the constituent, the mean difference between the first and second bottle tripped at the same depth should be zero, and the standard deviation of the difference will be a measure of the overall precision attained by the sampling and analytical procedures. On several occasions, sometimes by accident, multiple samples were taken and these may be used to determine precision estimates.

### 2. Well mixed water column

Assuming that adiabatic bottom water, encountered at several stations, is a well mixed reservoir for all of the constituents, then samples taken at various depths within such a water column can be used to estimate the precision of the sampling and analytical techniques.

### 3. Reoccupation of a station

Provided that the vertical profile of a constituent is stationary over a short period of time, reoccupation of a station and sampling and analysis of the water column at a later date should give a set of data whose mean deviation from the original profile is a measure of the overall sampling and analytical precision.

Ideally, we would like to establish the precision with which it is possible to dip into a homogeneous solution and determine a constituent over periods long enough that errors due to changes in standards, operators and instrument drift are included. Clearly none of the above methods meet this ideal.

Replicate sampling at a single depth comes as close as possible to the goal of sampling a homogeneous solution, but the replicated data are produced in a short time by a single operator using the same standards. Precision estimates determined in this way will be minimized. Method 2 suffers similar drawbacks, but has the added condition that a water column "well mixed" for potential temperature may not be so for other properties.

Method 3 overcomes the short analysis period problems, but it was evident in two station reoccupations in the Atlantic that the assumption of a stationary water column was invalid.

During the GEOSECS Pacific and Indian Oceans Expeditions the design of the track excluded station reoccupation. Further, the shortage of time, the depth of the water column and perhaps the inclinations of the chief scientists led to a decreased number of deliberate duplicate samplings. However, sufficient replications and instances of adiabatic water columns were encountered so that some reasonable precision estimates may be attempted.

## Methods of Operation, Sampling and Analyses

Throughout the GEOSECS program samples for salinity, dissolved oxygen and nutrient analyses were collected in 30-liter P.V.C. Niskin sample bottles mounted on General Oceanics rosette samplers. In general, two casts were made at each station, each cast having two rosettes with a total of 22 to 24 bottles. The lower rosette was equipped with a Neil Brown CTD for *in-situ* measurement of conductivity, temperature, and pressure. Reversing racks containing two protected and one unprotected deep sea reversing thermometers (DSRT's) were mounted on 3 or 4 bottles of each rosette.

Specially designed 4°C (-2° to +2° and 0° to 4°) range DSRT's were built for GEOSECS by Kahl Scientific Instrument Co., incorporating the suggestions of Folsom *et al.* (1) and of Nordstrom and Folsom (2) in order to eliminate possible pressure effects upon protected thermometers. The main scales were etched to 0.01°C and the auxiliary scales to 0.1°C, making it possible to read and correct those thermometers to the nearest 0.001°C. These low range thermometers, along with higher range protected and unprotected thermometers, were used to check the temperature and pressure calibration of the CTD's used on the GEOSECS Indian Ocean Expedition. Output from the CTD's provides the basic *in-situ* temperature and pressure data for the sampled levels. On rare occasions when the CTD's failed to function, various range thermometers were used on 30-liter Niskin bottles and the casts were done on the hydrographic wire. Temperatures were listed to the nearest 0.001°C

where paired low range thermometers agreed within 0.005°C, and for CTD temperatures with good calibration checks. Higher range thermometers or CTD temperatures with insufficient calibration were listed to 0.01°C.

The thermometers were calibrated at SIO both before and after the Indian Ocean Expedition against standard thermometers calibrated by the National Bureau of Standards and checked periodically against several triple point cells.

Salinities were analyzed on a University of Washington conductive salinometer calibrated against Copenhagen standard seawater. Each sample was run twice within two days of collection.

Dissolved oxygen samples were titrated in calibrated 125 ml iodine flasks with a 1 ml microburet, following the technique of Carpenter (3). Standardizations were performed with 0.01N potassium iodate solutions freshly prepared for each leg from preweighed potassium iodate crystals.

Phosphate, silicate, and nitrate analyses were performed on a Technicon AutoAnalyzer<sup>®</sup>. The procedures used are described in Hager *et al.* (4) and Atlas *et al.* (5). Standardizations were performed with solutions prepared aboard ship from preweighed standards; these solutions were used as working standards before and after each cast (approximately 22 samples) to correct for instrumental drift during analyses. Sets of 4-6 different concentrations of shipboard standards were analyzed periodically to determine the linearity of colorimeter response and the resulting correction factors. The silicate response was nonlinear at higher concentrations, while the phosphate and nitrate were usually linear.

## Results

The CTD temperatures were calibrated *in-situ* against paired deep sea reversing thermometers. Each of the CTD's had a different temperature offset. Small offsets varying from instrument to instrument remained as a result of the technique of calibration. The CTD's were typically given an approximate

Table 1—Precision of Deep Sea Reversing Thermometers Used on the GEOSECS Indian Ocean Expedition

Range, °C	Etching Interval, °C	1 Standard Deviation, °C
-2 to 30	0.1	0.009
-2 to 16	0.05	0.006
-2 to 6 or 0 to 8	0.02	0.002
0 to 4 or -2 to 2	0.01	0.002

calibration before being sent to sea, with the understanding that the final calibration of the temperature and conductivity would depend upon bottle data.

Although the CTD temperature probe has a sensitivity on the order of 0.001°C, its accuracy is limited by the precision and accuracy of the DSRT's used for calibration. Table 1 lists the precision of various range DSRT's, based upon paired thermometers read by two different observers. As a rule of thumb, the potential precision of the water temperature from four DSRT readings is approximately one-tenth of a scale etching.

Comparisons of the corrected CTD temperatures against the 4°C DSRT calibration check gave a mean difference of zero and a standard deviation of 0.005°C. At warmer temperatures, two problems common to all GEOSECS expeditions were encountered: 1) higher range DSRT's with poorer precision

Table 2—Statistics for Duplicated Samples

	Mean Difference	Std. Dev. of Differences	Std. Dev. Median Range X 100	Number of Duplicates
<b>DEEPER THAN 100 METERS</b>				
Potential Temperature (°C)				
	0.0001	0.0003		31
Salinity (‰)	0.0001	0.0010		31
Oxygen (μM/kg)	0.6		0.40	30
Silicate (μM/kg)	0.21		0.14	30
Phosphate (μM/kg)				
	0.005		0.23	30
Nitrate (μM/kg)	0.00		0.15	30
<b>SHALLOWER THAN 100 METERS</b>				
Potential Temperature (°C)				
	0.0003	0.0012		16
Salinity (‰)	0.0028	0.0028		16
Oxygen (μM/kg)	4.8		0.96	8
Silicate (μM/kg)	0.06		0.07	8
Phosphate (μM/kg)				
	0.006		0.21	8
Nitrate (μM/kg)	0.00		0.00	8

Table 3—Statistics on Replicate Samples.  
Means and Standard Deviations ( ).

Station	Depth m.	(No.)	Temperature °C	Salinity ‰
403	1990	(11)	12.734 (0)	38.427 (0.0004)
415	3718	(9)	1.394 (0)	34.738 (0.0005)
437	9	(4)	24.304 (0)	35.738 (0.0015)
446	1993	(3)	2.664 (0)	34.777 (0.0005)

had to be used for calibration checks; and 2) the calibrations at warmer temperatures were usually on the upper rosette, nominally at 10 meters above the CTD sensor. Slight depth errors in the rosette spacing in regions of large temperature gradients resulted in unsatisfactory calibration checks. As a consequence, it is difficult to demonstrate that the target precision of 0.005°C was met in the warmer upper water column but all of the deep water temperatures were within the desired precision.

Sampling in duplicate, with the deliberate intent of determining precision estimates of salinity, dissolved oxygen and nutrients, was performed infrequently on most of the legs of the Indian Ocean expedition. However, a number of duplicates are available from the last 2 legs, and the statistics are given in Table 2 in two groups, below and above 100 meters. For temperature and salinity, the standard deviations of the differences are shown in column two, with the number of paired sample depths in column four. Following our procedures in the Atlantic (6) and Pacific (7) and as the statistic "coefficient of variation" has no meaning for these data, we quote a somewhat equivalent statistic "(standard deviation/median range) × 100" as precision estimates for dissolved oxygen and nutrients in column three.

On four occasions, at Stations 403, 415, 437 and 446, more than two samples were tripped at the same depth or within a very small depth range. Means and standard deviations for the temperature and salinity data from these samples are given in Table 3.

At 24 of the 51 stations of the Indian Ocean expedition the bottom water appeared to be sufficiently well mixed so that precision estimates could be attempted. Standard deviations of the bottom potential temperatures and salinities, and the coefficients of variation for nutrients and dissolved oxygen from these stations are given in Table 4.

The data in Tables 2, 3, and 4 indicate that the target precisions for these properties have been met or exceeded during the Indian Ocean expedition.

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August 1982

Table 4—Statistics For Adiabatic Bottom Water

Station	Below depth m.	N	Standard Deviation		Coefficient of variation (%)			
			Pot. temp.	Salinity	O <sub>2</sub>	SiO <sub>3</sub>	PO <sub>4</sub>	NO <sub>3</sub>
415	3915	3	0.0000	0.0005				
417	4043	6	0.0008	0.0015		0.11	0.00	0.14
420	5050	3	0.0005	0.0005	0.00	0.11	0.00	0.14
422	4109	5	0.0005	0.0008	0.00	0.24	0.24	0.12
428	5245	5	0.0010	0.0005	0.22	0.12	0.28	0.00
432	4432	4	0.0019	0.0010	0.21	0.27	0.22	0.16
435	4558	5	0.0010	0.0000	0.00	0.07	0.22	0.00
436	5480	6	0.0006	0.0015	0.33	0.07	0.17	0.15
438	5657	7	0.0015	0.0013	0.55	0.17	0.22	0.12
440	5113	8	0.0010	0.0010	0.30	0.10	0.15	0.00
441	4807	6	0.0014	0.0007	0.24	0.07	0.22	0.15
442	4531	5	0.0006	0.0006	0.00	0.12	0.18	0.12
443	4426	5	0.0011	0.0005				
444	4329	7	0.0010	0.0003	0.26	0.08	0.21	0.15
445	3586	5	0.0012	0.0005	0.42	0.07	0.16	0.00
446	3226	6	0.0004	0.0005	0.32	0.05	0.19	0.13
447	4073	6	0.0014	0.0010	0.00	0.17	0.16	0.15
448	4550	6	0.0008	0.0015	0.70	0.15	0.16	0.15
449	5052	5	0.0012	0.0006	0.43	0.08	0.00	0.12
450	5123	9	0.0007	0.0005	0.26	0.23	0.14	0.14
451	4750	9	0.0009	0.0010	0.23	0.32	0.22	0.22
452	4613	7	0.0007	0.0007	0.27	0.05	0.23	0.15
453	4093	5	0.0011	0.0005	0.21	0.09	0.22	0.15
454	4754	4	0.0012	0.0007	0.23	0.09	0.19	0.00
Averages			0.0009	0.0008	0.26	0.13	0.17	0.11

## PRECISION AND ACCURACY OF THE GEOSECS INDIAN OCEAN ALKALINITY AND TOTAL CO<sub>2</sub> CONCENTRATION DATA

During the GEOSECS Expedition in the Indian Ocean, December 1977 through April 1978, discrete seawater samples were collected using 30-liter Niskin samplers made of PVC and analyzed for the alkalinity and dissolved total inorganic CO<sub>2</sub> using the potentiometric acid titration method. In this chapter the precision, accuracy and internal consistency of these data will be discussed.

### *Accuracy and Calibration:*

The alkalinity and total CO<sub>2</sub> concentration in seawater have been determined using the potentiometric acid titration method and the Gran method of data reduction. The automatic titrator, which was originally designed and constructed by the late A. E. Bainbridge and Mike Morrione, has been used throughout the GEOSECS Indian Ocean. The titrator system is basically unchanged since its use during the GEOSECS Pacific Expedition and is described in detail by Bos and Williams (8). The titrator was calibrated repeatedly throughout the Indian Ocean Expedition using standard solutions prepared of sodium borate decahydrate crystals and triple-distilled water. The ionic strength of the standard solutions was adjusted to that of seawater (0.7) using KCl. It would be noted that NaCl was used for this purpose during the GEOSECS Atlantic (except Leg 6) and Pacific Program. Since NaCl gave high alkalinity blank values, it was replaced with KCl for the Indian Ocean Expedition. While a blank correction of 21  $\mu\text{Eq/kg}$  was applied to the GEOSECS Atlantic and Pacific data, a blank correction of 5  $\mu\text{Eq/kg}$  has been used for the GEOSECS Indian Ocean data. Since the nature of the alkalinity blank associated with NaCl or KCl is not well understood, the alkalinity values reported in this volume may be subjected to a systematic error of up to 5  $\mu\text{Eq/kg}$ .

The titration data were reduced to yield the alkalinity values using a modified Bainbridge computer program, which was also used for reduction of the GEOSECS Pacific data. Recently, Bradshaw *et al.* (9) have found some errors in this program, and proposed an improved version. They computed the alkalinity using the GEOSECS Pacific and Indian Ocean Expeditions program and the one used for the Atlantic Expedition and compared the results with those computed with their improved program. The alkalinity values obtained using the GEOSECS Pacific and Indian Ocean program are found to be virtually identical to those obtained using their new program. On the other hand, those obtained using the GEOSECS Atlantic program are 1 to 2  $\mu\text{Eq/kg}$  greater than those computed using their new program. Therefore, it appears that a systematic error introduced by using different programs is no greater than 2  $\mu\text{Eq/kg}$ .

The total CO<sub>2</sub> concentrations reported in this volume have also been computed from the titration data using the modified Bainbridge program. Bradshaw *et al.* (9) have found that the program used for the Pacific and Indian Ocean Expeditions yields a total CO<sub>2</sub> value too high by 12  $\mu\text{M/kg}$  on the average. Furthermore, on the basis of about 200 measurements of pCO<sub>2</sub> in water samples, it has been found that the alkalinity, total CO<sub>2</sub> concentration and pCO<sub>2</sub> values are not consistent with the first and second apparent dissociation constants of carbonic acid determined by Mehrbach *et al.* (10). A correction of  $-18 \pm 7 \mu\text{M/kg}$  to the total CO<sub>2</sub> concentration is needed in order to bring these three quantities consistent with the dissociation constants. On the basis of pCO<sub>2</sub> measurements obtained during the GEOSECS Pacific, Broecker and Takahashi (11) had previously proposed a correction of  $-15 \mu\text{M/kg}$  for the GEOSECS Pacific total CO<sub>2</sub> concentration data. Keeling (personal communication) reported that the total CO<sub>2</sub> concentrations which were determined by means of his gasometric method in 33 water samples collected during the GEOSECS Indian Ocean Expedition are systematically smaller than the titrimetric total CO<sub>2</sub> values by  $16.5 \pm 4.7 \mu\text{M/kg}$ . Therefore, the titrimetric total CO<sub>2</sub> values reported in this volume appear to be too high by 12 to 18  $\mu\text{M/kg}$ , and accordingly, a correction of  $-15 \mu\text{M/kg}$  is recommended for the total CO<sub>2</sub> concentration data reported in this volume.

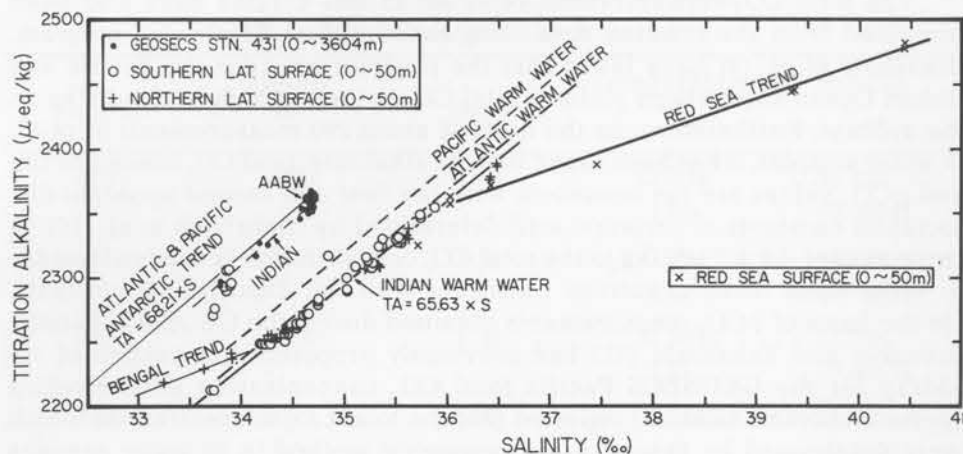
### *Precision of the Alkalinity and Total CO<sub>2</sub> Measurements:*

#### a) Precision at a single station:

The precision or the reproducibility of the alkalinity and total CO<sub>2</sub> measurements at a single station may be evaluated by examining the data obtained for the deep water samples below about 4000 meters, which have nearly the same  $\sigma_t$  density, oxygen, and nutrient concentrations. Based upon 130 measurements each for the alkalinity and total CO<sub>2</sub> concentration obtained at 25 stations, the precision of measurements at a single station has been estimated to be  $\pm 2 \mu\text{Eq/kg}$  (one standard deviation) for the alkalinity and  $\pm 4 \mu\text{M/kg}$  (one standard deviation) for the total CO<sub>2</sub> concentration. Thus, the precisions attained for the GEOSECS Indian Ocean Expedition appear to be improved by nearly a factor of 2 over the results of the GEOSECS Atlantic and Pacific.

#### b) Station-to station reproducibility:

The station-to-station reproducibility of the alkalinity data may be evaluated by examining its relationship with salinity in surface water. Figure 1 shows a plot of the alkalinity obtained at various stations and salinity in upper 50 meters. Four linear trends have been recognized by Takahashi *et al.* (12): the Indian Warm Water, Red Sea, Bengal, and Antarctic trends. On the basis of a linear regression analysis of the data presented in Figure 1, the



**FIGURE 1.** The relationship between the alkalinity and salinity observed in surface water. Four linear trends are recognized in the GEOSECS Indian Ocean data: Indian Warm Water, Red Sea, Bengal, and Antarctic trends. The Indian Warm Water and Antarctic (Indian Ocean Sector) trends are displaced downward by about  $6 \mu\text{Eq/kg}$  compared to the respective trends in the Atlantic. The Pacific Warm Water trends are about  $20 \mu\text{Eq/kg}$  and  $26 \mu\text{Eq/kg}$  greater than the Atlantic and Indian Warm Water trends. The differences appear to be within the limits of systematic errors caused by the alkalinity blank.

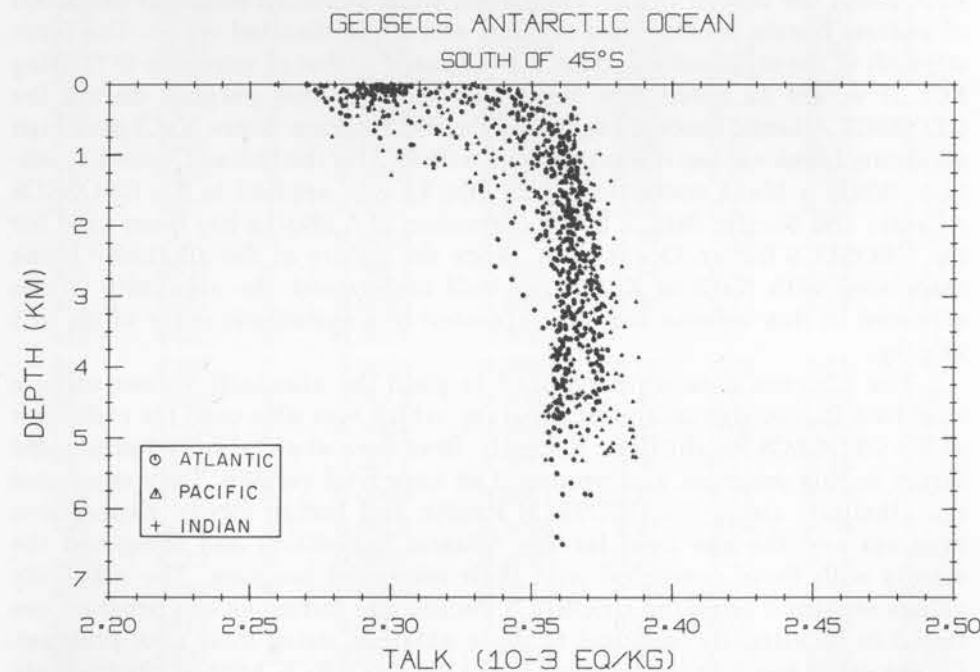
station-to-station reproducibility of the alkalinity data in surface water has been estimated to be  $\pm 4 \mu\text{Eq/kg}$  (one standard deviation). Furthermore, a comparison of the alkalinity values in deep water samples collected below 4000 meters at adjacent stations also indicates that the station-to-station reproducibility is consistent with this estimate.

Similarly, the reproducibility for the total  $\text{CO}_2$  measurements has been estimated to be  $\pm 10 \mu\text{M/kg}$  on the basis of a) a comparison of deep water values at adjacent stations, b) a comparison with the alkalinity and  $\text{pCO}_2$  data, and c) the observed relationship between the total  $\text{CO}_2$  concentration and temperature in surface water samples.

#### Inter-Ocean Comparison:

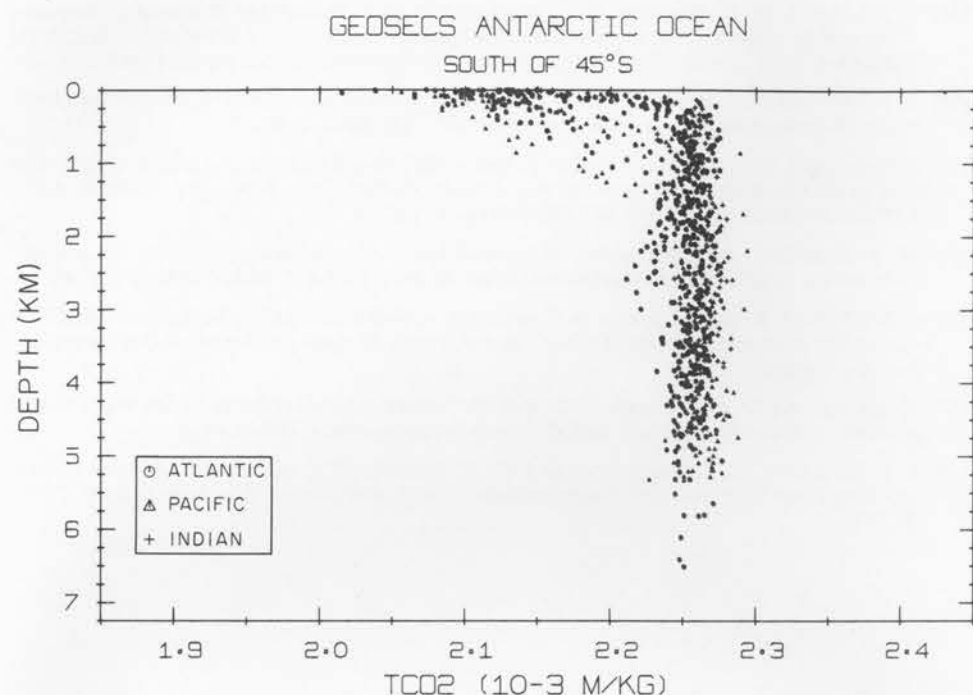
As shown in Figure 1, both the Indian Warm Water and Antarctic (Indian Ocean Sector) alkalinity trends in surface water are systematically displaced downward by  $6 \pm 4 \mu\text{Eq/kg}$  compared to the respective trends observed for the GEOSECS Atlantic data. As discussed earlier, the difference in the data reduction programs used for the Atlantic and the Indian Ocean studies can account for 1 to  $2 \mu\text{Eq/kg}$  of this difference. If a  $-2 \mu\text{Eq/kg}$  correction is applied to the GEOSECS Atlantic alkalinity data, the Atlantic data can be brought into agreement with the Indian Ocean data within the observed standard deviation of the data sets.

It is also observed in Figure 1 that the Pacific Warm Water trend lies as much as  $20 \mu\text{Eq/kg}$  and  $26 \mu\text{Eq/kg}$  above the Atlantic Warm Water and Indian Ocean Warm Water trends respectively, although the Antarctic trends observed for the GEOSECS Atlantic and Pacific data are mutually consistent. Furthermore, the surface water alkalinity values obtained during the more recent NORPAX Hawaii-Tahiti Shuttle Experiment in the equatorial Pacific in April 1979 (13), using the same instrument and techniques are systematically smaller than the GEOSECS Pacific alkalinity data by  $11 \pm 4 \mu\text{Eq/kg}$ . Thus, the GEOSECS Pacific alkalinity data appear to be systematically greater than the results of other expeditions. Even if the GEOSECS Pacific data are corrected by  $-11 \mu\text{Eq/kg}$  to conform with the new Shuttle Experiment data, they still appear to be greater than the GEOSECS Atlantic and Indian Ocean data by 9 to  $15 \mu\text{Eq/kg}$ . The magnitude of this difference is, however, smaller than the alkalinity blank correction  $21 \mu\text{Eq/kg}$  applied to the GEOSECS Pacific data. Since this blank correction represents an average value of about 100 determinations with a standard deviation of  $\pm 11 \mu\text{Eq/kg}$ , the difference between the GEOSECS Pacific and Indian Ocean data appears to be within the magnitude of uncertainty caused by the alkalinity blank. Furthermore, the alkalinity blank value is used for the computation of the titrator cell volume, and thus it affects the total  $\text{CO}_2$  concentration. Accordingly, the



**FIGURE 2.** The alkalinity data of the GEOSECS Atlantic, Pacific, and Indian Ocean Expeditions in the Circumpolar region, south of  $45^\circ\text{S}$ . Below 1500 meters deep, the data from these three expeditions agree within  $\pm 8 \mu\text{Eq/kg}$  (one standard deviation).





**FIGURE 3.** The total  $\text{CO}_2$  data of the GEOSecs Atlantic, Pacific, and Indian Ocean Expeditions in the Circumpolar region, south of  $45^\circ\text{S}$ . The Pacific and Indian Ocean data have been corrected by  $-15 \mu\text{M}/\text{kg}$ . Below 1500 meters deep, the data from these three expeditions agree within  $\pm 11 \mu\text{M}/\text{kg}$  (one standard deviation).

GEOSecs total  $\text{CO}_2$  concentration data for these three oceans are also subjected to systematic errors of a similar magnitude.

In order to illustrate the magnitude of inter-ocean compatibility in the GEOSecs alkalinity and total  $\text{CO}_2$  data, the data obtained in the Circumpolar region, south of  $45^\circ\text{S}$ , are plotted in Figures 2 and 3 as a function of water depth, using three different symbols. The total  $\text{CO}_2$  values for the GEOSecs Pacific and Indian Ocean have been corrected by  $-15 \mu\text{M}/\text{kg}$ . It is seen that the data obtained during these three GEOSecs Expeditions are mutually consistent within  $\pm 8 \mu\text{Eq}/\text{kg}$  for the alkalinity and  $\pm 11 \mu\text{M}/\text{kg}$  for the total  $\text{CO}_2$  concentration below the water depth of 1500 meters. More detailed statistical analyses of the GEOSecs alkalinity, total  $\text{CO}_2$ , oxygen and nutrient data have been presented by Takahashi *et al.* (14).

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May 1982

## GEOSecs SHIPBOARD $^{222}\text{Rn}$ MEASUREMENTS

### Method of Sampling and Analysis

Water samples were obtained with 30-liter Niskin bottles. All the bottom  $^{222}\text{Rn}$  samples and some of the surface samples were obtained by Niskins attached to a rosette. Most of the surface samples were obtained with Niskin bottles attached directly to a hydrowire. The bottom profiles were normally taken with the lower rosette of a double-rosette sampling system. Ten or eleven 30-liter Niskin bottles, a Bainbridge-Brown CTD, and oxygen probe, a pinger, and infrequently a carbonate saturometer, were typically mounted on the lower rosette.

Once the Niskin bottles were on the ship, the first sample drawn was for oxygen. This used approximately 0.5 liter of water. The next sample drawn was for  $^{222}\text{Rn}$ . A 20-liter flint glass sample bottle was connected by hose to the Niskin drain valve and the air vent was opened. The flint glass bottle, previously evacuated, was permitted to fill with water and was then sealed. Normally, the sample was between 19 and 20 liters. In the case of bottom samples, a filter was placed in line for particulates. The drawing procedure would take about one hour. Surface samples were not filtered, and the drawing procedure would take less than five minutes.

The analytical procedures and equipment were basically the same as those described by Broecker (15) except that the counting system was independent of the extraction system. The counting system was provided by the Lamont-Doherty Geological Observatory (LDGO); the extraction system was provided by the Scripps Institution of Oceanography (SIO). The counting cells were coupled to the extraction by means of a Swagelok double-ended Quick-Connect fitting. The procedures and equipment used during GEOSecs are described in detail by Mathieu *et al.* (16). The SIO radon extraction system utilized 13x molecular sieves to trap radon at the dry ice temperature.

### Data Presentation

The radon activities and standard deviations calculated for the  $^{222}\text{Rn}$  measurements are reported in the data tables. The tabulated data are the total radon activities at collection time. The data from Legs 4 and 5 were measured by the SIO group, while those of Legs 6 and 7 were measured by the LDGO group. The SIO data expressed as excess radon were published by Chung and Kim (17). The LDGO data were calculated by the method of Sarmiento *et al.* (18). Complete details of the calculations and laboratory intercalibrations based on Atlantic and Pacific samples are given in Mathieu *et al.* (16).

The  $^{222}\text{Rn}$  which is of greatest interest near the ocean floor is that which originates in the sediments and is in excess of  $^{222}\text{Rn}$  supported by *in situ*  $^{226}\text{Ra}$  decay. Near the ocean surface the radon which is of interest is that part of the supported  $^{222}\text{Rn}$  which escapes from the ocean to the atmosphere by gas exchange. To calculate these concentrations from the measurements reported in Chapter 4, we must know the  $^{226}\text{Ra}$  concentrations. Measurements of these were made on shore and will be reported with other shorebased measurements.

Yu-Chia Chung, SIO  
Wallace S. Broecker, LDGO  
Jorge Sarmiento, Princeton University  
September 1981

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HYDROGRAPHIC DATA

STATION: 403 LEG: III POSITION: 37° 41' N 8° 5' E DATE: 7 DEC 77

SAMPLE NO.	PRESS DB	DEPTH M	TEMP DEG C	POT TEMP DEG C	SALINITY 0/00	SIGMA 0	SIGMA 2	SIGMA 4	SIGMA Z	OXYGEN μM/KG	SiO <sub>2</sub> μM/KG	PO <sub>4</sub> μM/KG	NO <sub>3</sub> μM/KG	DEPTH M
113	2	2	16.872	16.872	37.415	27.422	35.958	44.105	27.431					2
1201	37	37	16.670	16.664	37.4780	27.521	36.063	44.215	27.683					37
1202	63	63	16.650	16.639	37.606D	27.625	36.166	44.318	27.900					63
1203	92	91	16.005	15.990	37.623D	27.793	36.356	44.528	28.196					91
1204	155	154	13.807	13.784	38.159D	28.705	37.340	45.579	29.389					154
1205	214	212	13.638	13.606	38.361D	28.899	37.538	45.781	29.844					212
1206	263	261	13.933	13.893	38.559D	28.990	37.616	45.846	30.148					261
1207	317	314	13.836	13.788	38.603D	29.047	37.676	45.909	30.443					314
1208	417	413	13.384	13.322	38.526D	29.088	37.735	45.985	30.926					413
1209	551	546	13.262	13.180	38.516D	29.110	37.763	46.018	31.536					546
1210	676	670	13.130	13.029	38.487D	29.119	37.778	46.039	32.093					670
1211	800	792	13.062	12.943	38.468D	29.123	37.786	46.050	32.638					792
1212	900	891	13.037	12.903	38.463D	29.127	37.792	46.057	33.078					891
1213	1006	996	13.013	12.862	38.453D	29.128	37.794	46.061	33.539					996
1214	1107	1095	12.999	12.833	38.447D	29.130	37.797	46.065	33.979					1095
1215	1206	1193	12.988	12.806	38.442D	29.131	37.800	46.069	34.408					1193
1216	1353	1338	12.986	12.781	38.437D	29.133	37.802	46.072	35.043					1338
1217	1502	1485	12.992	12.763	38.433D	29.133	37.803	46.074	35.683					1485
1218	1651	1632	13.003	12.750	38.432D	29.135	37.806	46.077	36.323					1632
1219	1799	1777	13.018	12.741	38.432D	29.137	37.808	46.080	36.955					1777
1220	1900	1877	13.031	12.737	38.430D	29.136	37.807	46.079	37.383					1877
119	2015	1990	13.043	12.730	38.428	29.136	37.807	46.080	37.871					1990
123	2015	1990	13.043	12.730	38.428	29.136	37.807	46.080	37.871					1990
117	2016	1991	13.043	12.730	38.427	29.135	37.807	46.079	37.874					1991
116	2016	1991	13.043	12.730	38.427	29.135	37.807	46.079	37.874					1991
120	2016	1991	13.043	12.730	38.427	29.135	37.807	46.079	37.874					1991
118	2016	1991	13.043	12.730	38.427	29.135	37.807	46.079	37.874					1991
124	2017	1992	13.043	12.730	38.427	29.135	37.807	46.079	37.879					1992
121	2017	1992	13.043	12.730	38.427	29.135	37.807	46.079	37.879					1992
122	2017	1992	13.043	12.730	38.427	29.135	37.807	46.079	37.879					1992
114	2017	1992	13.043	12.730	38.427	29.135	37.807	46.079	37.879					1992
115	2017	1992	13.043	12.730	38.427	29.135	37.807	46.079	37.879					1992

BOTTOM DEPTH OF CAST 1 IS 2757

STATION: 404 LEG: III POSITION: 35° 35' N 17° 15' E DATE: 9 DEC 77

SAMPLE NO.	PRESS DB	DEPTH M	TEMP DEG C	POT TEMP DEG C	SALINITY 0/00	SIGMA 0	SIGMA 2	SIGMA 4	SIGMA Z	OXYGEN μM/KG	SiO <sub>2</sub> μM/KG	PO <sub>4</sub> μM/KG	NO <sub>3</sub> μM/KG	DEPTH M
101	26	26	17.542	17.537	37.980	27.691	36.197	44.317	27.804	243	0.4	0.03	0.0	26
102	79	78	16.531	16.518	38.336	28.214	36.750	44.897	28.559	242	0.6	0.04	0.1	78
103	89	88	15.856	15.841	38.429	28.447	37.005	45.172	29.837	247	0.8	0.03	0.1	88
104	136	135	14.574	14.553	38.603	28.878	37.479	45.686	29.476	229	1.4	0.03	0.9	135
105	149	148	14.571	14.548	38.638	28.906	37.507	45.714	29.561	220	1.8	0.04	1.9	148
106	165	164	15.067	15.041	38.880	28.980	37.560	45.748	29.704	221	1.5	0.05	1.6	164
107	195	193	14.693	14.662	38.820	29.020	37.615	45.815	29.877	213	2.4	0.10	2.9	193
108	347	344	14.257	14.203	38.818	29.122	37.732	45.949	30.646	208	3.9	0.15	3.8	344
109	497	493	14.033	13.956	38.795	29.158	37.779	46.004	31.340	203	5.1	0.17	4.3	493
110	670	664	13.822	13.719	38.750	29.175	37.805	46.039	32.113	197	6.3	0.20	4.8	664
111	849	841	13.729	13.598	38.731	29.187	37.821	46.059	32.903	190	7.1	0.21	5.1	841
112	1104	1092	13.654	13.483	38.711	29.196	37.835	46.078	34.017	190	8.1	0.22	5.1	1092
114	1113	1101	13.654	13.481	38.710	29.196	37.835	46.077	34.055	188	7.9	0.22	5.1	1101
115	1348	1333	13.638	13.427	38.701	29.200	37.842	46.086	35.070	187	8.3	0.22	5.1	1333
116	1646	1627	13.633	13.374	38.690	29.203	37.847	46.093	36.347	188	8.6	0.21	5.0	1627
117	1990	1965	13.641	13.324	38.680	29.206	37.852	46.100	37.810	191	8.5	0.20	4.8	1965
118	2384	2352	13.667	13.282	38.672	29.209	37.856	46.106	39.470	193	8.5	0.19	4.7	2352
119	2779	2740	13.708	13.253	38.667	29.211	37.859	46.110	41.118	194	8.6	0.19	4.7	2740
120	3133	3086	13.755	13.236	38.663	29.212	37.861	46.112	42.581	193	8.9	0.19	4.7	3086
121	3337	3286	13.791	13.235	38.663	29.212	37.861	46.113	43.419	195	8.8	0.19	4.7	3286
122	3539	3483	13.828	13.234	38.663	29.212	37.861	46.113	44.244	194	8.9	0.19	4.7	3483
123	3845	3782	13.885	13.233	38.663	29.212	37.861	46.113	45.487	194	9.0	0.19	4.7	3782
124	4088	4019	13.930	13.232	38.664	29.213	37.863	46.114	46.469	194	9.1	0.19	4.7	4019

BOTTOM DEPTH OF CAST 1 IS 4030

STATION: 405 LEG: IV POSITION: 27° 16' N 34° 31' E DATE: 19 DEC 77

SAMPLE NO.	PRESS DB	DEPTH M	TEMP DEG C	POT TEMP DEG C	SALINITY 0/00	SIGMA 0	SIGMA 2	SIGMA 4	SIGMA Z	OXYGEN μM/KG	SiO <sub>2</sub> μM/KG	PO <sub>4</sub> μM/KG	NO <sub>3</sub> μM/KG	DEPTH M
101	7	7	23.373	23.371	40.402	27.940	36.243	44.170	27.970	215	1.0	0.05	0.0	7
102	27	27	23.377	23.371	40.402	27.940	36.243	44.170	28.055	211	1.0	0.04	0.0	27
103	78	77	22.535	22.518	40.365	28.162	36.489	44.439	28.494	192	1.3	0.14	1.3	77
104	98	97	22.090	22.069	40.378	28.301	36.640	44.602	28.719	185	1.5	0.20	2.6	97
105	149	148	21.879	21.848	40.411	28.390	36.735	44.702	29.025	168	2.6	0.33	5.3	148
106	199	198	21.736	21.694	40.451	28.464	36.813	44.784	29.313	148	3.7	0.46	7.8	198
107	249	247	21.650	21.598	40.499	28.528	36.879	44.852	29.589	117	5.8	0.63	11.0	247
108	298	296	21.637	21.575	40.518	28.549	36.900	44.874	29.819	96	7.2	0.72	12.6	296
109	349	346	21.645	21.572	40.540	28.566	36.918	44.891	30.053	87	8.2	0.78	13.6	346
110	401	398	21.658	21.574	40.549	28.572	36.924	44.897	30.279	76	9.0	0.82	14.2	398
111	450	446	21.672	21.577	40.571	28.588	36.939	44.912	30.502	64	10.0	0.88	15.4	446
112	500	496	21.682	21.577	40.580	28.595	36.946	44.919	30.720	65	10.4	0.89	15.4	496
114	551	547	21.686	21.570	40.583	28.599	36.950	44.924	30.940	66	10.3	0.87	15.2	547
115	601	596	21.691	21.564	40.587	28.604	36.955	44.929	31.156	65	10.5	0.87	15.1	596
116	651	646	21.694	21.556	40.588	28.607	36.958	44.932	31.369	72	10.3	0.85	14.7	646
117	701	695	21.694	21.546	40.589	28.611	36.963	44.936	31.584	75	10.0	0.83	14.3	695
118	750	744	21.688	21.529	40.589	28.616	36.968	44.942	31.794	82	9.7	0.79	13.6	744
119	800	793	21.687	21.518	40.590	28.620	36.972	44.947	32.008	85	9.4	0.77	13.2	793
120	850	843	21.674	21.494	40.587	28.624	36.977	44.952	32.223	95	8.9	0.72	12.3	843
121	900	892	21.653	21.462	40.585	28.631	36.986	44.962	32.440	108	7.9	0.65	11.2	892
122	948	940	21.648	21.447	40.583	28.634	36.989	44.965	32.644	112	7.4	0.61	10.6	940
123	1001	992	21.635	21.423	40.583	28.641	36.996	44.974	32.873	121	6.8	0.56	9.8	992
124	1048	1038	21.630	21.408	40.582	28.645	37.000	44.978	33.073	131	6.3	0.54	9.2	1038

BOTTOM DEPTH OF CAST 1 IS 1171

STATION: 407 LEG: IV POSITION: 19° 55' N 38° 29' E DATE: 22 DEC 77

SAMPLE NO.	PRESS DB	DEPTH M	TEMP DEG C	POT TEMP DEG C	SALINITY 0/00	SIGMA 0	SIGMA 2	SIGMA 4	SIGMA Z	OXYGEN μM/KG	SiO <sub>2</sub> μM/KG	PO <sub>4</sub> μM/KG	NO <sub>3</sub> μM/KG	DEPTH M
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STATION: 408 LEG: IV POSITION: 14° 42' N 42° 10' E DATE: 24 DEC 77

SAMPLE NO.	PRESS DB	DEPTH M	TEMP DEG C	POT TEMP DEG C	SALINITY 0/00	SIGMA 0	SIGMA 2	SIGMA 4	SIGMA Z	OXYGEN μM/KG	SiO <sub>2</sub> μM/KG	PO <sub>4</sub> μM/KG	NO <sub>3</sub> μM/KG	DEPTH M
113	15	15	26.730	26.726	37.327	24.596	32.847	40.720	24.659	203	3.0	0.34	0.4	15
114	60	60	26.627	26.612	37.464	24.735	32.987	40.862	24.988	187	3.3	0.44	1.2	60
115	78	78	23.350	23.333	37.847	26.016	34.350	42.305	26.348	97	9.7	1.01	11.1	78
116	84	84	23.221	23.203	38.569	26.601	34.930	42.881	26.959	74	10.1	1.06	13.1	84
117	103	103	23.223	23.200	40.015	27.697	36.009	43.945	28.135	119	4.7	0.57	8.0	103
118	183	182	21.915	21.876	40.469	28.425	36.769	44.735	29.206	55	10.0	0.92	15.2	182
119	242	241	21.824	21.773	40.528	28.500	36.846	44.814	29.531	32	12.7	1.06	17.4	241
120	328	326	21.759	21.690	40.575	28.559	36.907	44.877	29.956	21	16.3	1.14	18.3	326
121	377	375	21.756	21.676	40.584	28.570	36.918	44.888	30.174	21	16.5	1.14	18.4	375
122	437	434	21.750	21.658	40.595	28.584	36.932	44.903	30.442	23	19.0	1.14	18.0	434
123	497	494	21.751	21.646	40.598	28.589	36.938	44.909	30.701	25	19.6	1.13	17.7	494
124	591	587	21.764	21.639	40.602	28.594	36.943	44.914	31.103	29	19.5	1.11	17.6	587

BOTTOM DEPTH OF CAST 1 IS 590

STATION: 409 LEG: IV POSITION: 12° 10' N 43° 57' E DATE: 25 DEC 77

SAMPLE NO.	PRESS DB	DEPTH M	TEMP DEG C	POT TEMP DEG C	SALINITY 0/00	SIGMA 0	SIGMA 2	SIGMA 4	SIGMA Z	OXYGEN μM/KG	SiO <sub>2</sub> μM/KG	PO <sub>4</sub> μM/KG	NO <sub>3</sub> μM/KG	DEPTH M
113	16	16	27.070	27.066	36.436	23.819	32.071	39.945	23.886	201	0.6	0.37	0.1	16
114	49	49	23.345	23.334	35.728	24.412	32.771	40.750	24.622	114	6.6	1.14	13.4	49
115	69	69	22.287	22.273	35.944	24.879	33.265	41.271	25.175	51D	8.8	1.52	17.1	69
116	108	108	18.658	18.638	35.679	25.655	34.155	42.268	26.125	17	15.8	2.00	24.0	108
117	148	148	16.286	16.262	35.638	26.205	34.785	42.973	26.855	8	20.9	2.16	26.4	148
118	209	208	15.001	14.968	35.643	26.505	35.130	43.361	27.426	13	23.4	2.16	26.8	208
119	259	258	14.838	14.798	35.858	26.708	35.337	43.571	27.849	17	24.4	2.13	26.6	258
120	334	333	14.335	14.284	35.934	26.879	35.526	43.776	28.353	22	27.4	2.17	27.2	333
121	373	371	16.082	16.020	36.553	26.964	35.540	43.724	28.595	30	24.0	1.95	24.5	371
122	418	416	17.909	17.834	37.275	27.077	35.583	43.702	28.889	45	20.0	1.67	21.2	416
123	437	435	17.355	17.278	37.130	27.104	35.630	43.768	29.003	41	22.0	1.74	22.0	435
124	504	501	18.826	18.732	37.687	27.164	35.635	43.722	29.337	50	19.2	1.56	19.7	501

BOTTOM DEPTH OF CAST 1 IS 516

STATION: 410 LEG: IV POSITION: 12° 18' N 46° 58' E DATE: 26 DEC 77

SAMPLE NO.	PRESS DB	DEPTH M	TEMP DEG C	POT TEMP DEG C	SALINITY 0/00	SIGMA 0	SIGMA 2	SIGMA 4	SIGMA Z	OXYGEN μM/KG	SiO <sub>2</sub> μM/KG	PO <sub>4</sub> μM/KG	NO <sub>3</sub> μM/KG	DEPTH M
1201	0	0	26.322	26.322	36.184D	23.861	32.135	40.030	23.861					0
133	5H	5	26.33	26.33	36.203	23.872	32.145	40.041	23.893	202	1.1	0.38	0.1	5
1202	25	25	26.333	26.327	36.195D	23.867	32.141	40.037	23.974					25
1203	50	50	26.331	26.319	36.187D	23.864	32.138	40.034	24.076					50
1204	75	75	19.618	19.604	35.620D	25.361	33.830	41.916	25.686					75
1205	105	105	16.794	16.776	35.540D	26.008	34.571	42.744	26.468					105
134	169H	168	15.09	15.06	35.581	26.436	35.059	43.287	27.181	16	23.7	2.18	26.4	168
1206	269	268	13.988	13.948	35.656D	26.738	35.400	43.665	27.927					268
1207	369	367	13.857	13.802	35.871D	26.934	35.600	43.867	28.565					367
1208	469	467	13.876	13.806	36.035D	27.060	35.723	43.988	29.130					467
1209	569	566	14.692	14.603	36.422D	27.186	35.814	44.047	29.683					566
135	600H	597	14.568	14.474	36.432	27.222	35.855	44.092	29.855	26	33.9	2.17	26.4	597
136	610H	607	14.482H	14.387	36.424	27.235	35.871	44.111	29.913	24	34.2	2.19	26.5	607
1210	650	646	14.339	14.239	36.432D	27.273	35.915	44.160	30.128					646
1211	710	706	13.354	13.249	36.225D	27.324	36.005	44.288	30.454					706
1212	810	805	12.707	12.591	36.159D	27.408	36.115	44.422	30.985					805
1213	910	904	12.153	12.025	36.088D	27.465	36.196	44.524	31.490					904
1214	1010	1003	11.421	11.284	36.013D	27.549	36.311	44.668	32.027					1003
1215	1110	1102	9.868	9.730	35.731D	27.608	36.440	44.861	32.563					1102
137	1202H	1193	8.911H	8.769	35.576	27.646	36.522	44.985	33.032	20	68.4	2.74	34.9	1193
1216	1302	1292	7.604	7.462	35.357D	27.674	36.613	45.134	33.543					1292
1217	1402	1391	6.899	6.753	35.259D	27.697	36.671	45.224	34.034					1391

STATION: 410 LEG: IV POSITION: 12° 18' N 46° 58' E DATE: 26 DEC 77

SAMPLE NO.	PRESS DB	DEPTH M	TEMP DEG C	POT TEMP DEG C	SALINITY 0/00	SIGMA 0	SIGMA 2	SIGMA 4	SIGMA Z	OXYGEN μM/KG	SiO <sub>2</sub> μM/KG	PO <sub>4</sub> μM/KG	NO <sub>3</sub> μM/KG	DEPTH M
1218	1502	1490	5.889	5.743	35.126D	27.724	36.749	45.349	34.543					1490
1219	1602	1589	5.132	4.985	35.042D	27.749	36.813	45.450	35.045					1589
1220	1702	1687	4.277	4.131	34.960D	27.778	36.887	45.566	35.558					1687
138	1807H	1791	3.866H	3.716	34.921	27.789	36.921	45.620	36.059	69	118.5	2.84	36.8	1791
1221	1907	1890	3.650	3.493	34.903D	27.797	36.941	45.651	36.525					1890
1222	2007	1988	3.459	3.296	34.884D	27.801	36.955	45.676	36.986					1988
1223	2107	2087	3.362	3.190	34.876D	27.804	36.964	45.690	37.442					2087
1224	2207	2185	3.340	3.159	34.874D	27.805	36.967	45.695	37.890					2185
139	2366H	2342	3.338H	3.141	34.875D	27.808	36.971	45.699	38.599					2342

BOTTOM DEPTH OF CAST 1 IS 2358

STATION: 411 LEG: IV POSITION: 12° 45' N 50° 3' E DATE: 26 DEC 77

SAMPLE NO.	PRESS DB	DEPTH M	TEMP DEG C	POT TEMP DEG C	SALINITY 0/00	SIGMA 0	SIGMA 2	SIGMA 4	SIGMA Z	OXYGEN μM/KG	SiO <sub>2</sub> μM/KG	PO <sub>4</sub> μM/KG	NO <sub>3</sub> μM/KG	DEPTH M
125	5H	5	25.84	25.84	35.908	23.801	32.090	40.001	23.822	209	2.8	0.36	0.4	5
126	148H	148	14.78	14.75	35.486	26.432	35.067	43.307	27.085	25	25.5	2.11	26.3	148
127	339H	338	14.68	14.62	36.042	26.888	35.521	43.758	28.381	18	29.9	2.16	26.9	338
128	450H	448	14.56	14.49	36.238	27.068	35.703	43.942	29.048	21	33.2	2.16	26.7	448
129	580H	577	13.74	13.66	36.176	27.201	35.867	44.136	29.757	23	38.1	2.24	27.8	577
130	801H	796	12.219H	12.107	36.035	27.408	36.136	44.463	30.954	21	51.7	2.43	30.7	796
131	1103H	1095	9.170H	9.039	35.548	27.581	36.445	44.897	32.523	15	74.5	2.74	35.4	1095
132	1455H	1443	6.014H	5.872	35.134	27.715	36.733	45.327	34.319	41	103.3	2.86	37.4	1443
133	1810H	1794	3.771H	3.622	34.913	27.792	36.929	45.633	36.080	74	132.5	2.80	37.1	1794
134	2113H	2093	3.011H	2.845	34.843	27.809	36.989	45.732	37.494	91	140.2	2.74	36.7	2093
135	2417H	2392	2.804H	2.612	34.824	27.814	37.007	45.763	38.867	96	144.3	2.73	36.7	2392

BOTTOM DEPTH OF CAST 1 IS 2452

STATION: 412 LEG: IV POSITION: 13° 12' N 51° 7' E DATE: 27 DEC 77

SAMPLE NO.	PRESS DB	DEPTH M	TEMP DEG C	POT TEMP DEG C	SALINITY 0/00	SIGMA 0	SIGMA 2	SIGMA 4	SIGMA Z	OXYGEN μM/KG	SiO <sub>2</sub> μM/KG	PO <sub>4</sub> μM/KG	NO <sub>3</sub> μM/KG	DEPTH M
125	5H	5	26.49	26.49	35.997	23.669	31.940	39.834	23.690	210	1.0	0.37	0.9	5
1101	16	16	26.316	26.312	35.941D	23.681	31.958	39.856	23.749					16
1102	48	48	26.262	26.250	35.945D	23.703	31.981	39.881	23.906					48
1103	92	92	23.601	23.581	35.570D	24.221	32.575	40.549	24.614					92
1104	116	116	22.603	22.579	35.594D	24.527	32.909	40.910	25.025					116
1105	170	170	18.924	18.893	35.409D	25.384	33.879	41.988	26.122					170
126	188H	188	16.78	16.74	35.501	25.986	34.551	42.725	26.809	28	20.9	2.01	25.0	188
1106	250	249	15.726	15.686	35.630D	26.333	34.932	43.139	27.431					249
1107	299	298	14.623	14.577	35.526D	26.501	35.142	43.388	27.820					298
1108	394	392	13.741	13.683	35.682D	26.814	35.486	43.760	28.556					392
1109	491	489	13.085	13.014	35.724D	26.985	35.682	43.980	29.160					

STATION: 412 LEG: IV POSITION: 13° 12' N 51° 7' E DATE: 27 DEC 77

SAMPLE NO.	PRESS DB	DEPTH M	TEMP DEG C	POT TEMP DEG C	SALINITY 0/00	SIGMA 0	SIGMA 2	SIGMA 4	SIGMA Z	OXYGEN μM/KG	SiO <sub>2</sub> μM/KG	PO <sub>4</sub> μM/KG	NO <sub>3</sub> μM/KG	DEPTH M
1119	1794	1778	3.963	3.813	34.933D	27.789	36.916	45.610	35.996					1778
133	1908H	1891	3.425H	3.272	34.879	27.799	36.955	45.677	36.543	84	136.0	2.78	36.9	1891
1120	1942	1924	3.345	3.190	34.879D	27.807	36.967	45.693	36.707					1924
1121	2088	2068	3.128	2.962	34.853D	27.807	36.979	45.717	37.373					2068
1122	2185	2164	2.859	2.689	34.833D	27.815	37.003	45.755	37.830					2164
1123	2334	2310	2.656	2.475	34.815D	27.819	37.018	45.782	38.511					2310
1124	2483	2457	2.557	2.364	34.806D	27.821	37.027	45.796	39.183					2457
134	2517H	2490	2.546H	2.350	34.802	27.819	37.026	45.795	39.333	109	144.0	2.69	36.6	2490
1125	2688	2658	2.491	2.279	34.800D	27.823	37.034	45.807	40.099					2658
1126	2882	2849	2.444	2.214	34.793D	27.822	37.037	45.814	40.959					2849
1127	3085	3048	2.451	2.200	34.791D	27.822	37.037	45.815	41.851					3048
135	3179H	3140	2.446H	2.185	34.789	27.821	37.038	45.816	42.263	112	145.3	2.66	36.5	3140
1128	3244	3204	2.439	2.171	34.789D	27.823	37.040	45.819	42.549					3204

BOTTOM DEPTH OF CAST 1 IS 3276

STATION: 413 LEG: IV POSITION: 13° 21' N 53° 16' E DATE: 27 DEC 77

SAMPLE NO.	PRESS DB	DEPTH M	TEMP DEG C	POT TEMP DEG C	SALINITY 0/00	SIGMA 0	SIGMA 2	SIGMA 4	SIGMA Z	OXYGEN μM/KG	SiO <sub>2</sub> μM/KG	PO <sub>4</sub> μM/KG	NO <sub>3</sub> μM/KG	DEPTH M
101	8	8	26.075	26.073	36.035	23.825	32.107	40.011	23.859	211	1.6	0.37	0.7	8
102	44	44	25.983	25.973	36.034	23.855	32.140	40.046	24.042	198	3.8	0.52	2.3	44
103	108	108	23.411	23.388	35.714	24.386	32.743	40.721	24.847	138	7.8	1.03	11.6	108
104	168	168	19.239	19.208	35.528	25.394	33.877	41.975	26.122	61	16.8	1.70	21.4	168
105	201	200	16.658	16.624	35.505	26.018	34.586	42.764	26.898	28	22.5	2.05	25.3	200
106	251	250	15.047	15.008	35.504	26.389	35.015	43.246	27.495	21	25.9	2.15	26.2	250
107	310	309	13.902	13.856	35.516	26.649	35.317	43.587	28.020	25	28.0	2.17	27.0	309
108	391	389	13.389	13.332	35.667	26.876	35.561	43.848	28.607	12	33.3	2.34	27.8	389
109	408	406	13.228	13.169	35.666	26.909	35.601	43.893	28.716	11	34.2	2.37	28.0	406
110	470	468	12.899	12.832	35.687	26.994	35.699	44.003	29.077	14	36.3	2.38	28.5	468
111	531	528	12.352	12.278	35.665	27.087	35.814	44.139	29.446	15	40.7	2.45	29.4	528
112	589	586	11.970	11.890	35.668	27.165	35.908	44.247	29.784	13	45.3	2.51	30.2	586
114	703	699	11.454	11.360	35.689	27.283	36.046	44.405	30.412	16	51.3	2.54	31.5	699
115	763	759	11.160	11.060	35.699	27.347	36.122	44.492	30.745	15	55.0	2.59	32.1	759
116	835	830	10.629	10.522	35.638	27.397	36.196	44.587	31.123	15	61.1	2.65	33.4	830
117	905	899	9.952	9.840	35.568	27.462	36.291	44.710	31.511	13	66.4	2.73	34.4	899
121	1003	996	9.000	8.882	35.447	27.527	36.400	44.859	32.031	9	75.0	2.84	35.9	996
118	1007	1000	8.952	8.834	35.443	27.532	36.407	44.868	32.054	10	75.5	2.84	36.0	1000
119	1106	1098	7.926	7.805	35.327	27.600	36.524	45.030	32.589	15	83.9	2.89	37.2	1098
120	1203	1194	7.003	6.879	35.217	27.647	36.615	45.163	33.094	20	92.0	2.95	38.2	1194
529	1407H	1396	5.625H	5.493	35.072	27.713	36.751	45.363	34.117	48	104.8	2.88	37.8	1396
530	1660H	1646			34.944					75	119.8	2.81	37.4	1646
531	1915H	1898	3.251H	3.100	34.861	27.801	36.966	45.697	36.585	92	131.8	2.74	36.7	1898
532	2170H	2149	2.623H	2.458	34.810	27.816	37.017	45.781	37.778	113	136.4	2.66	36.3	2149
533	2477H	2451	2.174H	1.989	34.776	27.826	37.054	45.843	39.188	131	139.0	2.57	36.1	2451
534	2632H	2603	2.048H	1.851	34.767	27.830	37.065	45.861	39.890	136	140.3	2.56	35.7	2603
535	2784H	2753	1.857H	1.650	34.755	27.835	37.082	45.889	40.584	144	140.2	2.51	35.3	2753
122	2804	2772	1.826	1.618	34.752	27.835	37.084	45.892	40.675	139	142.6	2.53	35.3	2772
123	2815	2783	1.822	1.613	34.753	27.836	37.085	45.894	40.726	141	142.8	2.52	35.5	2783
124	2825	2793	1.790	1.580	34.752	27.838	37.088	45.899	40.774	143	143.1	2.52	35.3	2793

BOTTOM DEPTH OF CAST 5 IS 2786— CAST 1 IS 2815

STATION: 414 LEG: IV POSITION: 15° 45' N 58° 4' E DATE: 29 DEC 77

SAMPLE NO.	PRESS DB	DEPTH M	TEMP DEG C	POT TEMP DEG C	SALINITY 0/00	SIGMA 0	SIGMA 2	SIGMA 4	SIGMA Z	OXYGEN μM/KG	SiO <sub>2</sub> μM/KG	PO <sub>4</sub> μM/KG	NO <sub>3</sub> μM/KG	DEPTH M
1101	15	15	26.352	26.348	35.959D	23.683	31.959	39.856	23.747					15
1102	27	27	26.334	26.328	35.963D	23.693	31.969	39.867	23.807					27
1103	46	46	26.324	26.313	36.006D	23.729	32.006	39.904	23.924					46
1104	92	92	24.804	24.783	35.869D	24.092	32.409	40.348	24.483					92
1105	113	113	23.134	23.110	35.568D	24.356	32.723	40.710	24.839					113

STATION: 414 LEG: IV POSITION: 15° 45' N 58° 4' E DATE: 29 DEC 77

SAMPLE NO.	PRESS DB	DEPTH M	TEMP DEG C	POT TEMP DEG C	SALINITY 0/00	SIGMA 0	SIGMA 2	SIGMA 4	SIGMA Z	OXYGEN μM/KG	SiO <sub>2</sub> μM/KG	PO <sub>4</sub> μM/KG	NO <sub>3</sub> μM/KG	DEPTH M
1106	147	147	21.768	21.738	36.049D	25.109	33.509	41.529	25.740					147
1107	180	180	18.289	18.257	35.570D	25.669	34.182	42.308	26.452					180
1108	201	200	17.980	17.944	35.710D	25.854	34.375	42.509	26.729					200
1109	252	251	15.830	15.789	35.532D	26.234	34.831	43.036	27.340					251
1110	301	300	13.932	13.887	35.352D	26.516	35.185	43.456	27.848					300
1111	403	401	13.686	13.626	35.633D	26.788	35.463	43.740	28.570					401
1112	507	505	12.874	12.802	35.657D	26.977	35.683	43.989	29.224					505
1113	605	602	12.263	12.179	35.699D	27.133	35.864	44.191	29.819					602
1114	806	801	11.293	11.186	35.684D	27.311	36.082	44.447	30.898					801
1115	955	949	10.036	9.917	35.567D	27.448	36.274	44.690	31.716					949
1116	1108	1100	8.316	8.191	35.347D	27.558	36.463	44.953	32.545					1100
1117	1207	1198	7.532	7.402	35.269D	27.614	36.557	45.081	33.063					1198
1118	1427	1416	5.912	5.774	35.101D	27.701	36.724	45.324	34.184					1416
1119	1604	1591	4.774	4.631	34.990D	27.748	36.831	45.485	35.067					1591
1120	1903	1886	3.436	3.283	34.874D	27.794	36.949	45.671	36.515					1886
1121	2203	2181	2.689	2.520	34.813D	27.813	37.011	45.772	37.919					2181
1122	2503	2476	2.241	2.052	34.782D	27.826	37.050	45.836	39.299					2476

BOTTOM DEPTH OF CAST 1 IS 3744

STATION: 415 LEG: IV POSITION: 17° 14' N 60° 41' E DATE: 30 DEC 77

SAMPLE NO.	PRESS DB	DEPTH M	TEMP DEG C	POT TEMP DEG C	SALINITY 0/00	SIGMA 0	SIGMA 2	SIGMA 4	SIGMA Z	OXYGEN μM/KG	SiO <sub>2</sub> μM/KG	PO <sub>4</sub> μM/KG	NO <sub>3</sub> μM/KG	DEPTH M
101	6	6	26.65	26.65	36.091	23.689	31.955	39.844	23.714	211				6
1224	23	23	26.667	26.661	36.072D	23.671	31.938	39.826	23.769					23
1225	119	119	20.274	20.251	35.556D	25.141	33.591	41.658	25.655					119
1215	199	198	16.172	16.139	35.554D	26.170	34.754	42.947	27.043					198
1216	241	240	14.981	14.943	35.532D	26.425	35.053	43.286	27.487					240
1217	300	299	16.972	16.921	36.424D	26.651	35.198	43.355	27.959					299
1218	371	369	14.069	14.013	35.844D	26.869	35.526	43.787	28.506					369
1219	421	419	13.169	13.108	35.744D	26.981	35.675	43.968	28.847					419
102	587	584	11.911	11.831	35.685	27.190	35.934	44.275	29.801	9				584
1220	617	614	11.516	11.434	35.636D	27.228	35.989	44.345	29.976					614
1221	818	813	10.338	10.235	35.575D	27.399	36.211	44.614	31.055					813
1222	1017	1010	8.995	8.876	35.441D	27.524	36.397	44.856	32.090					1010

STATION: 416 LEG: IV POSITION: 19° 45' N 64° 37' E DATE: 31 DEC 77

Table with columns: SAMPLE NO., PRESS DB, DEPTH M, TEMP DEG C, POT TEMP DEG C, SALINITY 0/00, SIGMA 0, SIGMA 2, SIGMA 4, SIGMA Z, OXYGEN μM/KG, SiO2 μM/KG, PO4 μM/KG, NO3 μM/KG, DEPTH M. Rows 101-121 and 122-124.

BOTTOM DEPTH OF CAST 1 IS 3208

STATION: 417 LEG: IV POSITION: 12° 58' N 64° 28' E DATE: 2 JAN 78

Table with columns: SAMPLE NO., PRESS DB, DEPTH M, TEMP DEG C, POT TEMP DEG C, SALINITY 0/00, SIGMA 0, SIGMA 2, SIGMA 4, SIGMA Z, OXYGEN μM/KG, SiO2 μM/KG, PO4 μM/KG, NO3 μM/KG, DEPTH M. Rows 301-320, 311-320, 321-336, 321-336.

STATION: 417 LEG: IV POSITION: 12° 58' N 64° 28' E DATE: 2 JAN 78

Table with columns: SAMPLE NO., PRESS DB, DEPTH M, TEMP DEG C, POT TEMP DEG C, SALINITY 0/00, SIGMA 0, SIGMA 2, SIGMA 4, SIGMA Z, OXYGEN μM/KG, SiO2 μM/KG, PO4 μM/KG, NO3 μM/KG, DEPTH M. Rows 112-117, 118-124.

BOTTOM DEPTH OF CAST 1 IS 4117

STATION: 418 LEG: IV POSITION: 6° 11' N 64° 25' E DATE: 5 JAN 78

Table with columns: SAMPLE NO., PRESS DB, DEPTH M, TEMP DEG C, POT TEMP DEG C, SALINITY 0/00, SIGMA 0, SIGMA 2, SIGMA 4, SIGMA Z, OXYGEN μM/KG, SiO2 μM/KG, PO4 μM/KG, NO3 μM/KG, DEPTH M. Rows 301-310, 311-320, 321-336, 321-336, 107-117, 118-124.

BOTTOM DEPTH OF CAST 1 IS 4695

A DATA TAKEN FROM CTD DOWN TRACE
D DATA EXTRACTED FROM CTD RECORDS (NORMALLY TAKEN BY DISCRETE MEASUREMENTS)

STATION: 419 LEG: IV POSITION: 3° 57' N 56° 48' E DATE: 8 JAN 78

SAMPLE NO.	PRESS DB	DEPTH M	TEMP DEG C	POT TEMP DEG C	SALINITY 0/00	SIGMA 0	SIGMA 2	SIGMA 4	SIGMA Z	OXYGEN μM/KG	SiO <sub>2</sub> μM/KG	PO <sub>4</sub> μM/KG	NO <sub>3</sub> μM/KG	DEPTH M
301	5	5	27.338	27.337	35.337	22.907	31.165	39.044	22.928	206	2.1	0.23	0.0	5
302	16	16	27.239	27.235	35.344	22.944	31.205	39.086	23.012	206	2.1	0.23	0.0	16
303	116	116	18.658	18.637	35.222	25.307	33.812	41.931	25.812	124	11.8	1.09	14.3	116
304	166	166	16.950	16.922	35.264	25.762	34.324	42.495	26.489	101	14.7	1.38	18.2	166
305	218	217	13.596	13.564	35.226	26.487	35.170	43.454	27.454	74	20.3	1.79	23.9	217
306	284	283	11.986	11.948	35.200	26.791	35.538	43.881	28.060	77	24.6	1.92	25.9	283
307	317	316	11.269	11.228	35.118	26.864	35.641	44.012	28.284	91	25.4	1.91	26.0	316
308	406	404	10.097	10.048	35.027	27.005	35.833	44.251	28.832	79	31.9	2.05	28.2	404
309	477	475	9.954	9.897	35.061	27.057	35.891	44.315	29.203	92	36.1	2.17	29.6	475
310	527	525	9.942	9.878	35.134	27.117	35.951	44.374	29.487	56	41.5	2.34	31.6	525
311	592	589	9.810	9.739	35.151	27.154	35.994	44.422	29.816	50	44.4	2.40	32.3	589
312	628	625	9.286	9.213	35.097	27.200	36.063	44.514	30.030	57	48.3	2.41	32.6	625
313	658	655	9.282	9.205	35.140	27.235	36.098	44.548	30.199	45	52.6	2.51	33.7	655
314	698	694	8.922	8.842	35.117	27.275	36.155	44.621	30.424	41	57.6	2.59	34.7	694
315	758	754	8.414	8.330	35.078	27.325	36.229	44.716	30.751	44	62.9	2.62	35.3	754
316	789	785	8.509	8.421	35.110	27.336	36.235	44.718	30.899	42	63.6	2.63	35.3	785
317	850	845	8.547	8.451	35.159	27.370	36.266	44.748	31.204	38	65.5	2.66	35.4	845
318	914	908	7.899	7.800	35.122	27.440	36.367	44.876	31.574	41	72.7	2.71	36.1	908
319	960	954	7.393	7.293	35.054	27.461	36.412	44.944	31.812	45	77.3	2.73	36.5	954
320	1055	1048	6.847	6.741	35.037	27.524	36.502	45.059	32.315	45	83.8	2.77	37.2	1048
321	1114	1107	6.786	6.674	35.042	27.537	36.518	45.078	32.594	46	85.1	2.77	37.1	1107
322	1200	1192	6.386	6.268	35.012	27.568	36.568	45.146	33.021	52	88.6	2.77	37.2	1192
323	1349	1339	5.504	5.379	34.956	27.635	36.680	45.300	33.784	65	96.9	2.76	37.2	1339
324	1499	1487	4.653	4.523	34.905	27.692	36.782	45.443	34.547	81	105.2	2.72	37.4	1487
101	1519	1507	4.642	4.510	34.905	27.694	36.784	45.446	34.639	80	105.2	2.71	36.9	1507
102	1669	1655	4.114	3.974	34.863	27.717	36.836	45.524	35.358	93	110.3	2.67	36.5	1655
103	1818	1802	3.520	3.374	34.830	27.750	36.901	45.619	36.087	106	116.8	2.63	36.3	1802
104	1968	1950	2.988	2.836	34.803	27.778	36.958	45.704	36.815	119	122.7	2.60	36.0	1950
105	2121	2101	2.607	2.447	34.784	27.796	36.998	45.763	37.540	128	126.5	2.55	35.7	2101
106	2271	2249	2.364	2.195	34.772	27.807	37.023	45.801	38.238	135	129.0	2.52	35.4	2249
107	2421	2396	2.204	2.024	34.767	27.817	37.042	45.829	38.927	141	130.5	2.50	35.2	2396
108	2572	2545	2.100	1.908	34.761	27.821	37.053	45.846	39.611	145	131.0	2.49	35.1	2545
109	2723	2693	2.000	1.795	34.754	27.824	37.062	45.861	40.292	149	131.7	2.48	35.0	2693
110	2873	2841	1.888	1.671	34.750	27.829	37.075	45.881	40.971	154	132.3	2.45	34.8	2841
111	3028	2993	1.808	1.578	34.745	27.832	37.083	45.894	41.664	156	132.3	2.42	34.6	2993
112	3177	3139	1.727	1.484	34.740	27.835	37.091	45.907	42.330	162	132.4	2.40	34.3	3139
114	3323	3282	1.666	1.410	34.736	27.837	37.098	45.917	42.979	165	132.6	2.38	34.3	3282
115	3480	3436	1.599	1.329	34.734	27.841	37.106	45.930	43.676	169	132.8	2.37	34.2	3436
116	3609	3562	1.583	1.300	34.734	27.843	37.110	45.936	44.243	169	133.0	2.37	34.1	3562
117	3785	3734	1.521	1.221	34.729	27.844	37.116	45.946	45.016	174	133.4	2.35	33.8	3734
118	3938	3884	1.495	1.179	34.729	27.847	37.121	45.953	45.685	176	133.2	2.34	33.8	3884
119	4090	4032	1.464	1.132	34.726	27.848	37.124	45.959	46.347	179	133.6	2.34	33.8	4032
120	4243	4182	1.417	1.069	34.722	27.849	37.129	45.967	47.012	180	133.8	2.33	33.5	4182
121	4394	4329	1.394	1.030	34.724	27.853	37.135	45.976	47.668	182	133.6	2.32	33.4	4329
122	4497	4430	1.375	0.999	34.722	27.853	37.137	45.979	48.112	183	133.6	2.32	33.4	4430
123	4597	4527	1.361	0.974	34.720	27.853	37.139	45.982	48.542	186	133.1	2.31	33.3	4527
124	4698	4626	1.343	0.945	34.720	27.855	37.142	45.987	48.977	186	132.7	2.29	33.3	4626

BOTTOM DEPTH OF CAST 1 IS 4645

STATION: 420 LEG: IV POSITION: 0° 3' S 50° 55' E DATE: 10 JAN 78

SAMPLE NO.	PRESS DB	DEPTH M	TEMP DEG C	POT TEMP DEG C	SALINITY 0/00	SIGMA 0	SIGMA 2	SIGMA 4	SIGMA Z	OXYGEN μM/KG	SiO <sub>2</sub> μM/KG	PO <sub>4</sub> μM/KG	NO <sub>3</sub> μM/KG	DEPTH M
401	1	1	27.120	27.120	35.230	22.895	31.159	39.045	22.899	203	2.8	0.21	0.0	1
402	14	14	27.125	27.122	35.229	22.893	31.158	39.043	22.953	206	2.6	0.21	0.0	14
403	53	53	26.078	26.065	35.311	23.282	31.573	39.484	23.507	185	3.8	0.39	2.0	53
404	75	75	21.648	21.633	35.200	24.494	32.908	40.940	24.817	145	8.7	0.79	9.6	75
405	120	120	17.522	17.501	35.201	25.574	34.117	42.271	26.098	123	12.9	1.09	14.7	120
406	187	187	14.517	14.489	35.188	26.260	34.909	43.162	27.087	129	15.9	1.27	17.4	187
407	246	245	12.439	12.405	35.096	26.622	35.351	43.679	27.719	128	18.3	1.47	20.4	245
408	298	297	11.832	11.792	35.078	26.727	35.481	43.832	28.058	103	21.8	1.70	24.0	297
409	363	362	10.521	10.476	35.001	26.909	35.719	44.121	28.541	107	26.5	1.84	26.1	362
410	459	457	9.986	9.931	35.000	27.004	35.837	44.260	29.069	82	34.3	2.10	29.6	457

STATION: 420 LEG: IV POSITION: 0° 3' S 50° 55' E DATE: 10 JAN 78

SAMPLE NO.	PRESS DB	DEPTH M	TEMP DEG C	POT TEMP DEG C	SALINITY 0/00	SIGMA 0	SIGMA 2	SIGMA 4	SIGMA Z	OXYGEN μM/KG	SiO <sub>2</sub> μM/KG	PO <sub>4</sub> μM/KG	NO <sub>3</sub> μM/KG	DEPTH M
411	525	523	9.641	9.579	35.009	27.070	35.919	44.356	29.435	76	39.0	2.22	30.8	523
412	599	596	9.314	9.244	35.002	27.120	35.984	44.435	29.821	73	43.4	2.29	31.6	596
413	671	668	9.048	8.971	35.013	27.173	36.049	44.511	30.200	72	46.9	2.34	32.1	668
414	720	716	8.975	8.892	35.099	27.253	36.131	44.595	30.499	54	54.6	2.49	33.5	716
415	783	779	8.314	8.228	35.035	27.307	36.216	44.708	30.847	50	62.0	2.58	35.0	779
416	854	849	8.012	7.919	35.051	27.367	36.289	44.794	31.230	48	67.4	2.64	35.7	849
417	944	938	7.551	7.451	35.077	27.456	36.399	44.925	31.732	46	73.2	2.69	36.3	938
418	1105	1098	6.324	6.217	34.965	27.537	36.541	45.122	32.567	62	85.3	2.70	36.6	1098
419	1256	1247	5.444	5.329	34.910	27.604	36.653	45.275	33.339	72	94.0	2.70	36.9	1247
420	1407	1396	4.855	4.731	34.877	27.647	36.727	45.378	34.081	83	99.7	2.68	36.6	1396
421	1558	1546	3.967	3.839	34.833	27.707	36.834	45.528	34.855	101	107.8	2.62	36.4	1546
422	1707	1693	3.639	3.502	34.810	27.722	36.867	45.578	35.555	111	110.2	2.59	36.0	1693
423	1906	1889	3.068	2.920	34.788	27.759	36.935	45.676	36.513	124	116.4	2.54	35.6	1889
424	2106	2086	2.688	2.528	34.778	27.785	36.982	45.743	37.457	132	122.0	2.51	35.3	2086
201	2118	2098	2.587	2.428	34.773	27.789	36.992	45.758	37.521	132	123.7	2.50	35.3	2098
202	2320	2297	2.315	2.142	34.759	27.801	37.020	45.801	38.454	139	124.9	2.45	34.9	2297
203	2521	2495	2.041	1.855	34.751	27.817	37.052	45.848	39.384	147	129.6	2.44	34.7	2495
204	2725	2695	1.931	1.728	34.745	27.821	37.064	45.867	40.304	153	130.5	2.42	34.6	2695
205	2969	2935	1.796	1.572	34.738	27.827	37.078	45.890	41.400	159	131.2	2.38	34.2	2935
206	3197	3159	1.766	1.520	34.736	27.829	37.084	45.897	42.409	161	130.0	2.39	34.3	



STATION: 421 LEG: IV POSITION: 6° 9' S 50° 54' E DATE: 13 JAN 78

SAMPLE NO.	PRESS DB	DEPTH M	TEMP DEG C	POT TEMP DEG C	SALINITY 0/00	SIGMA 0	SIGMA 2	SIGMA 4	SIGMA Z	OXYGEN μM/KG	SiO <sub>2</sub> μM/KG	PO <sub>4</sub> μM/KG	NO <sub>3</sub> μM/KG	DEPTH M
321	1373	1363	4.380	4.265	34.797	27.635	36.739	45.414	33.933	106	98.6	2.57	35.8	1363
322	1501	1489	3.957	3.835	34.783	27.668	36.795	45.491	34.560	113	102.7	2.55	35.7	1489
323	1650	1636	3.398	3.269	34.765	27.708	36.866	45.590	35.296	124D	107.2	2.50	35.2	1636
101	1803	1787	3.060	2.922	34.763	27.738	36.915	45.656	36.031	131	111.5	2.46	35.1	1787
324	1851	1835	2.939	2.799	34.764	27.750	36.933	45.681	36.265	136	112.8	2.47	34.9	1835
102	1954	1936	2.710	2.564	34.758	27.766	36.962	45.721	36.755	139	116.1	2.44	34.9	1936
103	2106	2086	2.452	2.296	34.756	27.786	36.997	45.770	37.473	145	119.1	2.42	34.6	2086
104	2258	2236	2.311	2.144	34.754	27.797	37.016	45.797	38.172	149	121.5	2.41	34.6	2236
105	2409	2384	2.129	1.951	34.750	27.809	37.039	45.830	38.871	153	123.9	2.39	34.5	2384
106	2563	2536	1.993	1.804	34.747	27.817	37.056	45.854	39.575	156	126.7	2.38	34.4	2536
107	2714	2684	1.897	1.696	34.745	27.824	37.068	45.873	40.260	158	128.0	2.37	34.4	2684
108	2864	2832	1.836	1.622	34.742	27.827	37.075	45.884	40.932	160	129.5	2.37	34.4	2832
109	3017	2982	1.775	1.547	34.739	27.830	37.082	45.895	41.616	163	130.3	2.37	34.3	2982
110	3171	3133	1.741	1.499	34.738	27.832	37.088	45.903	42.300	165	130.9	2.36	34.2	3133
111	3321	3280	1.703	1.446	34.735	27.834	37.092	45.910	42.963	166	131.2	2.35	34.1	3280
112	3474	3430	1.673	1.401	34.734	27.836	37.097	45.917	43.638	169	131.7	2.35	34.1	3430
114	3640	3592	1.631	1.343	34.731	27.838	37.102	45.925	44.368	170	132.3	2.34	34.0	3592
115	3792	3741	1.578	1.275	34.730	27.841	37.110	45.937	45.038	173	132.3	2.34	33.8	3741
116	3945	3891	1.504	1.187	34.727	27.845	37.118	45.950	45.713	178	131.8	2.33	33.7	3891
117	4122	4063	1.364	1.031	34.722	27.851	37.133	45.974	46.499	186	129.7	2.29	33.2	4063
118	4302	4239	1.313	0.962	34.721	27.855	37.141	45.985	47.284	189	128.8	2.27	33.1	4239
119	4480	4413	1.289	0.918	34.719	27.856	37.145	45.991	48.052	192	128.2	2.27	33.0	4413
120	4609	4539	1.275	0.890	34.719	27.858	37.148	45.996	48.608	193	127.3	2.25	32.9	4539
121	4700	4627	1.272	0.876	34.717	27.857	37.148	45.997	48.996	195	126.4	2.24	32.7	4627
122	4787	4712	1.268	0.862	34.716	27.857	37.149	45.999	49.367	195	126.2	2.24	32.7	4712
123	4835	4759	1.252	0.841	34.716	27.858	37.152	46.002	49.575	196	126.2	2.23	32.7	4759
124	4915	4837	1.260	0.839	34.716	27.858	37.152	46.003	49.914	196	125.9	2.23	32.6	4837

BOTTOM DEPTH OF CAST 1 IS 4875

STATION: 422 LEG: IV POSITION: 8° 49' S 52° 14' E DATE: 15 JAN 78

SAMPLE NO.	PRESS DB	DEPTH M	TEMP DEG C	POT TEMP DEG C	SALINITY 0/00	SIGMA 0	SIGMA 2	SIGMA 4	SIGMA Z	OXYGEN μM/KG	SiO <sub>2</sub> μM/KG	PO <sub>4</sub> μM/KG	NO <sub>3</sub> μM/KG	DEPTH M
1215	23	23	28.173	28.167	34.750D	22.204	30.447	38.311	22.301					23
1216	78	78	19.457	19.442	35.104D	25.010	33.491	41.587	25.349					78
1217	129	129	15.355	15.335	35.156D	26.048	34.667	42.891	26.617					129
1218	173	173	13.719	13.694	35.094D	26.358	35.038	43.319	27.125					173
1219	224	223	12.083	12.053	35.039D	26.646	35.391	43.732	27.647					223
1220	272	271	11.365	11.330	34.998D	26.752	35.526	43.895	27.971					271
1221	314	313	11.093	11.053	34.978D	26.787	35.574	43.954	28.195					313
101	341	340	10.797	10.754	34.949	26.819	35.618	44.010	28.350	137	21.1	1.57	22.5	340
102	545	542	8.733	8.672	34.786	27.044	35.935	44.413	29.510	145	30.5	1.81	25.7	542
103	727	723	7.490	7.415	34.763	27.215	36.164	44.696	30.519	117	49.1	2.19	30.7	723
104	847	842	6.653	6.570	34.792	27.354	36.344	44.912	31.215	99	67.1	2.44	33.9	842
105	987	981	6.171	6.077	34.790	27.417	36.431	45.021	31.921	94	74.0	2.50	34.7	981
106	1249	1240	4.706	4.599	34.756	27.566	36.654	45.313	33.294	112	88.8	2.52	35.1	1240
107	1500	1488	3.796	3.676	34.761	27.666	36.802	45.506	34.560	123	99.9	2.52	35.2	1488
108	1701	1687	2.995	2.867	34.744	27.728	36.908	45.652	35.564	141	108.3	2.46	34.7	1687
109	2107	2087	2.369	2.215	34.752	27.790	37.005	45.782	37.485	150	119.1	2.43	34.4	2087
110	2511	2485	2.042	1.857	34.747	27.813	37.049	45.845	39.336	156	125.7	2.42	34.4	2485
111	2912	2879	1.844	1.625	34.742	27.826	37.075	45.883	41.144	166	129.4	2.40	34.2	2879
112	3314	3273	1.681	1.426	34.736	27.836	37.095	45.915	42.937	167	131.5	2.38	34.2	3273
114	3633	3585	1.524	1.240	34.729	27.843	37.113	45.942	44.354	175	131.1	2.35	33.9	3585
115	3889	3836	1.371	1.064	34.723	27.850	37.130	45.969	45.489	185	129.0	2.32	33.3	3836
116	4091	4033	1.143	0.821	34.717	27.860	37.155	46.006	46.399	197	126.6	2.27	32.7	4033
117	4123	4064	1.093	0.769	34.714	27.861	37.159	46.013	46.544	201	126.5	2.26	32.6	4064
118	4144	4085	1.071	0.745	34.714	27.862	37.162	46.017	46.639	201D	125.7	2.24	32.4	4085
119	4153	4094	1.059	0.733	34.714	27.863	37.163	46.019	46.680	202	125.4	2.25	32.4	4094
120	4169	4109	1.045	0.718	34.713	27.863	37.164	46.021	46.751	203	125.3	2.24	32.4	4109
121	4177	4117	1.045	0.717	34.714	27.864	37.165	46.022	46.786	203	124.9	2.24	32.4	4117
122	4188	4128	1.046	0.716	34.714	27.864	37.165	46.022	46.833	203	124.8	2.24	32.4	4128
123	4198	4137	1.047	0.716	34.713	27.863	37.164	46.021	46.876	203	124.7	2.23	32.4	4137
124	4205	4144	1.048	0.717	34.712	27.863	37.163	46.021	46.905	203	124.5	2.23	32.3	4144

BOTTOM DEPTH OF CAST 1 IS 4165

STATION: 423 LEG: IV POSITION: 9° 1' S 53° 15' E DATE: 15 JAN 78

SAMPLE NO.	PRESS DB	DEPTH M	TEMP DEG C	POT TEMP DEG C	SALINITY 0/00	SIGMA 0	SIGMA 2	SIGMA 4	SIGMA Z	OXYGEN μM/KG	SiO <sub>2</sub> μM/KG	PO <sub>4</sub> μM/KG	NO <sub>3</sub> μM/KG	DEPTH M
113	3	3	28.924	28.923	34.784	21.987	30.212	38.056	22.000	198	2.3	0.17	0.0	3
1215	37	37	27.643	27.634	34.949D	22.522	30.777	38.652	22.678					37
1216	99	99	20.312	20.293	35.168D	24.834	33.289	41.359	25.263					99
1217	125	125	16.467	16.446	35.085D	25.738	34.318	42.507	26.287					125
1218	175	175	14.859	14.832	35.253D	26.235	34.871	43.111	27.008					175
1219	273	272	11.469	11.433	35.000D	26.734	35.504	43.869	27.957					272
1220	373	372	9.688	9.644	34.840D	26.928	35.776	44.213	28.611					372
1221	491	489	8.638	8.584	34.773D	27.047	35.943	44.425	29.272					489
1222	601	598	8.022	7.958	34.762D	27.134	36.059	44.567	29.862					598
1223	809	804	6.775	6.695	34.775D	27.324	36.308	44.870	31.011					804
1224	1059	1052	5.656	5.559	34.802D	27.491	36.530	45.144	32.333					1052
101	1200	1192	4.908	4.804	34.781	27.563	36.640	45.289	33.063	101	89.8	2.54	35.5	1192
102	1394	1383	3.923	3.811	34.743	27.638	36.768	45.465	34.049	124	96.4	2.47	34.9	1383
103	1505	1493	3.658	3.539	34.752	27.672	36.816	45.527	34.595	126	102.7	2.50	35.2	1493
104	1724	1709	3.153	3.021	34.748	27.718	36.889	45.626	35.650	137	107.1	2.46	34.8	1709
105	1796	1780	2.980	2.844	34.759	27.742	36.923	45.668	36.007	137	111.1	2.47	34.9	1780
106	2038	2019	2.560	2.409	34.753	27.775	36.979	45.747	37.150	146	116.3	2.44	34.6	2019
107	2356	2332	2.169	1.996	34.753	27.808	37.035	45.824	38.630	155	123.0	2.41	34.4	2332
108	2803	2772	1.886	1.676	34.743	27.824	37.069	45.875	40.655	159	128.4	2.40	34.4	2772
109	3261	3221	1.667	1.417	34.736	27.836	37.097	45.916	42.706	169	130.5	2.37	34.1	3221
110	3661	3613	1.549	1.261	34.730	27.842	37.111	45.939	44.472	176	131.2	2.3		

STATION: 427 LEG: V POSITION: 27° 4' S 56° 58' E DATE: 30 JAN 78

SAMPLE NO.	PRESS DB	DEPTH M	TEMP DEG C	POT TEMP DEG C	SALINITY 0/00	SIGMA 0	SIGMA 2	SIGMA 4	SIGMA Z	OXYGEN μM/KG	SIO <sub>2</sub> μM/KG	PO <sub>4</sub> μM/KG	NO <sub>3</sub> μM/KG	DEPTH M
104	2241	2217	2.289	2.124	34.736	27.784	37.005	45.787	38.085	178	96.4	2.22	31.9	2217
105	2414	2387	2.148	1.970	34.738	27.798	37.027	45.817	38.881	173	106.7	2.27	32.5	2387
106	2566	2537	2.058	1.867	34.742	27.809	37.043	45.839	39.575	172	111.9	2.30	32.8	2537
107	2730	2698	1.959	1.755	34.741	27.816	37.057	45.859	40.319	170	116.8	2.32	33.1	2698
108	2893	2858	1.862	1.644	34.738	27.822	37.069	45.877	41.054	171	120.4	2.33	33.4	2858
109	3054	3016	1.768	1.537	34.735	27.827	37.081	45.894	41.778	173	122.6	2.34	33.4	3016
110	3214	3172	1.671	1.426	34.731	27.832	37.092	45.911	42.495	175	124.4	2.33	33.4	3172
111	3378	3333	1.567	1.308	34.728	27.837	37.104	45.929	43.230	179	125.3	2.32	33.2	3333
112	3542	3493	1.464	1.191	34.726	27.844	37.117	45.949	43.963	184	125.8	2.30	33.0	3493
114	3714	3661	1.375	1.086	34.722	27.847	37.127	45.964	44.726	188	125.8	2.29	32.8	3661
115	3877	3821	1.291	0.988	34.720	27.852	37.137	45.980	45.448	193	125.4	2.27	32.6	3821
116	4040	3980	1.201	0.883	34.718	27.857	37.148	45.997	46.169	197	125.1	2.25	32.4	3980
117	4204	4140	1.131	0.797	34.715	27.860	37.156	46.009	46.889	203	122.9	2.22	32.1	4140
118	4365	4297	1.057	0.707	34.713	27.864	37.165	46.023	47.595	205	124.1	2.22	32.2	4297
119	4529	4456	0.994	0.628	34.712	27.868	37.174	46.036	48.310	207	124.2	2.20	32.1	4456
120	4685	4608	0.961	0.578	34.709	27.868	37.177	46.042	48.983	209	124.3	2.20	32.0	4608
121	4846	4765	0.950	0.549	34.707	27.869	37.179	46.046	49.671	210	125.0	2.20	31.9	4765
122	5008	4922	0.942	0.521	34.709	27.872	37.184	46.052	50.364	210	125.1	2.20	32.0	4922
123	5120	5031	0.953	0.518	34.707	27.870	37.182	46.051	50.836	211	125.3	2.20	32.1	5031
124	5132	5043	0.954	0.518	34.707	27.870	37.183	46.051	50.887	212	125.4	2.19	32.1	5043

BOTTOM DEPTH OF CAST 1 IS 5101

STATION: 428 LEG: V POSITION: 37° 45' S 57° 37' E DATE: 2 FEB 78

SAMPLE NO.	PRESS DB	DEPTH M	TEMP DEG C	POT TEMP DEG C	SALINITY 0/00	SIGMA 0	SIGMA 2	SIGMA 4	SIGMA Z	OXYGEN μM/KG	SIO <sub>2</sub> μM/KG	PO <sub>4</sub> μM/KG	NO <sub>3</sub> μM/KG	DEPTH M
601	1	1	18.747	18.747	35.334	25.364	33.865	41.979	25.369	248	0.7	0.20	0.0	1
602	10	10	18.392	18.390	35.341	25.460	33.972	42.097	25.504	246	0.5	0.19	0.0	10
603	41	41	16.245	16.238	35.387	26.018	34.602	42.794	26.199	249	0.9	0.24	0.4	41
604	86	86	15.151	15.138	35.399	26.279	34.902	43.130	26.659	223	3.9	0.52	5.4	86
605	114	113	14.653	14.636	35.387	26.381	35.022	43.267	26.885	233	3.6	0.53	5.6	113
606	146	145	14.187	14.165	35.318	26.430	35.090	43.352	27.077	229	4.1	0.61	6.9	145
607	180	179	13.758	13.732	35.276	26.490	35.166	43.444	27.289	235	4.1	0.64	7.5	179
608	252	250	13.604	13.567	35.321	26.559	35.241	43.524	27.677	244	3.5	0.60	6.6	250
609	349	347	12.865	12.816	35.206	26.625	35.337	43.648	28.176	243	3.8	0.67	8.0	347
610	447	444	12.101	12.040	35.077	26.678	35.423	43.764	28.670	232	4.5	0.83	10.6	444
611	542	538	11.263	11.192	34.960	26.748	35.529	43.903	29.170	222	5.6	1.00	13.3	538
612	639	634	10.035	9.957	34.819	26.858	35.693	44.117	29.728	217	7.5	1.17	16.3	634
613	734	728	8.911	8.828	34.690	26.944	35.830	44.303	30.256	214	10.9	1.38	19.5	728
614	832	826	7.683	7.596	34.575	27.041	35.985	44.511	30.815	207	15.6	1.59	23.0	826
615	929	921	6.480	6.390	34.477	27.130	36.133	44.713	31.367	207	20.9	1.78	25.8	921
616	1023	1014	5.394	5.303	34.403	27.206	36.264	44.896	31.895	209	26.6	1.93	28.2	1014
617	1121	1111	4.601	4.508	34.374	27.273	36.372	45.041	32.428	208	32.9	2.04	29.8	1111
618	1216	1205	4.019	3.923	34.398	27.353	36.482	45.179	32.957	200	41.2	2.14	31.2	1205
619	1308	1296	3.567	3.467	34.412	27.409	36.562	45.281	33.446	194	47.6	2.22	32.4	1296
620	1397	1384	3.379	3.274	34.454	27.460	36.623	45.351	33.908	187	53.7	2.25	32.9	1384
621	1486	1472	3.053	2.944	34.476	27.508	36.688	45.432	34.372	185	58.2	2.28	33.3	1472
622	1572	1557	2.924	2.809	34.519	27.554	36.740	45.491	34.812	181	63.0	2.28	33.4	1557
623	1664	1647	2.797	2.676	34.566	27.603	36.796	45.553	35.283	180	66.6	2.26	33.1	1647
624	1746	1728	2.712	2.585	34.602	27.639	36.837	45.598	35.694	179	68.7	2.23	32.8	1728
401	1827	1808	2.664	2.530	34.628	27.665	36.865	45.628	36.087	180	71.1	2.21	32.4	1808
402	2056	2033	2.511	2.359	34.700	27.736	36.944	45.715	37.196	194	73.5	2.11	31.0	2033
403	2277	2250	2.361	2.191	34.729	27.773	36.990	45.769	38.231	194	79.9	2.08	30.6	2250
404	2494	2464	2.229	2.042	34.753	27.804	37.029	45.815	39.238	201	82.1	2.04	30.0	2464
405	2719	2684	2.069	1.863	34.758	27.822	37.056	45.852	40.267	198	87.4	2.05	30.0	2684
406	2949	2910	1.874	1.650	34.749	27.830	37.077	45.884	41.308	199	97.8	2.11	30.7	2910
407	3182	3138	1.710	1.467	34.750	27.844	37.101	45.918	42.363	202D	97.6	2.07	30.4	3138
408	3417	3368	1.481	1.220	34.742	27.855	37.126	45.956	43.425	209	104.4	2.10	30.8	3368
409	3638	3584	1.246	0.969	34.725	27.857	37.143	45.987	44.417	210	111.3	2.14	31.3	3584
410	3861	3801	0.947	0.656	34.712	27.866	37.171	46.031	45.429	213	118.5	2.17	31.8	3801
411	4088	4023	0.683	0.376	34.700	27.873	37.193	46.069	46.450	216D	125.3	2.20	32.1	4023
412	4321	4250	0.569	0.241	34.691	27.873	37.202	46.085	47.472	219	129.6	2.21	32.4	4250
414	4546	4469	0.505	0.154	34.688	27.875	37.209	46.097	48.451	220D	132.4	2.22	32.4	4469
415	4773	4690	0.472	0.097	34.688	27.878	37.215	46.107	49.432	220D	134.1	2.22	32.4	4690

STATION: 428 LEG: V POSITION: 37° 45' S 57° 37' E DATE: 2 FEB 78

SAMPLE NO.	PRESS DB	DEPTH M	TEMP DEG C	POT TEMP DEG C	SALINITY 0/00	SIGMA 0	SIGMA 2	SIGMA 4	SIGMA Z	OXYGEN μM/KG	SIO <sub>2</sub> μM/KG	PO <sub>4</sub> μM/KG	NO <sub>3</sub> μM/KG	DEPTH M
416	5008	4918	0.470	0.068	34.684	27.876	37.215	46.109	50.433	220D	135.4	2.22	32.4	4918
417	5241	5144	0.470	0.040	34.682	27.876	37.217	46.112	51.422	221	136.3	2.22	32.5	5144
418	5282	5184	0.470	0.035	34.682	27.876	37.217	46.113	51.596	222	136.8	2.22	32.4	5184
419	5315	5216	0.471	0.032	34.682	27.877	37.218	46.113	51.736	221D	136.8	2.22	32.5	5216
420	5345	5245	0.472	0.029	34.682	27.877	37.218	46.114	51.863	221D	137.3	2.22	32.5	5245
421	5365	5264	0.473	0.028	34.682	27.877	37.218	46.114	51.947	221D	137.4	2.23	32.5	5264
422	5382	5281	0.475	0.028	34.681	27.876	37.217	46.113	52.018	222	137.7	2.21	32.5	5281
423	5412	5310	0.478	0.027	34.681	27.876	37.218	46.113	52.144	221	137.7	2.22	32.5	5310
424	5426	5323	0.479	0.026	34.681	27.876	37.218	46.113	52.203	222	137.5	2.22	32.5	5323

BOTTOM DEPTH OF CAST 4 IS 5340

STATION: 429 LEG: V POSITION: 47° 40' S 57° 51' E DATE: 6 FEB 78

SAMPLE NO.	PRESS DB	DEPTH M	TEMP DEG C	POT TEMP DEG C	SALINITY 0/00	SIGMA 0	SIGMA 2	SIGMA 4	SIGMA Z	OXYGEN μM/KG	SIO <sub>2</sub> μM/KG	PO <sub>4</sub> μM/KG	NO <sub>3</sub> μM/KG	DEPTH M
301	4	4	6.492	6.492	33.726	26.525	35.535	44.122	26.544	305	5.4	1.48	20.2	4
302	30	30	6.451	6.448	33.743	26.544	35.556	44.144	26.683	306	5.6	1.48	20.1	30
303	70	70	6.298	6.292	33.759	26.577	35.596	44.191	26.900	307	5.0	1.49	20.1	70
304	145	144	4.246	4.236	33.808	26.853	35.975	44.666	27.530	308	9.7	1.68	23.6	144
305	196	195	3.128	3.116	33.896	27.030	36.210	44.956	27.950	306	16.5	1.83	26.5	195
306	245	243	3.099	3.083	34.036	27.145	36.324	45.069	28.294	279	22.0	1.95	28.4	243
307	297	295	3.004	2.985	34.123	27.223	36.406	45.154	28.616	263	26.4	2.03	29.8	295
308	389	386</												

STATION: 430 LEG: V POSITION: 59° 59' S 60° 58' E DATE: 10 FEB 78

SAMPLE NO.	PRESS DB	DEPTH M	TEMP DEG C	POT TEMP DEG C	SALINITY 0/00	SIGMA 0	SIGMA 2	SIGMA 4	SIGMA Z	OXYGEN μM/KG	SiO <sub>2</sub> μM/KG	PO <sub>4</sub> μM/KG	NO <sub>3</sub> μM/KG	DEPTH M
301	8	8	1.804	1.804	33.841	27.092	36.345	45.159	27.130	335	37.9	1.87	27.4	8
302	18	18	1.765	1.764	33.842	27.096	36.351	45.167	27.181	336	37.9	1.87	27.5	18
303	54	54	1.541	1.538	33.838	27.108	36.377	45.204	27.365	337	37.6	1.87	27.5	54
304	80	79	-0.904	-0.906	33.966	27.339	36.749	45.709	27.725	355	39.4	1.93	28.3	79
305	100	99	-0.848	-0.851	34.023	27.383	36.789	45.745	27.865	349	42.8	1.99	28.9	99
306	120	119	-1.145	-1.148	34.025	27.395	36.819	45.792	27.974	342	45.3	2.02	29.3	119
307	179	177	1.428	1.419	34.418	27.581	36.847	45.671	28.430	199	72.3	2.40	35.4	177
308	243	241	1.846	1.833	34.530	27.641	36.882	45.682	28.789	178	79.7	2.41	35.7	241
309	310	307	1.923	1.906	34.582	27.678	36.913	45.709	29.139	172	83.1	2.39	35.3	307
310	401	397	1.917	1.895	34.631	27.718	36.953	45.749	29.606	173	86.0	2.35	34.5	397

311	506	501	1.916	1.888	34.667	27.747	36.982	45.778	30.127	176	87.7	2.29	33.7	501
312	604	598	1.921	1.886	34.694	27.769	37.003	45.799	30.606	181	88.2	2.24	32.9	598
313	700	693	1.885	1.845	34.714	27.788	37.024	45.822	31.073	185	88.9	2.20	32.3	693
314	803	794	1.843	1.796	34.730	27.804	37.043	45.843	31.569	191	89.2	2.14	31.5	794
315	902	892	1.786	1.733	34.738	27.815	37.058	45.860	32.041	194	89.9	2.11	31.1	892
316	1002	991	1.732	1.673	34.746	27.826	37.072	45.878	32.515	196	90.9	2.09	30.9	991
317	1102	1089	1.654	1.589	34.746	27.832	37.083	45.893	32.986	199	93.0	2.09	30.9	1089
318	1205	1191	1.558	1.487	34.743	27.837	37.093	45.909	33.469	200	95.7	2.09	30.8	1191
319	1305	1289	1.462	1.385	34.745	27.846	37.108	45.929	33.941	202	98.2	2.09	31.0	1289
320	1405	1388	1.365	1.282	34.740	27.849	37.117	45.943	34.407	203	101.0	2.09	31.0	1388

321	1507	1488	1.278	1.189	34.735	27.851	37.124	45.956	34.881	204	103.3	2.11	31.2	1488
322	1607	1587	1.184	1.089	34.734	27.857	37.136	45.973	35.349	205	106.2	2.11	31.4	1587
323	1712	1690	1.101	0.999	34.727	27.857	37.141	45.983	35.832	206	108.4	2.13	31.6	1690
324	1837	1813	1.000	0.890	34.721	27.859	37.150	45.998	36.410	206	111.5	2.15	31.7	1813
101	1964	1937	0.889	0.772	34.718	27.864	37.162	46.016	36.998	206	117.9	2.17	32.1	1937
102	2138	2108	0.769	0.640	34.709	27.865	37.170	46.032	37.795	207	121.1	2.20	32.4	2108
103	2318	2285	0.662	0.521	34.702	27.866	37.178	46.046	38.617	208	124.2	2.23	32.7	2285
104	2496	2459	0.565	0.412	34.699	27.870	37.189	46.063	39.429	209	127.0	2.24	32.8	2459
105	2674	2634	0.468	0.302	34.693	27.871	37.196	46.077	40.237	212	129.5	2.25	32.9	2634
106	2849	2805	0.386	0.207	34.687	27.871	37.202	46.088	41.026	214	131.4	2.26	33.0	2805

107	3028	2980	0.292	0.100	34.683	27.874	37.211	46.103	41.835	216	132.4	2.26	33.1	2980
108	3204	3152	0.218	0.012	34.680	27.876	37.218	46.115	42.625	219	134.1	2.26	33.1	3152
109	3387	3330	0.144	-0.077	34.675	27.876	37.224	46.126	43.443	223	135.1	2.26	33.1	3330
110	3567	3506	0.075	-0.160	34.675	27.880	37.233	46.139	44.247	225	136.0	2.26	33.0	3506
111	3747	3681	0.012	-0.239	34.670	27.880	37.238	46.148	45.044	229	137.3	2.26	33.0	3681
112	3928	3858	-0.038	-0.305	34.667	27.881	37.242	46.157	45.843	231	137.8	2.26	32.9	3858
114	4105	4030	-0.093	-0.376	34.665	27.882	37.248	46.167	46.623	234	136.30	2.25	32.8	4030
115	4285	4205	-0.137	-0.437	34.663	27.884	37.253	46.175	47.412	236	138.4	2.24	32.8	4205
116	4464	4379	-0.174	-0.491	34.665	27.888	37.260	46.185	48.195	239	139.9	2.24	32.8	4379
117	4645	4554	-0.208	-0.543	34.661	27.887	37.263	46.190	48.980	242	140.8	2.24	32.7	4554

BOTTOM DEPTH OF CAST 1 IS 4737

STATION: 431 LEG: V POSITION: 64° 11' S 83° 58' E DATE: 13 FEB 78

SAMPLE NO.	PRESS DB	DEPTH M	TEMP DEG C	POT TEMP DEG C	SALINITY 0/00	SIGMA 0	SIGMA 2	SIGMA 4	SIGMA Z	OXYGEN μM/KG	SiO <sub>2</sub> μM/KG	PO <sub>4</sub> μM/KG	NO <sub>3</sub> μM/KG	DEPTH M
101	5	5	2.349	2.349	33.788	27.009	36.232	45.018	27.032	329	44.6	1.76	26.8	5
102	10	10	2.357	2.356	33.789	27.009	36.232	45.018	27.056	329	44.7	1.76	26.8	10
103	42	42	-0.686	-0.687	34.140	27.472	36.865	45.810	27.674	319	45.8	1.89	28.3	42
104	54	54	-1.074	-1.075	34.265	27.587	37.002	45.967	27.848	290	60.6	2.10	30.4	54
105	137	136	1.255	1.249	34.580	27.723	36.995	45.826	28.373	190	88.4	2.36	34.2	136
106	212	210	1.613	1.602	34.655	27.758	37.009	45.820	28.761	183	92.6	2.32	33.6	210
107	356	352	1.624	1.605	34.698	27.793	37.043	45.853	29.473	187	94.1	2.25	32.5	352
108	507	502	1.494	1.467	34.711	27.813	37.071	45.888	30.203	195	95.9	2.20	31.9	502
109	718	710	1.324	1.286	34.722	27.834	37.102	45.929	31.214	201	100.3	2.16	31.4	710
110	929	918	1.129	1.080	34.721	27.847	37.127	45.964	32.215	204	106.0	2.17	31.6	918

STATION: 431 LEG: V POSITION: 64° 11' S 83° 58' E DATE: 13 FEB 78

SAMPLE NO.	PRESS DB	DEPTH M	TEMP DEG C	POT TEMP DEG C	SALINITY 0/00	SIGMA 0	SIGMA 2	SIGMA 4	SIGMA Z	OXYGEN μM/KG	SiO <sub>2</sub> μM/KG	PO <sub>4</sub> μM/KG	NO <sub>3</sub> μM/KG	DEPTH M
111	1140	1126	0.980	0.919	34.718	27.855	37.144	45.990	33.206	205	113.0	2.20	31.9	1126
112	1351	1334	0.848	0.775	34.714	27.861	37.158	46.012	34.191	206	118.2	2.22	32.2	1334
114	1559	1539	0.684	0.599	34.707	27.866	37.173	46.037	35.160	207	123.2	2.25	32.4	1539
115	1809	1784	0.517	0.417	34.696	27.867	37.186	46.060	36.315	209	127.4	2.27	32.8	1784
116	2058	2029	0.381	0.265	34.689	27.870	37.197	46.080	37.461	212	131.2	2.28	32.9	2029
117	2306	2272	0.233	0.102	34.680	27.871	37.208	46.100	38.597	218	131.9	2.27	32.8	2272
118	2556	2517	0.127	-0.022	34.676	27.874	37.219	46.117	39.736	222	133.9	2.28	32.7	2517
119	2805	2760	0.029	-0.138	34.674	27.879	37.230	46.135	40.866	226	132.9	2.27	32.7	2760
120	2994	2945	-0.037	-0.218	34.674	27.882	37.239	46.148	41.720	229	131.6	2.26	32.6	2945
121	3182	3129	-0.078	-0.274	34.674	27.885	37.244	46.157	42.564	232	131.0	2.25	32.5	3129

BOTTOM DEPTH OF CAST 1 IS 3624

STATION: 432 LEG: V POSITION: 59° 19' S 92° 38' E DATE: 15 FEB 78

SAMPLE NO.	PRESS DB	DEPTH M	TEMP DEG C	POT TEMP DEG C	SALINITY 0/00	SIGMA 0	SIGMA 2	SIGMA 4	SIGMA Z	OXYGEN μM/KG	SiO <sub>2</sub> μM/KG	PO <sub>4</sub> μM/KG	NO <sub>3</sub> μM/KG	DEPTH M
301	11	11	1.832	1.831	33.865	27.109	36.361	45.172	27.161	332	29.3	1.57	23.9	11
302	34	34	1.829	1.827	33.865	27.110	36.361	45.173	27.271	332	29.0	1.57	23.9	34
303	61	60	-0.052	-0.054	33.953	27.293	36.652	45.564	27.586	329	37.8	1.79	25.5	60
304	92	91	-0.834	-0.836	34.170	27.502	36.904	45.857	27.945	303	61.8	2.16	30.2	91
305	174	172	0.574	0.567	34.451	27.662	36.975	45.845	28.490	225	75.7	2.30	33.3	172
306	256	254	1.346	1.333	34.591	27.726	36.993	45.819	28.938	196	83.8	2.31	33.5	254
307	336	333	1.305	1.288	34.628	27.759	37.028	45.856	29.348	199	86.7	2.26	32.8	333
308	417	413	1.534	1.512	34.675	27.781	37.037	45.852	29.749	195	89.1	2.22	32.4	413
309	494	489	1.635	1.608	34.706	27.799	37.049	45.858	30.127	193	89.8	2.19	32.0	489
310	569	563	1.590	1.559	34.714	27.809	37.061	45.874	30.488	194	91.2	2.18	31.7	563

311	650	643	1.530	1.495	34.718	27.817	37.073	45.888	30.875	197	92.8	2.17	31.6	643
312	729	721	1.534	1.494	34.728	27.825	37.080	45.896	31.252	198	94.6	2.15	31.3	721
313	806	797	1.556	1.511	34.740	27.833	37.088	45.902	31.618	199	96.0	2.13	31.1	797
314	902	892	1.467	1.417	34.7									

STATION: 433 LEG: V POSITION: 53° 0' S 103° 1' E DATE: 18 FEB 78

SAMPLE NO.	PRESS DB	DEPTH M	TEMP DEG C	POT TEMP DEG C	SALINITY 0/00	SIGMA 0	SIGMA 2	SIGMA 4	SIGMA Z	OXYGEN μM/KG	SiO <sub>2</sub> μM/KG	PO <sub>4</sub> μM/KG	NO <sub>3</sub> μM/KG	DEPTH M
401	8	8	3.335	3.334	33.905	27.018	36.186	44.920	27.055	323	12.0	1.62	24.4	8
402	30	30	3.287	3.285	33.907	27.024	36.195	44.931	27.165	322	11.6	1.62	24.4	30
403	70	69	3.200	3.196	33.910	27.034	36.210	44.951	27.363	323	11.4	1.63	24.4	69
404	106	105	1.547	1.542	33.970	27.214	36.480	45.305	27.717	322	24.4	1.90	26.4	105
405	141	140	0.904	0.898	34.040	27.312	36.613	45.472	27.983	305	36.6	2.06	29.6	140
406	200	198	1.403	1.393	34.244	27.444	36.713	45.542	28.392	243	53.4	2.28	33.2	198
407	263	261	1.909	1.895	34.365	27.505	36.744	45.545	28.746	208	61.5	2.36	34.3	261
408	343	340	1.984	1.965	34.463	27.578	36.812	45.607	29.194	192	69.9	2.38	34.6	340
409	424	420	2.083	2.059	34.536	27.629	36.857	45.646	29.624	183	74.5	2.36	34.5	420
410	504	499	2.126	2.097	34.602	27.679	36.903	45.689	30.047	180	77.9	2.31	33.7	499

411	594	588	2.079	2.044	34.639	27.713	36.939	45.727	30.501	181	80.2	2.27	33.2	588
412	635	629	2.205	2.167	34.673	27.730	36.949	45.731	30.707	182	79.4	2.21	32.4	629
413	721	714	2.151	2.108	34.693	27.751	36.973	45.757	31.128	184	80.5	2.19	32.1	714
414	808	800	2.059	2.010	34.705	27.768	36.995	45.784	31.551	186	82.7	2.17	31.9	800
415	894	885	2.031	1.977	34.723	27.785	37.014	45.804	31.967	189	83.8	2.14	31.3	885
416	980	970	2.012	1.952	34.740	27.800	37.031	45.822	32.380	193	84.1	2.10	30.8	970
417	1068	1056	1.923	1.858	34.740	27.808	37.043	45.839	32.796	194	86.2	2.10	30.7	1056
418	1153	1140	1.847	1.776	34.740	27.814	37.054	45.854	33.196	195	88.5	2.10	30.8	1140
419	1239	1225	1.796	1.720	34.751	27.827	37.070	45.873	33.607	197	89.9	2.09	30.5	1225
420	1326	1311	1.737	1.655	34.750	27.831	37.077	45.884	34.012	199	91.9	2.08	30.5	1311
421	1414	1398	1.676	1.588	34.749	27.835	37.085	45.895	34.422	199	93.9	2.08	30.5	1398
422	1498	1480	1.574	1.481	34.750	27.843	37.099	45.915	34.819	201	96.8	2.09	30.7	1480
423	1585	1566	1.478	1.380	34.743	27.845	37.107	45.928	35.222	202	99.6	2.10	30.8	1566
424	1671	1650	1.416	1.313	34.741	27.848	37.114	45.939	35.621	203	101.4	2.11	30.8	1650
101	1767	1745	1.365	1.255	34.742	27.852	37.122	45.949	36.065	203	105.7	2.11	31.1	1745
102	1861	1837	1.292	1.176	34.737	27.854	37.128	45.960	36.498	204	107.3	2.13	31.3	1837
103	1957	1932	1.217	1.095	34.734	27.857	37.135	45.972	36.940	205	109.5	2.15	31.4	1932
104	2050	2023	1.134	1.006	34.728	27.857	37.141	45.983	37.368	205	111.7	2.16	31.6	2023
105	2146	2117	1.016	0.882	34.721	27.860	37.151	45.999	37.811	207	114.7	2.17	31.8	2117
106	2241	2211	0.951	0.811	34.718	27.862	37.157	46.009	38.246	210	116.6	2.18	31.8	2211
107	2335	2303	0.888	0.741	34.714	27.863	37.162	46.018	38.675	208	118.4	2.19	32.1	2303
108	2431	2397	0.813	0.660	34.711	27.865	37.169	46.030	39.115	209	120.1	2.20	32.2	2397
109	2527	2491	0.705	0.546	34.706	27.868	37.179	46.045	39.556	210	122.6	2.21	32.3	2491
110	2624	2586	0.609	0.444	34.701	27.870	37.186	46.059	40.001	212	124.3	2.22	32.4	2586
111	2719	2679	0.547	0.375	34.698	27.871	37.192	46.068	40.432	214	125.7	2.22	32.4	2679
112	2813	2771	0.489	0.311	34.696	27.873	37.198	46.077	40.859	216	126.8	2.23	32.5	2771
114	2910	2866	0.428	0.243	34.692	27.874	37.202	46.086	41.297	217	127.5	2.23	32.6	2866
115	3005	2959	0.348	0.156	34.688	27.875	37.209	46.097	41.728	219	128.9	2.23	32.5	2959
116	3102	3054	0.280	0.082	34.687	27.878	37.216	46.109	42.169	222	129.6	2.23	32.6	3054
117	3195	3145	0.249	0.043	34.686	27.879	37.220	46.115	42.586	223	130.3	2.23	32.5	3145
118	3292	3239	0.190	-0.023	34.684	27.881	37.225	46.124	43.022	225	131.2	2.23	32.5	3239
119	3388	3333	0.153	-0.068	34.684	27.883	37.230	46.131	43.453	225	131.7	2.22	32.5	3333
120	3484	3427	0.117	-0.112	34.684	27.885	37.235	46.138	43.882	228	132.1	2.22	32.5	3427
121	3580	3520	0.098	-0.139	34.682	27.885	37.236	46.141	44.306	228	132.4	2.22	32.5	3520
123	3676	3614	0.104	-0.143	34.682	27.885	37.237	46.142	44.728	228	132.5	2.23	32.5	3614
124	3753	3689	0.103	-0.151	34.682	27.886	37.238	46.143	45.066	229	132.5	2.23	32.6	3689
122	3836	3770	0.094	-0.168	34.682	27.886	37.240	46.146	45.432	230	133.3	2.22	32.5	3770

BOTTOM DEPTH OF CAST 1 IS 3808

STATION: 434 LEG: V POSITION: 45° 38' S 107° 15' E DATE: 20 FEB 78

SAMPLE NO.	PRESS DB	DEPTH M	TEMP DEG C	POT TEMP DEG C	SALINITY 0/00	SIGMA 0	SIGMA 2	SIGMA 4	SIGMA Z	OXYGEN μM/KG	SiO <sub>2</sub> μM/KG	PO <sub>4</sub> μM/KG	NO <sub>3</sub> μM/KG	DEPTH M
101	4	4	11.755	11.754	34.641	26.395	35.157	43.515	26.413	270	3.7	0.76	8.6	4
102	43	43	11.584	11.578	34.640	26.427	35.197	43.561	26.621	268	3.6	0.77	8.7	43
103	98	97	11.492	11.479	34.654	26.457	35.230	43.598	26.897	267	3.4	0.79	8.9	97
104	147	146	10.814	10.796	34.844	26.730	35.529	43.921	27.392	258	5.2	0.86	10.6	146
105	334	332	10.114	10.074	34.733	26.771	35.602	44.023	28.276	262	5.2	0.95	12.0	332
106	433	430	9.924	9.872	34.735	26.807	35.647	44.076	28.758	251	6.3	1.06	13.9	430
107	565	560	9.292	9.227	34.689	26.879	35.747	44.203	29.429	238	7.7	1.20	16.4	560
108	792	785	6.895	6.817	34.485	27.079	36.062	44.623	30.699	209	18.4	1.71	24.8	785
109	1010	1001	4.489	4.407	34.343	27.259	36.364	45.039	31.913	214	31.1	2.07	30.0	1001
110	1196	1184	3.547	3.457	34.369	27.375	36.530	45.250	32.904	201	45.0	2.24	32.6	1184
111	1383	1369	2.979	2.879	34.446	27.490	36.673	45.422	33.888	187	58.8	2.34	33.9	1369

STATION: 434 LEG: V POSITION: 45° 38' S 107° 15' E DATE: 20 FEB 78

SAMPLE NO.	PRESS DB	DEPTH M	TEMP DEG C	POT TEMP DEG C	SALINITY 0/00	SIGMA 0	SIGMA 2	SIGMA 4	SIGMA Z	OXYGEN μM/KG	SiO <sub>2</sub> μM/KG	PO <sub>4</sub> μM/KG	NO <sub>3</sub> μM/KG	DEPTH M
112	1571	1554	2.704	2.592	34.532	27.583	36.781	45.543	34.846	179	67.6	2.34	34.1	1554
114	1750	1731	2.592	2.466	34.617	27.661	36.865	45.632	35.739	176	74.7	2.30	33.4	1731
115	1967	1944	2.469	2.326	34.680	27.723	36.933	45.706	36.785	182	76.6	2.21	32.3	1944
116	2188	2161	2.366	2.204	34.719	27.764	36.980	45.759	37.824	189	78.0	2.14	31.3	2161
117	2408	2377	2.240	2.060	34.748	27.799	37.022	45.808	38.849	195	80.7	2.07	30.4	2377
118	2629	2594	2.049	1.852	34.757	27.822	37.057	45.853	39.869	199	86.6	2.06	30.2	2594
119	2833	2794	1.808	1.597	34.753	27.837	37.087	45.897	40.808	201	94.2	2.08	30.5	2794
120	3038	2995	1.557	1.332	34.745	27.849	37.114	45.938	41.747	203	103.2	2.12	31.1	2995
121	3242	3194	1.405	1.164	34.742D	27.858	37.133	45.966	42.668	204	108.8	2.14	31.3	3194
122	3496	3442	1.354	1.089	34.731	27.855	37.133	45.970	43.783	205	111.2	2.15	31.6	3442
123	3748	3688	1.336	1.045	34.728D	27.855	37.136	45.976	44.885	205	112.6	2.16	31.6	3688
124	3959	3894	1.285	0.973	34.727D	27.859	37.144	45.988	45.811	206	112.4	2.16	31.6	3894

BOTTOM DEPTH OF CAST 1 IS 3924

STATION: 435 LEG: V POSITION: 39° 57' S 109° 58' E DATE: 22 FEB 78

SAMPLE NO.	PRESS DB	DEPTH M	TEMP DEG C	POT TEMP DEG C	SALINITY 0/00	SIGMA 0	SIGMA 2	SIGMA 4	SIGMA Z	OXYGEN μM/KG	SiO <sub>2</sub> μM/KG	PO <sub>4</sub> μM/KG	NO <sub>3</sub> μM/KG	DEPTH M
301	5	5	15.488	15.487	34.840	25.771	34.388	42.612	25.793	256	1.3	0.44	3.6	5
302	19	19	15.287	15.284	34.797	25.784	34.409	42.639	25.868	259	1.4	0.48	4.3	19
303	52	52	13.783	13.775	34.749	26.074	34.756	43.039	26.306	262	1.5	0.57	5.6	52
304	83	83	12.222	12.211	34.714	26.364	35.107	43.446	26.735	266	1.6	0.71	6.9	83
30														

STATION: 436 LEG: VI POSITION: 29° 15' S 109° 58' E DATE: 8 MAR 78

SAMPLE NO.	PRESS DB	DEPTH M	TEMP DEG C	POT TEMP DEG C	SALINITY 0/00	SIGMA 0	SIGMA 2	SIGMA 4	SIGMA Z	OXYGEN μM/KG	SIO <sub>2</sub> μM/KG	PO <sub>4</sub> μM/KG	NO <sub>3</sub> μM/KG	DEPTH M
301	10	10	24.517	24.515	35.734	24.070	32.396	40.344	24.113	211	4.0	0.06	0.0	10
302	35	35	21.502	21.495	35.880	25.048	33.458	41.486	25.199	224	4.1	0.06	0.5	35
303	65	65	20.445	20.432	35.918	25.367	33.808	41.866	25.648	228	3.8	0.07	0.4	65
304	86	86	18.094	18.079	35.788	25.880	34.396	42.525	26.254	239	3.6	0.10	0.4	86
305	121	120	16.681	16.661	35.715	26.170	34.735	42.909	26.700	228	3.2	0.14	0.4	120
306	167	166	15.281	15.255	35.574	26.388	35.004	43.225	27.123	231	3.0	0.21	0.5	166
307	209	208	14.077	14.046	35.395	26.515	35.178	43.443	27.441	232	2.7	0.30	2.0	208
308	255	254	12.829	12.793	35.220	26.640	35.353	43.665	27.775	234	2.5	0.41	3.6	254
309	300	298	11.706	11.666	35.056	26.734	35.494	43.849	28.075	238	2.6	0.56	6.0	298
310	357	355	10.488	10.444	34.890	26.829	35.642	44.046	28.434	241	3.0	0.70	8.3	355
311	428	425	9.652	9.602	34.764	26.875	35.726	44.166	28.806	242	3.6	0.87	11.0	425
312	537	534	8.717	8.657	34.640	26.932	35.826	44.306	29.363	236	4.5	1.03	13.9	534
313	674	669	7.010	6.943	34.489	27.065	36.042	44.597	30.140	211	6.3	1.24	17.6	669
314	802	796	5.064	4.996	34.404	27.243	36.316	44.962	30.935	193	15.8	1.65	24.2	796
315	924	917	4.156	4.084	34.456	27.383	36.502	45.191	31.652	168	33.0	2.03	29.8	917
316	1046	1038	3.797	3.717	34.504	27.458	36.596	45.302	32.293	155	55.7	2.29	33.1	1038
317	1174	1164	3.536	3.448	34.553	27.523	36.674	45.393	32.950	147	67.5	2.39	34.4	1164
318	1299	1288	3.232	3.136	34.597	27.587	36.754	45.488	33.593	146	77.7	2.43	34.8	1288
319	1423	1410	2.930	2.827	34.629	27.640	36.824	45.572	34.221	152	84.0	2.42	34.7	1410
320	1554	1540	2.791	2.679	34.662	27.679	36.871	45.626	34.860	152	87.2	2.40	34.4	1540
321	1675	1659	2.637	2.516	34.685	27.711	36.911	45.674	35.447	153	93.9	2.39	34.3	1659
322	1804	1786	2.475	2.346	34.704	27.741	36.949	45.721	36.067	157	99.0	2.38	34.1	1786
323	1929	1909	2.345	2.207	34.716	27.761	36.978	45.756	36.658	156	101.8	2.36	33.7	1909
324	2054	2032	2.233	2.086	34.722	27.776	36.999	45.783	37.241	158	110.1	2.37	33.9	2032
101	2107	2085	2.193	2.042	34.724	27.781	37.006	45.793	37.487	159	114.1	2.37	33.8	2085
102	2310	2284	2.043	1.876	34.726	27.795	37.030	45.825	38.421	163	118.0	2.37	33.8	2284
103	2515	2486	1.923	1.740	34.729	27.808	37.050	45.852	39.357	166	119.2	2.35	33.3	2486
104	2718	2685	1.799	1.599	34.729	27.818	37.068	45.878	40.279	172	119.8	2.33	33.1	2685
105	2973	2935	1.662	1.441	34.729	27.829	37.088	45.906	41.431	177	120.8	2.30	32.9	2935
106	3227	3184	1.542	1.299	34.727	27.837	37.104	45.930	42.569	183	122.7	2.28	32.7	3184
107	3484	3435	1.442	1.176	34.727	27.846	37.120	45.952	43.714	185	123.5	2.27	32.6	3435
108	3737	3683	1.347	1.057	34.724	27.851	37.132	45.971	44.832	191	124.9	2.26	32.5	3683
109	3990	3930	1.264	0.949	34.719	27.854	37.141	45.986	45.942	193	126.3	2.26	32.5	3930
110	4247	4180	1.211	0.869	34.718	27.858	37.150	45.999	47.063	196	126.6	2.25	32.4	4180
111	4503	4430	1.167	0.798	34.717	27.862	37.158	46.010	48.172	199	126.2	2.24	32.4	4430
112	4503	4430	1.167	0.798	34.718	27.862	37.158	46.011	48.172	201	125.9	2.23	32.4	4430
114	5024	4937	1.102	0.673	34.714	27.867	37.170	46.030	50.406	205	124.1	2.21	32.1	4937
115	5279	5184	1.099	0.639	34.713	27.868	37.173	46.035	51.486	206	124.1	2.20	32.1	5184
116	5279	5184	1.099	0.639	34.713	27.868	37.173	46.035	51.486	206	124.1	2.20	32.0	5184
117	5533	5431	1.110	0.617	34.712	27.869	37.175	46.038	52.553	207	123.9	2.20	32.1	5431
118	5563	5460	1.110	0.614	34.714	27.870	37.177	46.040	52.681	208	123.9	2.19	32.1	5460
119	5584	5480	1.106	0.607	34.711	27.868	37.175	46.039	52.767	209	124.0	2.20	32.2	5480
120	5599	5495	1.108	0.607	34.711	27.868	37.175	46.039	52.830	208	124.0	2.19	32.1	5495
124	5609	5504	1.110	0.608	34.711	27.868	37.175	46.039	52.871	208	123.9	2.19	32.2	5504
121	5630	5525	1.113	0.608	34.714	27.871	37.178	46.041	52.961	207	124.0	2.19	32.1	5525
122	5647	5541	1.114	0.606	34.714	27.871	37.178	46.041	53.032	208	123.8	2.19	32.1	5541
123	5662	5556	1.117	0.607	34.714	27.871	37.178	46.041	53.095	207	123.8	2.19	32.1	5556

BOTTOM DEPTH OF CAST 1 IS 5572

STATION: 437 LEG: VI POSITION: 24° 28' S 104° 55' E DATE: 11 MAR 78

SAMPLE NO.	PRESS DB	DEPTH M	TEMP DEG C	POT TEMP DEG C	SALINITY 0/00	SIGMA 0	SIGMA 2	SIGMA 4	SIGMA Z	OXYGEN μM/KG	SIO <sub>2</sub> μM/KG	PO <sub>4</sub> μM/KG	NO <sub>3</sub> μM/KG	DEPTH M
313	2	2	24.295	24.295	35.739	24.139	32.471	40.425	24.148					2
101	8H	8	24.37 H	24.37	35.728	24.109	32.439	40.391	24.143	213	3.4	0.07	0.0	8
314	9	9	24.302	24.300	35.736	24.135	32.467	40.421	24.173					9
315	9	9	24.302	24.300	35.739	24.137	32.469	40.423	24.176					9
316	9	9	24.302	24.300	35.740	24.138	32.470	40.423	24.177					9
317	9	9	24.302	24.300	35.739	24.137	32.469	40.423	24.176					9
318	16	16	24.252	24.248	35.736	24.150	32.484	40.438	24.219					16
319	23	23	24.232	24.227	35.734	24.155	32.489	40.445	24.253					23
320	27	27	24.217	24.211	35.728	24.155	32.490	40.446	24.271					27
321	30	30	24.162	24.155	35.689	24.142	32.479	40.437	24.270					30

STATION: 437 LEG: VI POSITION: 24° 28' S 104° 55' E DATE: 11 MAR 78

SAMPLE NO.	PRESS DB	DEPTH M	TEMP DEG C	POT TEMP DEG C	SALINITY 0/00	SIGMA 0	SIGMA 2	SIGMA 4	SIGMA Z	OXYGEN μM/KG	SIO <sub>2</sub> μM/KG	PO <sub>4</sub> μM/KG	NO <sub>3</sub> μM/KG	DEPTH M
322	33	33	23.745	23.738	35.687	24.263	32.612	40.580	24.405					33
102	40	40	23.2 A	23.2	35.701	24.434	32.797	40.780	24.605	221	3.2	0.06	0.0	40
103	70	70	21.2 A	21.2	35.638	24.951	33.373	41.412	25.253	227	3.1	0.12	0.0	70
323	95	95	20.066	20.048	35.676	25.286	33.741	41.813	25.697					95
324	95	95	20.066	20.048	35.676	25.286	33.741	41.813	25.697					95
104	110	110	19.5 A	19.5	35.730	25.478	33.951	42.038	25.955	213	2.9	0.19	0.2	110
105	161H	160	17.93 H	17.90	35.742	25.889	34.411	42.546	26.590	213	2.7	0.28	2.1	160
106	212	211	16.6 A	16.5	35.668	26.165	34.735	42.914	27.093	218	2.4	0.32	2.4	211
107	242	241	15.2 A	15.2	35.538	26.377	34.996	43.221	27.443	222	2.4	0.40	3.6	241
108	303	302	13.2 A	13.1	35.288	26.624	35.323	43.621	27.969	231	2.2	0.57	6.3	302
109	364H	362	11.609H	11.561	35.056	26.754	35.518	43.877	28.381	237	2.5	0.74	9.2	362
110	404	402	10.61 A	10.56	34.903	26.819	35.627	44.027	28.633	241	3.1	0.89	11.6	402
111	469	466	9.58 A	9.52	34.757	26.883	35.738	44.181	28.999	242	3.9	1.06	14.6	466
112	553H	550	8.640H	8.579	34.637	26.942	35.840	44.323	29.446	234	6.0	1.27	18.2	550
113	623	619	7.357	7.294	34.522	27.042	36.002	44.541	29.881	213	14.3	1.58	23.3	619
114	696	692	5.742	5.680	34.451	27.199	36.238	44.851	30.395	182	33.7	2.01	29.5	692
115	774	769	5.109	5.044	34.462	27.283	36.353	44.996	30.847	167	45.9	2.18	31.8	769
116	845	839	4.858	4.788	34.504	27.345	36.428	45.082	31.237	146	60.1	2.34	33.5	839
117	916	910	4.673	4.598	34.561	27.412	36.503	45.165	31.631	125	75.3	2.46	35.1	910
118	993	986	4.410	4.330	34.581	27.456	36.561	45.236	32.033	122	81.4	2.50	35.5	986
119	1096	1088	4.037	3.951	34.594	27.506	36.630	45.323	32.562	124	86.5	2.50	35.7	1088
120	1195	1186	3.730	3.638	34.607	27.547	36.688	45.396	33.063	130	88.1	2.48	35	

STATION: 438 LEG: VI POSITION: 19° 29' S 101° 17' E DATE: 12 MAR 78

Table with columns: SAMPLE NO., PRESS DB, DEPTH M, TEMP DEG C, POT TEMP DEG C, SALINITY 0/00, SIGMA 0, SIGMA 2, SIGMA 4, SIGMA Z, OXYGEN μM/KG, SiO2 μM/KG, PO4 μM/KG, NO3 μM/KG, DEPTH M. Rows 107-118, 119-124.

BOTTOM DEPTH OF CAST 1 IS 5842

STATION: 439 LEG: VI POSITION: 13° 2' S 97° 8' E DATE: 15 MAR 78

Table with columns: SAMPLE NO., PRESS DB, DEPTH M, TEMP DEG C, POT TEMP DEG C, SALINITY 0/00, SIGMA 0, SIGMA 2, SIGMA 4, SIGMA Z, OXYGEN μM/KG, SiO2 μM/KG, PO4 μM/KG, NO3 μM/KG, DEPTH M. Rows 101-110, 111-120, 121-124.

BOTTOM DEPTH OF CAST 1 IS 4699

STATION: 440 LEG: VI POSITION: 9° 21' S 95° 1' E DATE: 17 MAR 78

Table with columns: SAMPLE NO., PRESS DB, DEPTH M, TEMP DEG C, POT TEMP DEG C, SALINITY 0/00, SIGMA 0, SIGMA 2, SIGMA 4, SIGMA Z, OXYGEN μM/KG, SiO2 μM/KG, PO4 μM/KG, NO3 μM/KG, DEPTH M. Rows 713-721.

STATION: 440 LEG: VI POSITION: 9° 21' S 95° 1' E DATE: 17 MAR 78

Table with columns: SAMPLE NO., PRESS DB, DEPTH M, TEMP DEG C, POT TEMP DEG C, SALINITY 0/00, SIGMA 0, SIGMA 2, SIGMA 4, SIGMA Z, OXYGEN μM/KG, SiO2 μM/KG, PO4 μM/KG, NO3 μM/KG, DEPTH M. Rows 722-308, 309-318.

BOTTOM DEPTH OF CAST 1 IS 5255

STATION: 441 LEG: VI POSITION: 5° 1' S 91° 46' E DATE: 20 MAR 78

Table with columns: SAMPLE NO., PRESS DB, DEPTH M, TEMP DEG C, POT TEMP DEG C, SALINITY 0/00, SIGMA 0, SIGMA 2, SIGMA 4, SIGMA Z, OXYGEN μM/KG, SiO2 μM/KG, PO4 μM/KG, NO3 μM/KG, DEPTH M. Rows 301-310.

STATION: 441 LEG: VI POSITION: 5° 1' S 91° 46' E DATE: 20 MAR 78

SAMPLE NO.	PRESS DB	DEPTH M	TEMP DEG C	POT TEMP DEG C	SALINITY 0/00	SIGMA 0	SIGMA 2	SIGMA 4	SIGMA Z	OXYGEN μM/KG	SiO <sub>2</sub> μM/KG	PO <sub>4</sub> μM/KG	NO <sub>3</sub> μM/KG	DEPTH M
311	707	703	7.743	7.669	34.868	27.260	36.197	44.715	30.470	55	62.7	2.58	35.9	703
312	806	801	7.139	7.057	34.854	27.337	36.302	44.847	31.003	57	71.8	2.64	36.5	801
313	902	897	6.678	6.589	34.844	27.393	36.381	44.947	31.501	59	78.8	2.67	36.9	897
314	1001	995	6.064	5.970	34.813	27.449	36.467	45.062	32.018	66	86.2	2.68	37.0	995
315	1101	1094	5.671	5.570	34.809	27.495	36.534	45.147	32.526	70	90.7	2.68	37.2	1094
316	1203	1195	5.264	5.156	34.805	27.542	36.601	45.233	33.044	76	94.9	2.68	37.2	1195
317	1305	1296	4.809	4.696	34.794	27.585	36.668	45.322	33.562	83	99.8	2.67	37.1	1296
318	1405	1395	4.400	4.282	34.792	27.629	36.733	45.407	34.071	90	103.4	2.64	36.7	1395
319	1505	1493	4.012	3.889	34.801	27.677	36.801	45.494	34.584	99	106.5	2.62	36.7	1493
320	1606	1593	3.735	3.606	34.785	27.692	36.832	45.539	35.067	106	109.0	2.59	36.3	1593
321	1708	1694	3.375	3.241	34.777	27.721	36.880	45.605	35.570	116	111.9	2.56	36.1	1694
322	1803	1788	3.152	3.013	34.777	27.742	36.913	45.649	36.029	119	114.4	2.54	36.0	1788
323	1900	1883	2.907	2.763	34.767	27.756	36.941	45.690	36.492	128	116.9	2.51	35.8	1883
324	2002	1984	2.661	2.511	34.760	27.772	36.970	45.733	36.979	132	119.6	2.49	35.5	1984
101	2010	1992	2.708	2.557	34.759	27.767	36.963	45.723	37.008	131	118.9	2.50	35.4	1992
102	2211	2190	2.391	2.227	34.750	27.787	37.002	45.779	37.948	140	122.2	2.48	35.1	2190
103	2414	2390	2.122	1.944	34.743	27.803	37.034	45.826	38.889	149	126.1	2.44	34.8	2390
104	2615	2587	1.958	1.765	34.739	27.814	37.054	45.855	39.806	155	127.6	2.42	34.5	2587
105	2819	2788	1.827	1.617	34.735	27.821	37.070	45.879	40.729	160	129.0	2.41	34.5	2788
106	3019	2984	1.710	1.483	34.731	27.828	37.084	45.900	41.629	163	130.6	2.39	34.2	2984
107	3271	3231	1.555	1.307	34.726	27.836	37.103	45.928	42.760	168	132.3	2.37	34.0	3231
108	3519	3474	1.386	1.118	34.720	27.844	37.121	45.957	43.870	176	132.2	2.35	33.7	3474
109	3768	3718	1.257	0.966	34.717	27.851	37.137	45.981	44.977	185	130.7	2.31	33.3	3718
110	4012	3956	1.163	0.849	34.713	27.855	37.148	45.999	46.050	192	128.8	2.28	32.9	3956
111	4271	4209	1.150	0.808	34.713	27.858	37.153	46.006	47.173	196	127.7	2.26	32.7	4209
112	4525	4457	1.158	0.787	34.715	27.861	37.157	46.011	48.266	197	126.9	2.25	32.6	4457
115	4772	4698	1.180	0.779	34.713	27.860	37.157	46.011	49.317	198	126.3	2.25	32.5	4698
116	4776	4701	1.180	0.778	34.714	27.860	37.158	46.012	49.335	198	125.7	2.25	32.6	4701
117	4817	4741	1.184	0.777	34.713	27.860	37.157	46.011	49.509	199	126.0	2.24	32.5	4741
118	4839	4763	1.184	0.775	34.714	27.861	37.158	46.012	49.603	198	125.8	2.24	32.5	4763
119	4884	4807	1.189	0.774	34.713	27.860	37.157	46.012	49.793	199	126.1	2.24	32.5	4807
120	4918	4840	1.191	0.772	34.714	27.861	37.158	46.013	49.938	199	125.9	2.24	32.5	4840
121	4949	4870	1.195	0.772	34.713	27.860	37.158	46.012	50.069	199	125.9	2.24	32.4	4870
122	4977	4897	1.198	0.771	34.714	27.861	37.158	46.013	50.188	200	126.0	2.23	32.5	4897
123	5008	4927	1.201	0.771	34.712	27.859	37.157	46.011	50.317	199	125.8	2.23	32.5	4927
124	5008	4927	1.201	0.771	34.714	27.861	37.158	46.013	50.319	200	125.9	2.23	32.4	4927

BOTTOM DEPTH OF CAST 1 IS 4942

STATION: 442 LEG: VI POSITION: 1° 12' S 90° 45' E DATE: 22 MAR 78

SAMPLE NO.	PRESS DB	DEPTH M	TEMP DEG C	POT TEMP DEG C	SALINITY 0/00	SIGMA 0	SIGMA 2	SIGMA 4	SIGMA Z	OXYGEN μM/KG	SiO <sub>2</sub> μM/KG	PO <sub>4</sub> μM/KG	NO <sub>3</sub> μM/KG	DEPTH M
401	20	20	29.678	29.673	33.731	20.955	29.173	37.009	21.039	201	0.8	0.09	0.0	20
402	51	51	29.106	29.093	34.434	21.670	29.894	37.738	21.885	203	1.1	0.15	0.0	51
403	89	89	23.141	23.122	35.183	24.061	32.432	40.423	24.442	111	8.3	0.99	12.3	89
404	109	109	20.667	20.646	35.181	24.750	33.193	41.253	25.220	80	12.0	1.31	17.8	109
405	139	139	15.752	15.730	35.129	25.938	34.543	42.754	26.550	70	19.1	1.71	24.4	139
406	170	170	14.918	14.892	35.121	26.120	34.755	42.995	26.871	54	20.9	1.82	25.8	170
407	210	210	13.946	13.915	35.125	26.335	35.006	43.279	27.266	65	20.8	1.79	25.4	210
408	260	259	12.743	12.707	35.109	26.572	35.289	43.606	27.729	79	21.6	1.82	26.0	259
409	308	307	12.194	12.152	35.085	26.663	35.403	43.740	28.037	77	22.7	1.86	26.7	307
410	413	411	10.640	10.588	35.020	26.904	35.709	44.106	28.758	69	29.7	2.07	30.1	411
411	510	508	10.088	10.026	34.986	26.976	35.806	44.226	29.269	75	32.6	2.12	30.7	508
412	613	610	9.186	9.115	34.953	27.103	35.973	44.430	29.868	66	42.5	2.33	32.9	610
415	709	705	8.718	8.638	35.002	27.218	36.108	44.584	30.419	53	53.7	2.51	34.7	705
416	808	804	8.108	8.020	34.988	27.302	36.221	44.723	30.958	48	63.1	2.60	35.9	804
417	907	902	7.418	7.324	34.952	27.376	36.327	44.860	31.490	53	72.4	2.68	36.7	902
418	1009	1003	6.815	6.714	34.946	27.456	36.436	44.996	32.042	52	80.1	2.71	37.2	1003
419	1110	1103	6.315	6.207	34.917	27.500	36.506	45.088	32.553	59	85.3	2.71	37.3	1103
420	1211	1203	5.887	5.773	34.897	27.540	36.567	45.169	33.059	63	90.3	2.71	37.3	1203
421	1362	1352	4.953	4.833	34.864	27.625	36.700	45.347	33.854	84	99.3	2.69	37.1	1352
422	1511	1499	4.106	3.981	34.828	27.689	36.808	45.496	34.620	96	107.0	2.64	36.7	1499
423	1664	1651	3.686	3.552	34.812	27.719	36.861	45.570	35.356	109	111.3	2.60	36.5	1651
101	1809	1794	3.232	3.091	34.797	27.750	36.917	45.649	36.061	117	116.0	2.56	36.0	1794

STATION: 442 LEG: VI POSITION: 1° 12' S 90° 45' E DATE: 22 MAR 78

SAMPLE NO.	PRESS DB	DEPTH M	TEMP DEG C	POT TEMP DEG C	SALINITY 0/00	SIGMA 0	SIGMA 2	SIGMA 4	SIGMA Z	OXYGEN μM/KG	SiO <sub>2</sub> μM/KG	PO <sub>4</sub> μM/KG	NO <sub>3</sub> μM/KG	DEPTH M
424	1814	1799	3.172	3.031	34.796	27.755	36.925	45.660	36.091	118	116.5	2.56	36.0	1799
102	2008	1990	2.686	2.535	34.776	27.782	36.980	45.740	37.015	131	122.3	2.54	35.6	1990
103	2209	2188	2.358	2.195	34.762	27.799	37.015	45.794	37.953	140	126.0	2.51	35.2	2188
104	2410	2386	2.129	1.951	34.754	27.812	37.042	45.833	38.878	146	129.1	2.48	34.9	2386
105	2613	2585	1.944	1.751	34.745	27.820	37.061	45.863	39.804	152	130.9	2.46	34.8	2585
106	2816	2785	1.820	1.611	34.740	27.826	37.075	45.884	40.720	158	132.0	2.44	34.6	2785
107	3019	2984	1.699	1.473	34.737	27.833	37.090	45.907	41.635	161	133.9	2.42	34.5	2984
108	3269	3229	1.610	1.361	34.730	27.835	37.099	45.921	42.745	165	135.0	2.40	34.3	3229
109	3523	3478	1.416	1.146	34.725	27.846	37.122	45.956	43.887	175	134.2	2.37	33.8	3478
110	3776	3726	1.183	0.894	34.721	27.859	37.149	45.997	45.027	190	130.1	2.30	33.1	3726
111	4033	3977	1.148	0.832	34.718	27.860	37.154	46.005	46.148	194	128.6	2.28	32.9	3977
112	4284	4222	1.155	0.811	34.718	27.862	37.157	46.009	47.232	196	128.6	2.27	32.8	4222
115	4523	4455	1.165	0.794	34.718	27.863	37.159	46.012	48.258	197	127.4	2.26	32.6	4455
116	4523	4455	1.165	0.794	34.718	27.863	37.159	46.012	48.258	198	127.9	2.27	32.7	4455
117	4550	4482	1.166	0.791	34.717	27.862	37.158	46.012	48.373	197	127.9	2.25	32.6	4482
119	4575	4506	1.167	0.789	34.718	27.863	37.159	46.013	48.481	197	127.4	2.25	32.6	4506
118	4591	4521	1.169	0.790	34.718	27.863	37.159	46.013	48.549	197	127.2	2.25	32.6	4521
120	4601	4531	1.168	0.787	34.717	27.862	37.159	46.012	48.591	198	127.0	2.24	32.5	4531
121	4626	4556	1.170	0.786	3									

STATION: 444 LEG: VI POSITION: 0° 35' N 88° 38' E DATE: 24 MAR 78

SAMPLE NO.	PRESS DB	DEPTH M	TEMP DEG C	POT TEMP DEG C	SALINITY 0/00	SIGMA 0	SIGMA 2	SIGMA 4	SIGMA Z	OXYGEN μM/KG	SiO <sub>2</sub> μM/KG	PO <sub>4</sub> μM/KG	NO <sub>3</sub> μM/KG	DEPTH M
2101	5	5	29.95 A	29.95	33.516D	20.705	28.919	36.751	20.726					5
229	5H	5	30.22 H	30.22	33.636	20.705	28.911	36.734	20.726	196				5
2102	40	40	29.68 A	29.66	34.614D	21.619	29.828	37.656	21.787					40
2103	68	68	26.09 A	26.08	35.045D	23.079	31.372	39.286	23.368					68
2104	118	118	18.47 A	18.44	35.120D	25.278	33.791	41.917	25.792					118
2105	151	151	15.61 A	15.59	35.085D	25.937	34.547	42.764	26.602					151
2106	182	182	14.84 A	14.82	35.110D	26.129	34.767	43.009	26.932					182
2107	281	280	12.46 A	12.42	35.088D	26.612	35.341	43.668	27.864					280
2108	384	383	10.64 A	10.59	35.008D	26.894	35.700	44.097	28.619					383
2109	525	523	10.06 A	9.99	34.977D	26.975	35.806	44.227	29.335					523
2110	605	602	9.31 A	9.24	34.980D	27.104	35.968	44.419	29.831					602
2111	745	741	8.60 A	8.52	35.004D	27.238	36.134	44.614	30.603					741
2112	896	891	7.27 A	7.18	34.965D	27.407	36.365	44.903	31.474					891
2113	1146	1138	5.75 A	5.64	34.885D	27.546	36.580	45.188	32.777					1138
2114	1297	1288	5.04 A	4.92	34.856D	27.609	36.679	45.322	33.542					1288
2115	1442	1431	4.30 A	4.18	34.830D	27.670	36.779	45.457	34.282					1431
2116	1593	1580	3.79 A	3.66	34.812D	27.708	36.844	45.548	35.021					1580
2117	1743	1729	3.26 A	3.12	34.793D	27.744	36.909	45.640	35.757					1729
2118	1889	1873	2.92 A	2.77	34.779D	27.764	36.949	45.697	36.451					1873
2119	2138	2118	2.38 A	2.22	34.761D	27.796	37.011	45.788	37.630					2118
2120	2288	2266	2.17 A	2.00	34.751D	27.806	37.033	45.821	38.325					2266
201	2309H	2286	2.192H	2.022	34.753	27.805	37.031	45.819	38.417	141	128.6	2.50	35.1	2286
202	2461	2436	2.06 A	1.88	34.747	27.812	37.045	45.840	39.110	146	129.4	2.44	34.9	2436
203	2614	2586	1.95 A	1.75	34.745	27.819	37.060	45.862	39.808	150	131.9	2.43	34.9	2586
204	2766	2736	1.82 A	1.61	34.736	27.823	37.072	45.881	40.496	155	132.6	2.41	34.6	2736
205	2919H	2886	1.745H	1.527	34.734	27.827	37.081	45.895	41.183	159	133.1	2.40	34.5	2886
206	3072	3036	1.65 A	1.42	34.732	27.833	37.093	45.912	41.872	162	135.6	2.40	34.5	3036
207	3275	3235	1.55 A	1.30	34.729	27.839	37.106	45.931	42.781	164	136.5	2.39	34.4	3235
208	3377	3335	1.51 A	1.25	34.726	27.840	37.110	45.938	43.233	166	136.3	2.37	34.3	3335
209	3581H	3535	1.390H	1.115	34.724	27.847	37.125	45.960	44.144	174	137.0	2.36	34.1	3535
210	3785	3735	1.36 A	1.06	34.721	27.848	37.129	45.967	45.037	175	137.5	2.35	34.0	3735
211	3990	3935	1.37 A	1.05	34.720	27.848	37.129	45.968	45.925	176	137.0	2.34	33.9	3935
212	4194H	4134	1.388H	1.047	34.719	27.848	37.129	45.969	46.804	176	137.5	2.34	34.0	4134
215	4344H	4281	1.397H	1.038	34.720	27.849	37.131	45.971	47.449	176	136.9	2.34	33.9	4281
216	4345	4282	1.406	1.047	34.720	27.848	37.130	45.969	47.452	176	137.2	2.34	33.9	4282
217	4369	4305	1.407	1.045	34.719	27.848	37.129	45.969	47.554	176	136.8	2.35	34.0	4305
218	4394	4329	1.408	1.043	34.718	27.847	37.129	45.969	47.661	176	136.8	2.34	34.0	4329
219	4419	4354	1.409	1.041	34.718	27.847	37.129	45.969	47.768	177	136.5	2.34	33.9	4354
220	4444	4378	1.412	1.041	34.718	27.847	37.129	45.969	47.875	176	136.5	2.34	34.0	4378
221	4470	4404	1.414	1.040	34.718	27.847	37.129	45.969	47.986	176	136.6	2.34	33.9	4404
222	4495	4428	1.417	1.040	34.718	27.847	37.129	45.969	48.093	176	136.5	2.33	34.0	4428
223	4521	4453	1.420	1.040	34.718	27.847	37.129	45.969	48.204	177	136.7	2.33	34.0	4453
224	4521	4453	1.420	1.040	34.717	27.846	37.128	45.968	48.203	176	136.6	2.33	33.9	4453

BOTTOM DEPTH OF CAST 2 IS 4464

STATION: 445 LEG: VI POSITION: 8° 31' N 86° 2' E DATE: 26 MAR 78

SAMPLE NO.	PRESS DB	DEPTH M	TEMP DEG C	POT TEMP DEG C	SALINITY 0/00	SIGMA 0	SIGMA 2	SIGMA 4	SIGMA Z	OXYGEN μM/KG	SiO <sub>2</sub> μM/KG	PO <sub>4</sub> μM/KG	NO <sub>3</sub> μM/KG	DEPTH M
301	19	19	29.084	29.079	34.225	21.517	29.744	37.591	21.598	199	1.8	0.13	0.0	19
302	59	59	25.724	25.710	34.285	22.618	30.929	38.861	22.869	140	6.5	0.63	6.3	59
303	90	90	21.407	21.389	34.809	24.265	32.691	40.734	24.653	44	15.9	1.55	21.5	90
304	125	125	17.715	17.693	34.867	25.272	33.812	41.964	25.817	18	24.7	1.98	27.7	125
305	140	140	16.579	16.556	34.877	25.553	34.132	42.320	26.167	17	26.7	2.05	28.5	140
306	160	160	15.343	15.318	34.924	25.874	34.496	42.724	26.579	11	30.1	2.21	30.4	160
307	180	180	14.094	14.067	34.951	26.169	34.836	43.106	26.966	10	32.7	2.30	31.6	180
308	200	200	13.336	13.307	34.986	26.355	35.051	43.347	27.244	10	33.3	2.33	32.1	200
309	241	240	12.210	12.177	35.016	26.604	35.344	43.681	27.680	12	36.2	2.37	33.2	240
310	281	280	11.554	11.517	35.048	26.756	35.522	43.883	28.013	17	36.3	2.37	33.5	280
311	322	321	11.017	10.976	35.035	26.846	35.634	44.016	28.290	14	40.1	2.45	34.7	321
312	382	381	10.556	10.509	35.034	26.929	35.738	44.138	28.645	24	43.2	2.50	35.4	381
313	447	445	10.027	9.973	35.024	27.015	35.846	44.268	29.027	20	48.3	2.55	35.9	445
314	548	545	9.388	9.324	35.011	27.114	35.974	44.421	29.585	21	55.1	2.62	36.5	545
315	649	646	8.689	8.616	34.998	27.218	36.110	44.586	30.151	25	62.2	2.68	37.0	646
316	749	745	7.982	7.902	34.978	27.312	36.236	44.743	30.706	30	70.4	2.73	37.6	745

STATION: 445 LEG: VI POSITION: 8° 31' N 86° 2' E DATE: 26 MAR 78

SAMPLE NO.	PRESS DB	DEPTH M	TEMP DEG C	POT TEMP DEG C	SALINITY 0/00	SIGMA 0	SIGMA 2	SIGMA 4	SIGMA Z	OXYGEN μM/KG	SiO <sub>2</sub> μM/KG	PO <sub>4</sub> μM/KG	NO <sub>3</sub> μM/KG	DEPTH M
317	849	844	7.410	7.322	34.961	27.383	36.335	44.867	31.237	35	76.7	2.75	37.7	844
318	949	943	6.865	6.770	34.940	27.444	36.422	44.978	31.759	42	82.9	2.76	37.9	943
319	1048	1041	6.415	6.313	34.927	27.495	36.495	45.072	32.266	48	88.3	2.77	38.0	1041
320	1142	1134	5.936	5.828	34.906	27.540	36.564	45.164	32.747	55	93.5	2.76	37.9	1134
321	1239	1230	5.485	5.372	34.890	27.583	36.630	45.251	33.240	62	98.3	2.75	37.8	1230
322	1338	1328	5.011	4.892	34.873	27.626	36.697	45.341	33.744	70	103.7	2.73	37.7	1328
323	1436	1425	4.582	4.459	34.854	27.659	36.753	45.417	34.234	79	108.6	2.72	37.5	1425
101	1509	1497	4.359	4.231	34.843	27.675	36.780	45.456	34.586	83	111.1	2.70	37.2	1497
324	1537	1525	4.170	4.042	34.839	27.691	36.807	45.492	34.736	85	113.1	2.71	37.4	1525
102	1657	1643	3.738	3.604	34.821	27.721	36.860	45.566	35.324	94	117.9	2.68	36.9	1643
103	1808	1792	3.162	3.022	34.799	27.758	36.929	45.664	36.068	106	125.2	2.66	36.6	1792
104	1962	1944	2.796	2.648	34.782	27.778	36.969	45.724	36.798	115	129.3	2.62	36.3	1944
105	2111	2091	2.541	2.383	34.771	27.791	36.997	45.765	37.495	122	133.2	2.60	36.1	2091
106	2263	2241	2.310	2.142	34.759	27.801	37.020	45.801	38.199	127	136.3	2.57	36.0	2241
107	2414	2389	2.141	1.963	34.751	27.808	37.038	45.828	38.892	132	139.2	2.57	35.8	2389
108	2563	2536	1.994	1.805	34.746	27.816	37.055	45.854	39.574	135	141.4	2.54	35.7	2536
109	2716	2686	1.873	1.672	34.741	27.822	37.068	45.874	40.269	145	141.4	2.51	35.3	2686
110	2963	2929	1.731	1.509	34.734	27.828	37.083	45.898	41.380	147	143.0	2.49	35.1	2929
111	3114	3077	1.641	1.407	34.730	27.832	37.093	45.913	42.058	150	144.9	2.48	35.0	3077
112	3266	3226	1.561	1.314	34.729	27.838	37.104	45.929	42.739	153	145.7	2.46	34.9	3226
114	3420	3377	1.488	1.227</										



STATION: 446 LEG: VI POSITION: 12° 29' N 84° 29' E DATE: 28 MAR 78

SAMPLE NO.	PRESS DB	DEPTH M	TEMP DEG C	POT TEMP DEG C	SALINITY 0/00	SIGMA 0	SIGMA 2	SIGMA 4	SIGMA Z	OXYGEN μM/KG	SiO <sub>2</sub> μM/KG	PO <sub>4</sub> μM/KG	NO <sub>3</sub> μM/KG	DEPTH M
420	625	622	8.866	8.795	35.000	27.191	36.075	44.544	30.014	15	62.5	2.73	37.7	622
421	749	745	8.045	7.964	34.980	27.304	36.225	44.730	30.697	23	71.0	2.76	38.0	745
422	899	894	7.147	7.055	34.949	27.412	36.376	44.920	31.495	35	81.4	2.78	38.1	894
423	1047	1040	6.349	6.248	34.920	27.498	36.501	45.081	32.266	46	90.3	2.78	38.1	1040
424	1198	1190	5.642	5.531	34.898	27.570	36.609	45.223	33.038	56	97.8	2.78	38.1	1190
201	1200	1192	5.569	5.459	34.891	27.574	36.616	45.233	33.053	59	98.6	2.76	38.0	1192
202	1352	1342	4.994	4.874	34.872	27.627	36.699	45.344	33.809	66	105.1	2.77	38.0	1342
203	1500	1488	4.416	4.288	34.848	27.673	36.775	45.448	34.541	79	112.0	2.75	37.6	1488
204	1654	1640	3.675	3.542	34.819	27.725	36.868	45.577	35.318	92	120.6	2.71	37.3	1640
205	1806	1790	3.097	2.958	34.796	27.762	36.935	45.675	36.065	105	127.7	2.67	36.9	1790
206	1956	1938	2.742	2.595	34.779	27.780	36.974	45.731	36.776	113	132.9	2.64	36.7	1938
722	2011H	1993	2.660	2.509	34.777	27.785	36.984	45.746	37.033					1993
723	2011H	1993	2.660	2.509	34.777	27.785	36.984	45.746	37.033					1993
724	2011H	1993	2.660	2.509	34.776	27.785	36.983	45.745	37.033					1993
207	2107	2087	2.493	2.336	34.768	27.792	37.001	45.772	37.481	119	136.0	2.61	36.5	2087
208	2258	2236	2.290	2.123	34.759	27.802	37.023	45.805	38.179	124	139.3	2.59	36.3	2236
209	2410	2385	2.115	1.938	34.751	27.810	37.041	45.833	38.878	128	142.1	2.58	36.2	2385
210	2563	2536	1.981	1.792	34.745	27.817	37.055	45.855	39.575	133	143.5	2.55	36.0	2536
211	2714	2684	1.868	1.667	34.740	27.822	37.068	45.874	40.260	138	144.6	2.53	35.9	2684
212	2966	2932	1.713	1.492	34.734	27.830	37.086	45.901	41.396	142	147.1	2.51	35.7	2932
214	3128	3091	1.588	1.354	34.729	27.835	37.099	45.922	42.127	146	148.9	2.48	35.5	3091
216	3224	3185	1.502	1.260	34.727	27.840	37.109	45.937	42.562	153	147.5	2.44	35.3	3185
215	3226	3187	1.500	1.258	34.727	27.840	37.109	45.937	42.571	153	147.5	2.46	35.3	3187
217	3239	3199	1.490	1.247	34.726	27.840	37.110	45.939	42.629	154	147.0	2.43	35.2	3199
218	3255	3215	1.472	1.228	34.725	27.840	37.112	45.941	42.701	153	148.5	2.43	35.4	3215
219	3266	3226	1.465	1.220	34.725	27.841	37.113	45.943	42.751	149	153.8	2.46	35.8	3226
220	3279	3239	1.466	1.220	34.724	27.840	37.112	45.942	42.807	148	153.8	2.46	35.8	3239
221	3305	3264	1.469	1.220	34.725	27.841	37.113	45.943	42.922	148	153.9	2.45	35.8	3264
222	3328	3287	1.471	1.220	34.725	27.841	37.113	45.943	43.023	149	154.0	2.45	35.8	3287
224	3348	3306	1.473	1.220	34.725	27.841	37.113	45.943	43.110	148	153.9	2.45	35.7	3306
223	3350	3308	1.473	1.219	34.724	27.840	37.112	45.942	43.118	148	154.0	2.45	35.7	3308

BOTTOM DEPTH OF CAST 2 IS 3321

STATION: 447 LEG: VII POSITION: 4° 59' N 79° 57' E DATE: 5 APR 78

SAMPLE NO.	PRESS DB	DEPTH M	TEMP DEG C	POT TEMP DEG C	SALINITY 0/00	SIGMA 0	SIGMA 2	SIGMA 4	SIGMA Z	OXYGEN μM/KG	SiO <sub>2</sub> μM/KG	PO <sub>4</sub> μM/KG	NO <sub>3</sub> μM/KG	DEPTH M
301	2	2	29.991	29.990	33.917	20.990	29.199	37.026	20.999	207	1.8	0.11	0.0	2
302	2	2	29.991	29.990	33.913	20.987	29.196	37.023	20.996	203	1.6	0.10	0.0	2
303	5	5	29.433	29.432	34.297	21.457	29.675	37.512	21.478	198	1.6	0.12	0.0	5
304	46	46	28.503	28.491	35.200	22.438	30.669	38.520	22.632	199	1.8	0.21	0.1	46
305	85	85	21.826	21.809	34.819	24.157	32.570	40.601	24.523	55	15.1	1.41	19.7	85
306	123	123	17.083	17.062	34.850	25.412	33.974	42.146	25.950	21	26.0	1.96	27.7	123
307	148	148	14.419	14.397	34.975	26.116	34.771	43.030	26.771	16	30.6	2.18	30.6	148
308	198	198	12.818	12.790	35.082	26.534	35.249	43.563	27.416	27	29.1	2.16	30.7	198
309	248	247	11.965	11.932	35.108	26.723	35.472	43.816	27.831	40	28.7	2.11	30.2	247
310	298	297	11.596	11.557	35.097	26.786	35.550	43.909	28.119	59	28.0	2.06	29.6	297
311	329	328	11.276	11.234	35.081	26.834	35.611	43.983	28.308	51	31.1	2.15	30.9	328
312	350	359	10.912	10.866	35.073	26.895	35.688	44.074	28.510	57	30.4	2.10	30.3	359
313	429	427	10.566	10.513	35.054	26.944	35.752	44.152	28.870	65	31.7	2.10	30.3	427
314	501	499	10.121	10.060	35.059	27.027	35.854	44.272	29.279	47	39.1	2.31	32.6	499
315	602	599	9.479	9.408	35.038	27.122	35.977	44.421	29.833	27	50.6	2.53	35.6	599
316	700	696	8.782	8.703	35.019	27.221	36.108	44.581	30.381	30	58.0	2.60	36.3	696
317	800	796	8.064	7.977	34.983	27.305	36.225	44.729	30.926	29	69.2	2.68	37.3	796
318	902	897	7.563	7.468	34.968	27.368	36.312	44.838	31.456	33	75.0	2.71	37.6	897
319	1002	996	6.930	6.829	34.949	27.443	36.418	44.972	31.994	40	81.9	2.73	37.7	996
320	1101	1094	6.320	6.213	34.927	27.508	36.512	45.094	32.520	48	88.2	2.72	37.6	1094
321	1201	1193	5.849	5.736	34.913	27.557	36.586	45.189	33.032	56	93.6	2.72	37.6	1193
323	1352	1342	5.167	5.045	34.880	27.614	36.677	45.314	33.789	65	100.9	2.70	37.4	1342
322	1352	1342	5.167	5.045	34.884	27.617	36.680	45.317	33.793	67	101.0	2.71	37.4	1342
101	1397	1387	5.124	4.998	34.877	27.617	36.683	45.321	33.996	68	101.6	2.69	37.3	1387
324	1510	1498	4.470	4.341	34.855	27.672	36.772	45.443	34.584	81	107.4	2.68	37.1	1498
102	1551	1539	4.514	4.380	34.857	27.670	36.768	45.436	34.764	80	107.5	2.68	37.2	1539
103	1700	1686	3.825	3.686	34.827	27.718	36.852	45.555	35.511	93	115.9	2.66	36.9	1686

STATION: 447 LEG: VII POSITION: 4° 59' N 79° 57' E DATE: 5 APR 78

SAMPLE NO.	PRESS DB	DEPTH M	TEMP DEG C	POT TEMP DEG C	SALINITY 0/00	SIGMA 0	SIGMA 2	SIGMA 4	SIGMA Z	OXYGEN μM/KG	SiO <sub>2</sub> μM/KG	PO <sub>4</sub> μM/KG	NO <sub>3</sub> μM/KG	DEPTH M
104	1854	1838	3.101	2.958	34.800	27.765	36.939	45.678	36.284	110	122.8	2.60	36.4	1838
105	2006	1988	2.741	2.589	34.781	27.782	36.976	45.734	37.003	119	128.0	2.56	36.2	1988
106	2205	2184	2.393	2.229	34.765	27.799	37.013	45.790	37.932	129	131.4	2.52	35.8	2184
107	2408	2384	2.147	1.969	34.756	27.812	37.041	45.831	38.868	137	134.0	2.49	35.4	2384
108	2607	2579	1.957	1.764	34.745	27.819	37.059	45.860	39.775	144	136.4	2.47	35.2	2579
109	2812	2781	1.805	1.596	34.738	27.825	37.075	45.885	40.703	149	136.7	2.44	35.0	2781
110	3004	2969	1.694	1.469	34.733	27.830	37.088	45.904	41.566	153	138.4	2.42	34.9	2969
111	3215	3176	1.611	1.367	34.730	27.835	37.098	45.920	42.508	153	142.6	2.42	35.0	3176
112	3419	3376	1.532	1.270	34.727	27.839	37.108	45.935	43.414	155	144.2	2.42	35.0	3376
114	3682	3634	1.455	1.167	34.725	27.845	37.119	45.952	44.576	160	143.7	2.39	34.8	3634
115	3789	3738	1.434	1.136	34.721	27.843	37.120	45.954	45.042	166	141.1	2.37	34.5	3738
116	4008	3952	1.394	1.073	34.720	27.847	37.127	45.965	45.999	170	139.2	2.35	34.2	3952
117	4056	3999	1.389	1.063	34.721	27.848	37.129	45.967	46.209	171	138.4	2.35	34.1	3999
118	4057	4000	1.390	1.064	34.720	27.847	37.128	45.966	46.212	171	138.4	2.35	34.1	4000
119	4131	4073	1.389	1.055	34.720	27.848	37.129	45.968	46.532	172	137.6	2.34	34.1	4073
120	4172	4113	1.393	1.054	34.722	27.850	37.131	45.970	46.710	172	137.1	2.34	34.0	4113
121	4213	4153	1.395	1.051	34.720	27.848	37.129	45.969	46.885	172	137.6	2.34	34.1	4153
122	4233	4172	1.398	1.052	34.719	27.847	37.128	45.968	46.970	172	137.4	2.34	34.0	4172
123	4248	4187	1.400	1.052	34.721	27.849	37.130	45.969	47.036	172	137.3	2.33	34.0	

STATION: 448 LEG: VII POSITION: 0° 1' N 80° 3' E DATE: 6 APR 78

SAMPLE NO.	PRESS DB	DEPTH M	TEMP DEG C	POT TEMP DEG C	SALINITY 0/00	SIGMA 0	SIGMA 2	SIGMA 4	SIGMA Z	OXYGEN μM/KG	SiO <sub>2</sub> μM/KG	PO <sub>4</sub> μM/KG	NO <sub>3</sub> μM/KG	DEPTH M
105	2605	2578	1.952	1.760	34.740	27.815	37.056	45.857	39.763	152	129.4	2.42	34.7	2578
106	2807	2776	1.792	1.584	34.734	27.823	37.074	45.884	40.680	158	130.5	2.38	34.4	2776
107	3009	2974	1.672	1.447	34.733	27.832	37.090	45.908	41.592	161	132.7	2.37	34.4	2974
108	3214	3175	1.597	1.354	34.725	27.832	37.096	45.919	42.502	163	134.4	2.37	34.4	3175
109	3417	3374	1.521	1.259	34.724	27.838	37.107	45.935	43.405	164	136.6	2.37	34.4	3374
110	3620	3573	1.491	1.209	34.724	27.841	37.113	45.944	44.298	167	136.4	2.37	34.3	3573
111	3823	3772	1.428	1.126	34.719	27.842	37.119	45.955	45.190	170	137.2	2.35	34.1	3772
112	4028	3972	1.420	1.096	34.720	27.845	37.124	45.961	46.081	172	137.0	2.35	34.1	3972
114	4239	4178	1.404	1.057	34.720	27.848	37.129	45.968	46.996	175	135.2	2.33	33.9	4178
115	4395	4330	1.402	1.037	34.719	27.848	37.130	45.970	47.667	178	134.7	2.31	33.8	4330
116	4496	4429	1.407	1.030	34.718	27.848	37.130	45.971	48.099	178	134.5	2.31	33.7	4429
117	4569	4500	1.412	1.027	34.721	27.851	37.133	45.974	48.413	179	134.2	2.31	33.7	4500
118	4570	4501	1.411	1.025	34.719	27.849	37.132	45.972	48.416	179	133.6	2.30	33.6	4501
119	4620	4550	1.414	1.022	34.718	27.848	37.131	45.972	48.629	179	133.4	2.30	33.6	4550
120	4651	4590	1.417	1.022	34.722	27.852	37.135	45.975	48.764	179	133.1	2.29	33.6	4590
121	4676	4604	1.419	1.021	34.718	27.848	37.132	45.972	48.867	176	132.9	2.29	33.6	4604
122	4697	4625	1.422	1.021	34.718	27.848	37.132	45.972	48.956	180	133.4	2.29	33.5	4625
124	4712	4639	1.423	1.020	34.720	27.850	37.133	45.974	49.022	179	133.3	2.29	33.5	4639
123	4713	4640	1.423	1.020	34.720	27.850	37.133	45.974	49.026	179	133.5	2.29	33.5	4640

BOTTOM DEPTH OF CAST 1 IS 4651

STATION: 449 LEG: VII POSITION: 5° 0' S 79° 59' E DATE: 8 APR 78

SAMPLE NO.	PRESS DB	DEPTH M	TEMP DEG C	POT TEMP DEG C	SALINITY 0/00	SIGMA 0	SIGMA 2	SIGMA 4	SIGMA Z	OXYGEN μM/KG	SiO <sub>2</sub> μM/KG	PO <sub>4</sub> μM/KG	NO <sub>3</sub> μM/KG	DEPTH M
301	0	0	29.290	29.290	34.433	21.605	29.825	37.664	21.605	195	1.8	0.14	0.0	0
302	0	0	29.290	29.290	34.431	21.604	29.823	37.662	21.604	200	1.8	0.14	0.0	0
303	33	33	29.326	29.317	34.436	21.599	29.817	37.656	21.738	203	1.8	0.15	0.0	33
304	65	65	27.741	27.725	34.837	22.409	30.663	38.537	22.684	209	2.4	0.21	0.0	65
305	116	116	18.161	18.140	35.091	25.332	33.855	41.990	25.838	73	15.8	1.42	20.6	116
306	146	146	15.339	15.316	35.024	25.951	34.572	42.799	26.595	67	21.3	1.64	23.8	146
307	196	196	12.606	12.579	35.030	26.536	35.260	43.582	27.410	79	23.0	1.75	25.4	196
308	248	247	11.442	11.410	34.988	26.729	35.500	43.867	27.840	95	23.4	1.75	25.7	247
309	295	294	10.760	10.723	34.931	26.811	35.611	44.005	28.136	101	25.5	1.81	26.7	294
310	349	348	10.395	10.352	34.924	26.871	35.688	44.095	28.441	95	26.4	1.87	27.9	348
311	400	398	9.878	9.830	34.893	26.937	35.777	44.205	28.740	93	29.0	1.94	28.8	398
312	448	446	9.431	9.379	34.866	26.992	35.851	44.299	29.015	93	32.8	2.02	29.8	446
313	523	521	8.954	8.895	34.855	27.062	35.943	44.410	29.427	83	40.1	2.18	31.6	521
314	609	606	8.445	8.378	34.854	27.143	36.047	44.535	29.900	73	48.4	2.34	33.2	606
315	711	707	7.814	7.739	34.848	27.234	36.168	44.684	30.461	67	58.8	2.46	34.9	707
316	810	805	7.223	7.141	34.832	27.308	36.269	44.811	30.990	62	69.2	2.56	36.0	805
317	921	915	6.566	6.476	34.814	27.384	36.378	44.950	31.581	63	78.5	2.61	36.6	915
318	1011	1005	5.991	5.896	34.797	27.446	36.468	45.066	32.062	69	85.2	2.63	36.8	1005
319	1121	1114	5.403	5.302	34.786	27.509	36.561	45.187	32.638	75	92.0	2.63	36.9	1114
320	1243	1234	4.967	4.858	34.786	27.561	36.635	45.282	33.253	83	96.9	2.63	36.9	1234
321	1403	1393	4.438	4.319	34.794	27.626	36.728	45.400	34.058	93	101.2	2.61	36.6	1393
322	1553	1541	3.903	3.777	34.785	27.675	36.806	45.504	34.804	104	105.6	2.57	36.4	1541
323	1704	1690	3.407	3.273	34.777	27.718	36.875	45.598	35.548	115	110.2	2.53	36.0	1690
101	1803	1788	3.054	2.916	34.772	27.746	36.923	45.664	36.039	123	115.1	2.51	35.7	1788
324	1852	1836	2.937	2.796	34.769	27.754	36.937	45.685	36.273	127	115.1	2.49	35.6	1836
102	2002	1984	2.595	2.446	34.762	27.779	36.981	45.746	36.990	134	120.5	2.46	35.4	1984
103	2206	2185	2.286	2.124	34.754	27.798	37.019	45.801	37.943	144	123.6	2.42	34.9	2185
104	2409	2385	2.071	1.895	34.747	27.810	37.044	45.838	38.876	151	125.9	2.40	34.7	2385
105	2608	2580	1.913	1.721	34.740	27.818	37.061	45.864	39.782	157	127.1	2.38	34.5	2580
106	2812	2781	1.789	1.581	34.736	27.825	37.076	45.887	40.704	162	127.8	2.36	34.2	2781
107	3014	2979	1.680	1.455	34.736	27.834	37.092	45.909	41.615	166	130.9	2.36	34.2	2979
108	3217	3178	1.575	1.332	34.729	27.837	37.102	45.926	42.521	166	133.6	2.37	34.3	3178
109	3419	3376	1.486	1.225	34.726	27.841	37.113	45.943	43.421	170	135.9	2.35	34.3	3376
110	3670	3622	1.423	1.138	34.725	27.846	37.123	45.957	44.528	173	136.3	2.34	34.1	3622
111	3925	3871	1.399	1.087	34.723	27.848	37.127	45.965	45.641	176	136.2	2.33	34.0	3871
112	4182	4122	1.399	1.059	34.722	27.849	37.130	45.969	46.752	176	135.7	2.32	33.9	4122
114	4445	4379	1.399	1.028	34.723	27.852	37.134	45.975	47.885	179	135.2	2.31	33.8	4379
115	4720	4647	1.399	0.996	34.720	27.852	37.136	45.978	49.060	181	133.7	2.29	33.6	4647
116	4975	4895	1.414	0.980	34.720	27.853	37.138	45.981	50.143	183	132.3	2.28	33.5	4895
118	5056	4974	1.417	0.972	34.721	27.854	37.140	45.983	50.486	185	132.1	2.28	33.5	4974

STATION: 449 LEG: VII POSITION: 5° 0' S 79° 59' E DATE: 8 APR 78

SAMPLE NO.	PRESS DB	DEPTH M	TEMP DEG C	POT TEMP DEG C	SALINITY 0/00	SIGMA 0	SIGMA 2	SIGMA 4	SIGMA Z	OXYGEN μM/KG	SiO <sub>2</sub> μM/KG	PO <sub>4</sub> μM/KG	NO <sub>3</sub> μM/KG	DEPTH M
117	5056	4974	1.417	0.972	34.722	27.855	37.141	45.984	50.487	183	131.9	2.28	33.5	4974
119	5106	5023	1.412	0.961	34.720	27.854	37.140	45.984	50.698	184	131.4	2.28	33.4	5023
120	5136	5052	1.411	0.957	34.721	27.855	37.142	45.986	50.826	185	131.3	2.27	33.3	5052
121	5162	5077	1.413	0.955	34.720	27.854	37.141	45.985	50.935	184	131.1	2.27	33.3	5077
122	5184	5098	1.415	0.954	34.720	27.854	37.141	45.986	51.028	186	131.0	2.27	33.3	5098
123	5193	5107	1.416	0.954	34.720	27.854	37.141	45.986	51.066	186	131.1	2.27	33.3	5107
124	5193	5107	1.416	0.954	34.719	27.854	37.140	45.985	51.065	186	131.0	2.27	33.3	5107

BOTTOM DEPTH OF CAST 1 IS 5122

STATION: 450 LEG: VII POSITION: 10° 0' S 79° 59' E DATE: 10 APR 78

SAMPLE NO.	PRESS DB	DEPTH M	TEMP DEG C	POT TEMP DEG C	SALINITY 0/00	SIGMA 0	SIGMA 2	SIGMA 4	SIGMA Z	OXYGEN μM/KG	SiO <sub>2</sub> μM/KG	PO <sub>4</sub> μM/KG	NO <sub>3</sub> μM/KG	DEPTH M
301	1	1	28.230	28.230	34.231	21.794	30.042	37.910	21.798	201	1.7	0.11	0.0	1
302	1	1	28.230	28.230	34.232	21.795	30.043	37.910	21.799	205	1.7	0.11	0.0	1
303	19	19	28.200	28.195	34.607	22.087	30.332	38.197	22.168	203	1.7	0.11	0.0	19
304	63	63	24.201	24.187	34.922	23.554	31.899	39.864	23.823	156	6.2	0.57	3.2	63
305	105	105	19.395	19.375	34.757	24.763	33.251	41.353	25.219	94	16.3	1.20	16.3	105
306	134	134	17.440	17.417	34.938	25.393	33.942	42.102	25.979	84	19.3	1.42	19.4	134
307	166	166	14.319	14.294	34.673	25.906	34.569	42.835	26.641	94	29.4	1.60	21.8	166
308	247	246	11.514	11.482	34.737	26.521	35.293	43.659	27.628	92	36.0	1.84	25.4	246
309	319	318	10.2											

STATION: 451 LEG: VII POSITION: 14° 59' S 79° 57' E DATE: 13 APR 78

SAMPLE NO.	PRESS DB	DEPTH M	TEMP DEG C	POT TEMP DEG C	SALINITY 0/00	SIGMA 0	SIGMA 2	SIGMA 4	SIGMA Z	OXYGEN μM/KG	SiO <sub>2</sub> μM/KG	PO <sub>4</sub> μM/KG	NO <sub>3</sub> μM/KG	DEPTH M
301	1	1	27.823	27.823	34.550	22.163	30.417	38.292	22.167	201	2.0	0.12	0.0	1
302	1	1	27.823	27.823	34.547	22.160	30.415	38.290	22.165	207	1.8	0.11	0.0	1
303	45	45	27.833	27.822	34.548	22.161	30.416	38.291	22.352	206	1.8	0.11	0.0	45
304	98	98	24.033	24.011	34.918	23.602	31.952	39.922	24.021	192	3.6	0.24	0.4	98
305	141	141	20.996	20.968	35.073	24.580	33.015	41.067	25.189	157	7.9	0.62	7.1	141
306	197	197	17.131	17.097	34.893	25.436	33.997	42.167	26.298	122	19.5	1.15	15.9	197
307	249	248	14.447	14.409	34.842	26.011	34.667	42.927	27.112	115	26.6	1.41	19.5	248
308	279	278	15.402	15.358	35.393	26.225	34.840	43.061	27.452	173	11.0	0.79	9.8	278
309	320	319	13.874	13.827	35.394	26.561	35.232	43.505	27.977	206	4.9	0.67	7.7	319
310	380	379	11.989	11.938	35.139	26.746	35.494	43.838	28.441	222	4.4	0.81	10.1	379
311	461	459	9.997	9.942	34.840	26.877	35.712	44.137	28.952	175	18.8	1.39	19.6	459
312	553	551	8.823	8.761	34.711	26.971	35.860	44.335	29.472	168	22.9	1.61	23.2	551
313	660	657	7.104	7.038	34.595	27.136	36.106	44.656	30.145	152	35.9	1.99	28.9	657
314	765	761	6.274	6.202	34.635	27.279	36.289	44.875	30.778	117	57.7	2.32	33.1	761
315	861	856	5.828	5.749	34.674	27.367	36.398	45.005	31.309	100	73.1	2.46	35.0	856
316	962	956	5.438	5.352	34.701	27.436	36.487	45.112	31.845	90	85.2	2.54	36.1	956
317	1062	1055	5.081	4.989	34.701	27.479	36.548	45.189	32.350	94	89.7	2.56	36.2	1055
318	1164	1156	4.700	4.602	34.702	27.523	36.612	45.272	32.867	98	93.6	2.56	36.3	1156
319	1267	1258	4.341	4.236	34.704	27.564	36.672	45.349	33.385	104	96.5	2.56	36.3	1258
320	1365	1355	3.948	3.839	34.701	27.602	36.731	45.428	33.881	111	100.3	2.54	36.1	1355
321	1468	1457	3.669	3.553	34.701	27.630	36.774	45.485	34.386	116	103.4	2.53	36.1	1457
322	1563	1550	3.387	3.266	34.712	27.666	36.825	45.550	34.862	123	103.9	2.49	35.6	1550
323	1713	1699	3.014	2.885	34.723	27.710	36.889	45.633	35.599	133	108.6	2.47	35.4	1699
101	1802	1786	2.853	2.718	34.726	27.727	36.915	45.667	36.025	136	110.5	2.43	35.2	1786
324	1865	1848	2.719	2.581	34.729	27.741	36.937	45.696	36.320	139	111.4	2.43	35.0	1848
102	2001	1983	2.515	2.368	34.732	27.761	36.968	45.738	36.973	146	114.5	2.42	34.8	1983
103	2207	2185	2.217	2.056	34.734	27.788	37.012	45.798	37.941	156	117.2	2.37	34.3	2185
104	2407	2382	2.026	1.851	34.735	27.804	37.040	45.837	38.864	163	118.8	2.36	34.0	2382
105	2609	2581	1.877	1.686	34.732	27.814	37.059	45.864	39.785	168	120.2	2.34	33.8	2581
106	2808	2776	1.747	1.540	34.730	27.823	37.076	45.889	40.688	171	122.6	2.32	33.7	2776
107	3006	2971	1.656	1.432	34.730	27.831	37.090	45.909	41.579	172	125.1	2.32	33.7	2971
108	3205	3166	1.570	1.329	34.727	27.835	37.101	45.925	42.468	175	127.4	2.31	33.6	3166
109	3406	3363	1.483	1.223	34.725	27.841	37.112	45.942	43.363	178	128.3	2.30	33.5	3363
110	3609	3561	1.421	1.142	34.724	27.845	37.121	45.956	44.262	181	129.0	2.30	33.5	3561
111	3811	3759	1.380	1.081	34.722	27.848	37.127	45.965	45.148	183	130.4	2.28	33.4	3759
112	4071	4013	1.363	1.036	34.720	27.849	37.131	45.971	46.277	185	131.9	2.29	33.5	4013
114	4338	4274	1.370	1.013	34.720	27.851	37.134	45.975	47.428	183	133.2	2.29	33.5	4274
115	4599	4528	1.392	1.004	34.719	27.850	37.134	45.976	48.544	183	133.9	2.29	33.6	4528
116	4827	4750	1.417	1.001	34.719	27.851	37.135	45.977	49.512	183	134.0	2.29	33.6	4750
118	4927	4847	1.429	1.000	34.719	27.851	37.135	45.977	49.935	183	133.8	2.29	33.5	4847
117	4928	4848	1.429	1.000	34.720	27.851	37.136	45.978	49.940	183	133.5	2.29	33.6	4848
119	4996	4915	1.437	0.999	34.719	27.851	37.135	45.977	50.227	183	133.0	2.28	33.5	4915
120	5025	4943	1.440	0.998	34.721	27.852	37.137	45.979	50.351	183	133.4	2.28	33.4	4943
121	5050	4967	1.443	0.998	34.719	27.851	37.135	45.977	50.454	183	132.9	2.28	33.4	4967
122	5070	4986	1.445	0.998	34.718	27.850	37.134	45.976	50.538	184	132.7	2.28	33.5	4986
123	5085	5001	1.447	0.998	34.721	27.852	37.137	45.979	50.603	183	133.3	2.28	33.5	5001
124	5085	5001	1.447	0.998	34.719	27.851	37.135	45.977	50.602	184	132.8	2.29	33.4	5001

BOTTOM DEPTH OF CAST 1 IS 5016

STATION: 452 LEG: VII POSITION: 20° 5' S 79° 59' E DATE: 15 APR 78

SAMPLE NO.	PRESS DB	DEPTH M	TEMP DEG C	POT TEMP DEG C	SALINITY 0/00	SIGMA 0	SIGMA 2	SIGMA 4	SIGMA Z	OXYGEN μM/KG	SiO <sub>2</sub> μM/KG	PO <sub>4</sub> μM/KG	NO <sub>3</sub> μM/KG	DEPTH M
301	24	24	26.800	26.794	34.748	22.634	30.912	38.811	22.736	201	2.1	0.15	0.0	24
302	24	24	26.800	26.794	34.747	22.633	30.911	38.810	22.735	209	2.1	0.15	0.0	24
303	33	33	26.820	26.812	34.748	22.628	30.906	38.804	22.768	206	2.0	0.14	0.0	33
304	75	75	25.342	25.325	35.313	23.509	31.819	39.750	23.828	210	2.3	0.16	0.0	75
305	89	89	23.280	23.261	35.364	24.158	32.523	40.508	24.539	211	3.2	0.21	0.8	89
306	119	119	21.074	21.050	35.280	24.715	33.145	41.192	25.228	174	6.0	0.48	5.1	119
307	155	155	19.988	19.958	35.281	25.009	33.472	41.551	25.680	173	6.4	0.51	5.4	155
308	197	196	18.781	18.745	35.389	25.407	33.907	42.020	26.262	178	6.3	0.50	5.4	196
309	253	252	16.941	16.898	35.520	25.964	34.523	42.692	27.070	189	5.9	0.52	5.5	252
310	283	282	15.960	15.914	35.609	26.264	34.856	43.056	27.505	199	4.6	0.54	5.5	282

STATION: 452 LEG: VII POSITION: 20° 5' S 79° 59' E DATE: 15 APR 78

SAMPLE NO.	PRESS DB	DEPTH M	TEMP DEG C	POT TEMP DEG C	SALINITY 0/00	SIGMA 0	SIGMA 2	SIGMA 4	SIGMA Z	OXYGEN μM/KG	SiO <sub>2</sub> μM/KG	PO <sub>4</sub> μM/KG	NO <sub>3</sub> μM/KG	DEPTH M
311	345	344	13.803	13.752	35.352	26.545	35.219	43.495	26.071	222	2.7	0.62	6.6	344
312	430	428	11.848	11.790	35.099	26.743	35.498	43.848	26.662	234	3.1	0.78	9.6	428
313	535	532	10.573	10.506	34.908	26.832	35.642	44.044	29.231	238	3.8	0.95	12.4	532
314	608	605	9.470	9.399	34.749	26.897	35.758	44.206	29.637	232	5.5	1.14	15.9	605
315	708	704	8.458	8.380	34.635	26.971	35.878	44.370	30.174	224	8.5	1.36	19.3	704
316	798	793	6.862	6.783	34.527	27.117	36.100	44.663	30.754	186	24.8	1.80	26.4	793
317	857	852	5.870	5.792	34.496	27.221	36.253	44.860	31.146	165	39.4	2.08	30.3	852
318	956	950	5.341	5.257	34.577	27.349	36.407	45.038	31.735	124	65.4	2.39	34.3	950
319	1059	1052	4.816	4.726	34.609	27.435	36.519	45.175	32.301	116	77.6	2.48	35.4	1052
320	1207	1198	4.300	4.201	34.647	27.522	36.633	45.313	33.074	117	87.2	2.51	35.7	1198
321	1359	1349	3.792	3.685	34.672	27.595	36.732	45.436	33.852	124	93.0	2.49	35.6	1349
322	1510	1498	3.435	3.319	34.697	27.650	36.806	45.528	34.604	130	98.1	2.47	35.3	1498
323	1683	1668	3.087	2.960	34.719	27.700	36.875	45.615	35.451	135	104.3	2.45	35.0	1668
101	1773	1757	2.871	2.739	34.723	27.723	36.910	45.661	35.890	140	107.1	2.40	34.7	1757
324	1856	1839	2.755	2.617	34.727	27.736	36.930	45.687	36.283	143	108.2	2.41	34.6	1839
102	2004	1985	2.501	2.354	34.728	27.759	36.967	45.738	36.985	153	110.7	2.37	34.2	1985
103	2236	2213	2.206	2.043	34.729	27.785	37.010	45.797	38.069	162	112.2	2.33	33.7	2213
104	2463	2437	1.987	1.807	34.728	27.802	37.040	45.839	39.115	171	113.1	2.29	33.2	2437
105	2683	2653	1.847	1.650	34.728	27.813	37.061	45.868	40.116	176	113.4	2.26	32.9	2653
106	2849	2816	1.739	1.528	34.727	27.821	37.075	45.889	40.869	182	113.7			

STATION: 453 LEG: VII POSITION: 23° 0' S 74° 1' E DATE: 18 APR 78

SAMPLE NO.	PRESS DB	DEPTH M	TEMP DEG C	POT TEMP DEG C	SALINITY 0/00	SIGMA 0	SIGMA 2	SIGMA 4	SIGMA Z	OXYGEN μM/KG	SiO <sub>2</sub> μM/KG	PO <sub>4</sub> μM/KG	NO <sub>3</sub> μM/KG	DEPTH M
523	526	523	10.849	10.782	34.944	26.810	35.608	43.999	29.166	234	4.1	0.94	12.6	523
524	597	594	10.350	10.276	34.880	26.850	35.671	44.082	29.529	235	4.5	1.02	13.9	594
313	700	696	9.172	9.091	34.723	26.927	35.801	44.263	30.083	229	6.5	1.22	17.2	696
314	791	786	7.899	7.815	34.587	27.018	35.952	44.469	30.604	214	12.0	1.50	21.6	786
315	874	868	6.520	6.436	34.485	27.130	36.131	44.709	31.118	202	21.6	1.78	26.1	868
316	936	930	5.528	5.445	34.437	27.216	36.267	44.891	31.508	195	32.1	1.99	29.2	930
317	1027	1020	4.651	4.566	34.454	27.330	36.425	45.090	32.056	172	48.1	2.20	32.0	1020
318	1130	1122	4.146	4.056	34.526	27.441	36.561	45.250	32.649	147	67.4	2.37	34.2	1122
319	1229	1220	3.847	3.751	34.568	27.505	36.641	45.344	33.172	140	76.8	2.42	34.9	1220
320	1329	1318	3.571	3.469	34.606	27.563	36.713	45.429	33.693	139	83.6	2.42	35.0	1318
321	1455	1443	3.277	3.167	34.644	27.621	36.787	45.517	34.334	140	89.8	2.42	34.9	1443
322	1580	1566	3.166	3.047	34.689	27.668	36.839	45.575	34.951	139	97.3	2.41	34.7	1566
323	1703	1688	2.987	2.859	34.711	27.703	36.883	45.629	35.548	142	102.1	2.40	34.5	1688
101	1806	1789	2.792	2.658	34.716	27.724	36.916	45.671	36.044	146	104.2	2.35	34.6	1789
324	1828	1811	2.731	2.596	34.716	27.729	36.924	45.683	36.151	149	104.3	2.38	34.2	1811
102	2010	1990	2.447	2.300	34.721	27.758	36.969	45.743	37.014	157	106.8	2.32	34.1	1990
103	2213	2190	2.149	1.989	34.723	27.784	37.012	45.802	37.969	170	106.0	2.27	33.2	2190
104	2413	2387	1.932	1.758	34.728	27.805	37.047	45.848	38.899	180	105.0	2.22	32.6	2387
105	2567	2538	1.816	1.630	34.729	27.816	37.064	45.872	39.604	186	105.8	2.19	32.4	2538
106	2716	2684	1.720	1.522	34.732	27.826	37.080	45.894	40.284	190	106.4	2.16	32.1	2684
107	2869	2835	1.626	1.416	34.736	27.836	37.097	45.916	40.981	192	108.0	2.17	32.2	2835
108	3018	2981	1.536	1.314	34.733	27.841	37.107	45.932	41.652	193	110.5	2.16	32.2	2981
109	3172	3132	1.474	1.238	34.730	27.844	37.114	45.943	42.339	193	114.2	2.17	32.4	3132
690	3254	3212	1.46	1.21	34.731	27.846	37.118	45.948	42.704					3212
110	3322	3279	1.449	1.199	34.730	27.846	37.119	45.950	43.004	192	117.4	2.18	32.5	3279
111	3471	3424	1.431	1.166	34.726	27.845	37.120	45.953	43.658	190	120.0	2.20	32.7	3424
112	3627	3577	1.421	1.140	34.725	27.846	37.122	45.957	44.341	189	122.6	2.22	32.9	3577
114	3839	3784	1.421	1.118	34.724	27.847	37.124	45.960	45.264	188	125.1	2.23	33.0	3784
115	3904	3848	1.425	1.115	34.724	27.847	37.125	45.961	45.546	187	125.8	2.23	33.0	3848
116	4006	3947	1.433	1.111	34.723	27.847	37.124	45.960	45.986	188	125.9	2.24	33.1	3947
118	4074	4014	1.439	1.109	34.723	27.847	37.125	45.961	46.280	187	125.6	2.24	33.1	4014
117	4075	4015	1.439	1.109	34.724	27.848	37.125	45.961	46.285	187	125.8	2.24	33.1	4015
119	4124	4063	1.440	1.105	34.723	27.847	37.125	45.962	46.496	187	126.4	2.24	33.1	4063
120	4155	4093	1.443	1.104	34.723	27.847	37.125	45.962	46.629	186	126.7	2.24	33.0	4093
121	4180	4117	1.444	1.102	34.723	27.847	37.126	45.962	46.737	186	126.6	2.25	33.0	4117
122	4201	4138	1.446	1.102	34.723	27.847	37.126	45.962	46.827	186	126.9	2.24	32.9	4138
124	4215	4151	1.447	1.101	34.724	27.848	37.127	45.963	46.888	186	126.6	2.24	32.9	4151
123	4217	4153	1.447	1.101	34.724	27.848	37.127	45.963	46.897	187	126.7	2.25	33.0	4153

BOTTOM DEPTH OF CAST 1 IS 4161

STATION: 454 LEG: VII POSITION: 26° 59' S 67° 5' E DATE: 21 APR 78

SAMPLE NO.	PRESS DB	DEPTH M	TEMP DEG C	POT TEMP DEG C	SALINITY 0/00	SIGMA 0	SIGMA 2	SIGMA 4	SIGMA Z	OXYGEN μM/KG	SiO <sub>2</sub> μM/KG	PO <sub>4</sub> μM/KG	NO <sub>3</sub> μM/KG	DEPTH M
301	1	1	24.495	24.495	35.513	23.909	32.239	40.189	23.913	212	2.1	0.11	0.0	1
302	1	1	24.495	24.495	35.509	23.906	32.236	40.186	23.910	214	2.1	0.10	0.0	1
303	25	25	24.448	24.442	35.545	23.949	32.279	40.231	24.055	215	2.1	0.10	0.0	25
304	70	70	24.185	24.169	35.595	24.067	32.405	40.363	24.366	214	2.1	0.10	0.0	70
305	111	111	19.479	19.458	35.573	25.363	33.838	41.928	25.844	224	2.3	0.18	0.0	111
306	161	160	17.660	17.632	35.590	25.839	34.373	42.518	26.542	212	2.4	0.32	2.0	160
307	221	220	15.899	15.863	35.523	26.210	34.805	43.007	27.180	216	2.6	0.45	3.9	220
308	277	276	14.412	14.370	35.401	26.450	35.101	43.355	27.674	219	2.9	0.57	5.9	276
309	368	366	13.246	13.193	35.267	26.595	35.292	43.589	28.227	228	3.2	0.67	7.7	366
310	464	462	12.107	12.044	35.104	26.698	35.443	43.783	28.765	232	3.7	0.81	10.2	462
311	548	545	11.433	11.361	35.019	26.762	35.535	43.903	29.209	231	4.0	0.89	11.1	545
312	622	618	10.771	10.692	34.934	26.819	35.621	44.015	29.602	233	4.3	0.97	13.0	618
313	706	702	10.167	10.080	34.851	26.862	35.691	44.110	30.028	233	5.1	1.07	14.6	702
314	782	777	9.278	9.187	34.735	26.921	35.791	44.248	30.441	226	6.7	1.22	17.1	777
315	858	852	8.486	8.390	34.648	26.979	35.886	44.377	30.854	220	9.7	1.38	19.6	852
316	930	924	7.145	7.051	34.525	27.079	36.050	44.600	31.305	205	17.9	1.68	24.3	924
317	1030	1023	5.777	5.683	34.441	27.191	36.229	44.843	31.901	196	28.3	1.94	28.2	1023
318	1126	1118	4.659	4.565	34.427	27.309	36.404	45.070	32.484	184	41.4	2.13	31.0	1118
319	1232	1222	4.085	3.987	34.468	27.402	36.527	45.220	33.076	168	55.7	2.28	32.9	1222
320	1329	1318	3.734	3.630	34.518	27.477	36.620	45.330	33.603	157	67.1	2.36	33.9	1318

STATION: 454 LEG: VII POSITION: 26° 59' S 67° 5' E DATE: 21 APR 78

SAMPLE NO.	PRESS DB	DEPTH M	TEMP DEG C	POT TEMP DEG C	SALINITY 0/00	SIGMA 0	SIGMA 2	SIGMA 4	SIGMA Z	OXYGEN μM/KG	SiO <sub>2</sub> μM/KG	PO <sub>4</sub> μM/KG	NO <sub>3</sub> μM/KG	DEPTH M
321	1428	1416	3.418	3.309	34.568	27.548	36.706	45.431	34.133	153	75.4	2.38	34.1	1416
322	1540	1527	3.093	2.978	34.612	27.613	36.789	45.530	34.718	156	80.4	2.36	32.5	1527
323	1662	1647	2.857	2.735	34.643	27.659	36.848	45.600	35.327	161	83.8	2.32	33.5	1647
324	1801	1784	2.635	2.504	34.669	27.700	36.900	45.664	36.005	167				1784
101	1810	1793	2.654	2.522	34.667	27.696	36.896	45.659	36.042	165	86.8	2.27	33.0	1793
102	2010	1990	2.297	2.153	34.700	27.753	36.973	45.754	37.017	172	95.1	2.25	32.6	1990
103	2210	2187	2.067	1.909	34.717	27.785	37.018	45.812	37.962	174	104.3	2.25	32.7	2187
104	2412	2386	1.916	1.742	34.724	27.803	37.045	45.848	38.894	176	110.0	2.26	32.7	2386
105	2615	2585	1.846	1.655	34.724	27.810	37.057	45.864	39.810	178	112.1	2.26	32.7	2585
106	2819	2785	1.769	1.561	34.724	27.817	37.069	45.881	40.729	179	114.0	2.26	32.7	2785
107	3019	2981	1.737	1.510	34.725	27.821	37.076	45.891	41.620	180	115.6	2.28	32.8	2981
108	3222	3180	1.705	1.458	34.725	27.825	37.083	45.900	42.520	179	118.2	2.28	32.9	3180
109	3427	3381	1.665	1.398	34.724	27.828	37.089	45.910	43.426	182	119.6	2.27	32.8	3381
110	3631	3580	1.630	1.343	34.723	27.831	37.096	45.919	44.323	182	120.3	2.27	32.9	3580
111	3834	3779	1.585	1.277	34.722	27.835	37.103	45.930	45.213	184	121.3	2.27	32.9	3779
112	4039	3979	1.576	1.246	34.721	27.836	37.106	45.935	46.103	185	121.3	2.27	32.8	3979
114	4046	3986	1.575	1.244	34.722	27.837	37.107	45.936	46.134	185	121.6	2.27	32.8	3986
116	4271	4205	1.578	1.222	34.720	27.837	37.108	45.939	47.103	185	121.8	2.28	32.8	4205
115	4272	4206	1.578	1.221	34.721	27.838	37.109	45.939	47.108	18				

CARBONATE CHEMISTRY

STATION: 404 LEG: III POSITION: 35° 36' N 17° 15' E DATE: 9 DEC 77

MEASURED PARAMETERS					CALCULATED PARAMETERS P = 1 ATM. T = INSITU					CALCULATED PARAMETERS P, T = INSITU					DELTA CO <sub>2</sub> = CO <sub>2</sub> =	DELTA CO <sub>2</sub> = CO <sub>2</sub> =		
SAMPLE NO.	DEPTH M	TEMP DEG C	SALINITY ‰	TITRATOR ALK μEQ/KG	TITRATOR TCO <sub>2</sub> μM/KG	PCO <sub>2</sub> μATM	H <sub>2</sub> CO <sub>3</sub> μM/KG	HCO <sub>3</sub> <sup>-</sup> μM/KG	CO <sub>3</sub> <sup>=</sup> μM/KG	PH	H <sub>2</sub> CO <sub>3</sub> μM/KG	HCO <sub>3</sub> <sup>-</sup> μM/KG	CO <sub>3</sub> <sup>=</sup> μM/KG	AH (10 <sup>3</sup> )	PH	ICP 10 <sup>3</sup> (M/KG) <sup>2</sup>	DELTA CO <sub>2</sub> (CALC) μM/KG	DELTA CO <sub>2</sub> (ARAG) μM/KG
101	26	17.54	37.980	2536	2211	321.8	11.0	1946.2	238.8	8.275	11.0	1946.2	238.8	5.320	8.274	2.658	193.8	173.6
102	78	16.53	38.336	2580	2250	315.4	11.1	1981.6	242.3	8.285	11.1	1981.6	242.3	5.223	8.282	2.721	197.0	176.7
103	88	15.86	38.429	2592	2272	323.8	11.6	2009.8	235.6	8.275	11.6	2010.1	235.3	5.343	8.272	2.651	190.1	169.9
104	135	14.57	38.603	2621	2309	325.7	12.1	2051.9	230.0	8.274	12.1	2052.2	229.7	5.383	8.269	2.599	184.2	163.9
105	148	14.57	38.638	2616	2315	341.2	12.7	2064.5	222.8	8.256	12.7	2064.9	222.4	5.612	8.251	2.519	176.9	156.5
106	164	15.07	38.880	2625	2313	336.1	12.3	2055.7	230.1	8.263	12.3	2056.1	229.6	5.528	8.257	2.617	184.1	163.8
107	193	14.69	38.820	2631	2328	345.0	12.8	2076.6	224.8	8.254	12.7	2076.6	223.7	5.659	8.247	2.546	178.0	157.6
108	344	14.26	38.818	2635	2328	345.5	13.0	2086.6	221.4	8.253	12.9	2087.6	220.5	5.742	8.241	2.509	173.8	153.1
109	493	14.03	38.795	2622	2332	346.5	13.1	2082.2	217.7	8.249	13.0	2083.6	216.4	5.857	8.232	2.461	168.7	147.7
110	664	13.82	38.750	2627	2332	342.7	13.0	2085.5	218.5	8.254	12.9	2087.4	216.7	5.881	8.231	2.462	167.8	146.4
111	841	13.73	38.731	2614	2324	345.6	13.2	2081.0	214.8	8.249	13.0	2083.4	212.6	6.035	8.219	2.414	162.4	140.6
112	1092	13.65	38.711	2624	2326	335.0	12.8	2077.9	220.3	8.261	12.6	2081.0	217.4	5.984	8.223	2.467	165.4	143.1
114	1101	13.65	38.710	2621	2329	343.1	13.1	2084.6	216.3	8.252	12.9	2087.7	213.4	6.114	8.214	2.422	161.4	139.0
115	1333	13.64	38.701	2611	2323	346.3	13.2	2081.3	213.4	8.247	13.0	2085.1	209.9	6.300	8.201	2.382	156.1	133.2
116	1627	13.63	38.690	2618	2329	346.2	13.2	2086.5	214.2	8.249	12.9	2091.1	210.0	6.433	8.192	2.381	153.9	130.3
117	1965	13.64	38.680	2615	2323	341.0	13.0	2078.8	216.1	8.254	12.7	2084.4	210.9	6.534	8.185	2.392	152.1	127.8
118	2352	13.67	38.672	2621	2332	347.5	13.3	2089.3	214.4	8.248	12.8	2095.9	208.3	6.834	8.165	2.361	146.2	120.9
119	2740	13.71	38.667	2619	2322	335.1	12.8	2074.7	219.5	8.261	12.3	2082.6	212.2	6.841	8.165	2.405	146.6	120.3
120	3086	13.76	38.663	2619	2330	348.4	13.3	2087.2	214.5	8.247	12.7	2095.9	206.4	7.268	8.139	2.339	137.6	110.4
121	3286	13.79	38.663	2620	2344	370.0	14.1	2108.8	206.1	8.225	13.4	2117.9	197.7	7.764	8.110	2.241	127.0	99.3
122	3483	13.83	38.663	2618	2328	347.8	13.2	2084.6	215.2	8.247	12.6	2094.4	206.0	7.493	8.125	2.335	133.3	105.1
123	3782	13.89	38.663	2622	2327	341.8	13.0	2080.5	218.5	8.254	12.3	2091.3	208.5	7.551	8.122	2.363	132.7	103.7
124	4019	13.93	38.664	2621	2342	368.0	14.0	2104.7	208.3	8.228	13.1	2115.9	197.9	8.193	8.087	2.243	119.6	89.9

STATION: 405 LEG: IV POSITION: 27° 16' N 34° 31' E DATE: 19 DEC 77

MEASURED PARAMETERS					CALCULATED PARAMETERS P = 1 ATM. T = INSITU					CALCULATED PARAMETERS P, T = INSITU					DELTA CO <sub>2</sub> = CO <sub>2</sub> =	DELTA CO <sub>2</sub> = CO <sub>2</sub> =		
SAMPLE NO.	DEPTH M	TEMP DEG C	SALINITY ‰	TITRATOR ALK μEQ/KG	TITRATOR TCO <sub>2</sub> μM/KG	PCO <sub>2</sub> μATM	H <sub>2</sub> CO <sub>3</sub> μM/KG	HCO <sub>3</sub> <sup>-</sup> μM/KG	CO <sub>3</sub> <sup>=</sup> μM/KG	PH	H <sub>2</sub> CO <sub>3</sub> μM/KG	HCO <sub>3</sub> <sup>-</sup> μM/KG	CO <sub>3</sub> <sup>=</sup> μM/KG	AH (10 <sup>3</sup> )	PH	ICP 10 <sup>3</sup> (M/KG) <sup>2</sup>	DELTA CO <sub>2</sub> (CALC) μM/KG	DELTA CO <sub>2</sub> (ARAG) μM/KG
101	7	23.37	40.402	2483	2099	328.6	9.5	1799.9	274.7	8.263	9.5	1799.9	274.7	5.461	8.263	3.253	231.3	211.8
102	27	23.38	40.402	2479	2099	332.8	9.6	1802.6	271.9	8.258	9.6	1802.6	271.8	5.531	8.257	3.219	228.3	208.8
103	77	22.53	40.365	2472	2118	355.6	10.5	1838.3	254.3	8.233	10.4	1838.5	254.1	5.888	8.230	3.006	210.3	190.6
104	97	22.09	40.378	2469	2124	361.7	10.8	1850.2	248.0	8.225	10.7	1850.5	247.7	5.998	8.222	2.932	203.8	184.1
105	148	21.88	40.411	2468	2136	379.3	11.3	1870.2	239.5	8.208	11.3	1870.6	239.1	6.266	8.203	2.832	194.9	175.1
106	198	21.74	40.451	2466	2156	415.0	12.5	1903.3	225.2	8.175	12.4	1903.9	224.7	6.778	8.169	2.664	180.2	160.4
107	247	21.65	40.499	2458	2176	468.0	14.1	1939.6	207.3	8.131	14.0	1940.2	206.7	7.541	8.123	2.454	162.0	142.1
108	296	21.64	40.519	2455	2183	488.4	14.7	1952.5	200.8	8.115	14.6	1953.3	200.1	7.849	8.105	2.377	155.1	135.1
109	346	21.65	40.540	2453	2185	497.3	15.0	1956.8	198.2	8.108	14.9	1957.7	197.4	8.005	8.097	2.346	152.1	132.0
110	398	21.66	40.549	2450	2190	515.5	15.5	1966.4	193.1	8.095	15.4	1967.4	192.2	8.291	8.081	2.285	146.6	126.4
111	446	21.67	40.571	2447	2197	540.5	16.2	1978.9	186.9	8.077	16.2	1980.0	185.9	8.669	8.062	2.210	140.0	119.8
112	496	21.68	40.580	2447	2196	538.0	16.2	1977.4	187.4	8.079	16.1	1978.6	186.3	8.667	8.062	2.216	140.2	119.8
114	547	21.69	40.583	2449	2191	521.4	15.7	1968.5	191.9	8.090	15.6	1969.8	190.6	8.471	8.072	2.268	144.2	123.7
115	596	21.69	40.587	2443	2195	544.3	16.3	1978.2	185.4	8.074	16.2	1979.7	184.1	8.833	8.054	2.190	137.3	116.8
116	646	21.69	40.588	2447	2189	521.6	15.7	1966.4	191.9	8.090	15.5	1968.0	190.4	8.547	8.068	2.266	143.4	122.8
117	695	21.69	40.589	2446	2187	518.3	15.6	1964.0	192.4	8.092	15.4	1965.7	190.8	8.536	8.069	2.271	143.5	122.8
118	744	21.69	40.589	2458	2183	484.7	14.6	1950.7	202.7	8.118	14.4	1952.6	200.9	8.068	8.093	2.391	153.3	132.5
119	793	21.69	40.590	2449	2183	502.4	15.1	1956.0	196.9	8.104	14.9	1958.1	195.0	8.371	8.077	2.320	147.1	126.2
120	843	21.67	40.587	2458	2173	462.0	13.9	1935.3	208.9	8.135	13.7	1937.5	206.8	7.812	8.107	2.460	158.5	137.6
121	892	21.65	40.585	2456	2170	459.4	13.8	1931.7	209.5	8.137	13.6	1934.0	207.3	7.812	8.107	2.467	158.8	137.7
122	940	21.65	40.583	2458	2168	451.3	13.6	1927.4	212.1	8.144	13.4	1929.9	209.7	7.722	8.112	2.495	160.8	139.7
123	992	21.64	40.583	2457	2169	455.3	13.7	1929.5	210.8	8.140	13.5	1932.1	208.4	7.812	8.107	2.479	159.2	137.9
124	1038	21.63	40.582	2460	2160	431.4	13.0	1913.7	218.3	8.160	12.8	1916.5	215.7	7.491	8.125	2.566	166.2	144.9

STATION: 407 LEG: IV POSITION: 19° 56' N 38° 30' E DATE: 22 DEC 77

MEASURED PARAMETERS					CALCULATED PARAMETERS P = 1 ATM. T = INSITU					CALCULATED PARAMETERS P, T = INSITU					DELTA CO <sub>2</sub> = CO <sub>2</sub> =	DELTA CO <sub>2</sub> = CO <sub>2</sub> =		
SAMPLE NO.	DEPTH M	TEMP DEG C	SALINITY ‰	TITRATOR ALK μEQ/KG	TITRATOR TCO <sub>2</sub> μM/KG	PCO <sub>2</sub> μATM	H <sub>2</sub> CO <sub>3</sub> μM/KG	HCO <sub>3</sub> <sup>-</sup> μM/KG	CO <sub>3</sub> <sup>=</sup> μM/KG	PH	H <sub>2</sub> CO <sub>3</sub> μM/KG	HCO <sub>3</sub> <sup>-</sup> μM/KG	CO <sub>3</sub> <sup>=</sup> μM/KG	AH (10 <sup>3</sup> )	PH	ICP 10 <sup>3</sup> (M/KG) <sup>2</sup>	DELTA CO <sub>2</sub> (CALC) μM/KG	DELTA CO <sub>2</sub> (ARAG) μM/KG
101	6	27.26	39.369	2446	2069	373.2	9.8	1771.5	272.7	8.227	9.8	1771.5	272.7	5.925	8.227	3.147	228.9	209.2
102	29	27.27	39.359	2445	2066	369.4	9.7	1767.5	273.8	8.231	9.7	1767.5	273.8	5.887	8.230	3.159	229.9	210.1
103	59	27.22	39.430	2444	2067	372.7	9.8	1769.7	272.5	8.227	9.8	1769.9	272.3	5.951	8.225	3.148	228.3	208.5
105	164	22.10	40.376	2461	2158	432.1	12.9	1909.2	220.9	8.162	12.8	1909.7	220.5	6.979	8.156	2.610	176.2	156.4
106	278	21.80	40.549	2446	2222	617.2	18.5	2017.4	171.1	8.029	18.4	2018.0	170.5	9.566	8.019	2.027	125.7	105.7
107	377	21.75	40.586	2442	2215	604.9	18.1	2009.2	172.7	8.035	18.1	2010.1	171.9	9.495	8.022	2.045	126.4	106.3
108	462	21.74	40.593	2446	2212	586.1	17.6	2002.3	177.1	8.047	17.5	2003.4	176.1	9.295	8.032	2.095	130.2	109.9
109	548	21.74	40.599	2441	2201	567.0	17.0	1988.4	180.6	8.059	16.9	1989.7	179.4	9.116	8.040	2.135	132.9	112.5
110	630	21.74	40.606	2442	2197	553.7	16.6	1981.7	183.6	8.067	16.5	1983.3	182.2	8.988	8.046	2.169	135.3	114.7
111	720	21.75	40.606	2440	2190	539.0	16.2	1972.3	186.5	8.077	16.0	1974.1	184.9					

STATION: 413 LEG: IV POSITION: 13° 22' N 53° 16' E DATE: 27 DEC 77

MEASURED PARAMETERS					CALCULATED PARAMETERS P = 1 ATM. T = INSITU					CALCULATED PARAMETERS P, T = INSITU					DELTA CO <sub>2</sub> <sup>*</sup>	DELTA CO <sub>2</sub> <sup>*</sup>		
SAMPLE NO.	DEPTH M	TEMP DEG C	SALINITY ‰	TITRATOR ALK μEQ/KG	TCO <sub>2</sub> μM/KG	PCO <sub>2</sub> μATM	H <sub>2</sub> CO <sub>3</sub> μM/KG	HCO <sub>3</sub> <sup>-</sup> μM/KG	CO <sub>3</sub> <sup>=</sup> μM/KG	PH	H <sub>2</sub> CO <sub>3</sub> μM/KG	HCO <sub>3</sub> <sup>-</sup> μM/KG	CO <sub>3</sub> <sup>=</sup> μM/KG	AH (10 <sup>3</sup> )	PH	ICP 10 <sup>4</sup> (M/KG) <sup>*</sup>	DELTA CO <sub>2</sub> <sup>*</sup> (CALC)	DELTA CO <sub>2</sub> <sup>*</sup> (ARAG)
116	830	10.63	35.638	2367	2309	* 907.1	38.8	2181.4	73.8	7.839	* 38.5	2182.9	72.6	15.577	7.808	0.759	21.0	-1.4
117	899	9.95	35.568	2373	2320	* 917.8	40.2	2193.5	71.3	7.833	* 39.8	2195.1	70.1	15.913	7.798	0.731	17.9	-4.8
121	996	9.00	35.447	2379	2327	* 891.3	40.3	2201.0	70.6	7.842	* 39.9	2202.8	69.3	15.729	7.803	0.720	16.2	-6.7
118	1000	9.00	35.443		2341													
119	1098	7.93	35.327	2385	2348	* 959.2	45.0	2224.2	63.8	7.808	* 44.5	2226.1	62.4	17.158	7.766	0.646	8.4	-14.9
120	1194	7.00	35.217	2391	2362	* 984.8	47.8	2239.0	60.2	7.795	* 47.2	2241.0	58.8	17.876	7.748	0.607	3.8	-19.8
529	1396	5.63	35.072	2408	2362	* 823.1	41.9	2237.4	67.7	7.865	* 41.3	2239.9	65.8	15.488	7.810	0.677	8.9	-15.3
530	1646		34.944	2426	2371													
531	1898	3.25	34.861	2436	2384	* 724.2	40.3	2258.1	70.6	7.912	* 39.4	2261.7	68.0	14.584	7.836	0.695	6.0	-19.8
532	2149	2.62	34.810	2436	2372	* 645.6	36.8	2244.0	76.2	7.956	* 35.8	2248.2	73.1	13.488	7.870	0.745	8.5	-18.2
533	2451	2.17	34.776	2439	2364	* 586.0	33.9	2233.4	81.6	7.994	* 32.9	2238.2	77.9	12.711	7.896	0.794	10.0	-17.6
534	2603	2.05	34.767	2443	2367	* 580.0	33.8	2236.1	82.2	7.998	* 32.6	2241.2	78.2	12.764	7.894	0.797	8.7	-19.5
535	2753	1.86	34.755	2438	2358	* 557.6	32.7	2226.3	84.1	8.012	* 31.5	2231.7	79.8	12.525	7.902	0.813	8.5	-20.1
122	2772	1.83	34.752	2433	2367	* 614.8	36.1	2239.0	77.0	7.972	* 34.9	2244.3	72.9	13.785	7.861	0.742	1.4	-27.3
123	2783	1.82	34.753	2437	2360	* 569.0	33.4	2229.0	82.6	8.004	* 32.2	2234.5	78.3	12.812	7.892	0.797	6.7	-22.1
124	2793	1.79	34.752	2434	2357	* 567.2	33.3	2226.2	82.5	8.004	* 32.1	2231.7	78.1	12.804	7.893	0.796	6.4	-22.4

STATION: 416 LEG: IV POSITION: 19° 46' N 64° 37' E DATE: 31 DEC 77

MEASURED PARAMETERS					CALCULATED PARAMETERS P = 1 ATM. T = INSITU					CALCULATED PARAMETERS P, T = INSITU					DELTA CO <sub>2</sub> <sup>*</sup>	DELTA CO <sub>2</sub> <sup>*</sup>		
SAMPLE NO.	DEPTH M	TEMP DEG C	SALINITY ‰	TITRATOR ALK μEQ/KG	TCO <sub>2</sub> μM/KG	PCO <sub>2</sub> μATM	H <sub>2</sub> CO <sub>3</sub> μM/KG	HCO <sub>3</sub> <sup>-</sup> μM/KG	CO <sub>3</sub> <sup>=</sup> μM/KG	PH	H <sub>2</sub> CO <sub>3</sub> μM/KG	HCO <sub>3</sub> <sup>-</sup> μM/KG	CO <sub>3</sub> <sup>=</sup> μM/KG	AH (10 <sup>3</sup> )	PH	ICP 10 <sup>4</sup> (M/KG) <sup>*</sup>	DELTA CO <sub>2</sub> <sup>*</sup> (CALC)	DELTA CO <sub>2</sub> <sup>*</sup> (ARAG)
101	3	26.35	36.487	2388	2049	* 370.8	10.1	1773.5	250.4	8.231	* 10.1	1773.5	250.4	5.871	8.231	2.679	205.5	185.3
102	39	26.33	36.488	2388	2050	* 372.5	10.2	1775.0	249.8	8.230	* 10.1	1775.1	249.7	5.910	8.228	2.671	204.6	184.3
103	71	23.17	36.255	2362	2184	* 702.6	20.8	2002.5	145.7	7.987	* 20.8	2002.7	145.6	10.361	7.985	1.547	100.1	79.6
104	114	20.69	36.052	2351	2229	* 877.2	27.7	2074.7	111.6	7.891	* 27.7	2074.9	111.4	12.968	7.887	1.178	65.5	44.9
105	132	19.93	35.984	2347	2245	* 964.2	31.1	2098.7	100.1	7.850	* 31.1	2099.0	99.9	14.261	7.846	1.054	53.8	33.2
106	179	18.17	35.947	2350	2259	* 969.2	32.9	2117.6	93.5	7.841	* 32.8	2118.0	92.2	14.618	7.835	0.982	46.7	25.9
107	187	17.89	35.936	2347	2268	* 1039.2	35.6	2130.3	87.1	7.812	* 35.5	2130.7	86.8	15.654	7.805	0.915	40.3	19.5
108	233	17.00	36.084	2358	2275	* 985.0	34.6	2136.5	88.9	7.831	* 34.5	2137.0	88.6	15.049	7.823	0.937	41.7	20.8
109	279	15.62	36.002	2356	2288	* 1031.5	37.7	2154.7	80.6	7.806	* 37.6	2155.2	80.2	15.988	7.796	0.846	32.9	11.9
110	320	14.71	35.888	2353	2288	* 1012.1	38.1	2156.4	78.6	7.810	* 37.9	2156.9	78.1	15.920	7.798	0.822	30.5	9.3
111	433	13.27	35.777	2354	2300	* 1034.4	40.7	2171.6	72.7	7.795	* 40.5	2172.4	72.2	16.633	7.779	0.757	23.6	2.2
112	585	11.73	35.633	2357	2306	* 993.1	41.0	2179.2	70.7	7.806	* 40.8	2180.3	70.0	16.460	7.784	0.731	20.2	-1.6
114	796	10.21	35.520	2362	2324	* 1033.0	44.9	2199.7	64.4	7.784	* 44.5	2201.1	63.4	17.641	7.753	0.661	12.0	-10.4
115	996	8.79	35.394	2376	2339	* 989.0	45.1	2215.1	63.9	7.798	* 44.6	2216.8	62.6	17.401	7.759	0.650	9.5	-13.5
116	1197	7.42	35.247	2382	2352	* 988.9	47.3	2229.2	60.5	7.794	* 46.7	2231.3	59.1	17.933	7.746	0.610	4.1	-19.5
117	1396	6.18	35.125	2397	2361	* 904.0	45.2	2237.7	63.1	7.827	* 44.5	2240.2	61.3	16.898	7.772	0.632	4.5	-19.6
118	1645	4.76	34.990	2409	2370	* 838.9	44.1	2246.5	64.4	7.854	* 43.3	2249.4	62.3	16.281	7.788	0.639	3.0	-22.0
119	1895	3.65	34.889	2422	2368	* 719.2	39.4	2242.4	71.2	7.914	* 38.5	2245.9	68.6	14.501	7.839	0.701	6.7	-19.1
120	2143	2.91	34.828	2429	2378	* 717.2	40.4	2252.7	69.9	7.913	* 39.4	2256.6	67.0	14.880	7.827	0.684	2.5	-24.1
121	2391	2.42	34.794	2439	2374	* 637.0	36.6	2245.7	76.8	7.961	* 35.5	2250.3	73.2	13.635	7.865	0.747	6.1	-21.3
122	2634	2.09	34.764	2454	2379	* 588.6	34.2	2247.8	81.9	7.994	* 33.1	2253.0	77.9	12.915	7.889	0.794	8.1	-20.2
123	2885	1.87	34.754	2454	2389	* 627.9	36.8	2260.2	77.0	7.967	* 35.5	2265.7	72.8	14.087	7.851	0.741	0.0	-29.1
124	3156	1.72	34.743	2470	2398	* 598.6	35.3	2266.8	80.9	7.988	* 33.9	2273.0	76.1	13.745	7.862	0.775	0.1	-29.9

STATION: 417 LEG: IV POSITION: 12° 58' N 64° 29' E DATE: 2 JAN 78

MEASURED PARAMETERS					CALCULATED PARAMETERS P = 1 ATM. T = INSITU					CALCULATED PARAMETERS P, T = INSITU					DELTA CO <sub>2</sub> <sup>*</sup>	DELTA CO <sub>2</sub> <sup>*</sup>		
SAMPLE NO.	DEPTH M	TEMP DEG C	SALINITY ‰	TITRATOR ALK μEQ/KG	TCO <sub>2</sub> μM/KG	PCO <sub>2</sub> μATM	H <sub>2</sub> CO <sub>3</sub> μM/KG	HCO <sub>3</sub> <sup>-</sup> μM/KG	CO <sub>3</sub> <sup>=</sup> μM/KG	PH	H <sub>2</sub> CO <sub>3</sub> μM/KG	HCO <sub>3</sub> <sup>-</sup> μM/KG	CO <sub>3</sub> <sup>=</sup> μM/KG	AH (10 <sup>3</sup> )	PH	ICP 10 <sup>4</sup> (M/KG) <sup>*</sup>	DELTA CO <sub>2</sub> <sup>*</sup> (CALC)	DELTA CO <sub>2</sub> <sup>*</sup> (ARAG)
301	9	26.62	36.410	2377	2041	* 375.4	10.2	1767.6	248.3	8.227	* 10.2	1767.6	248.3	5.939	8.226	2.650	203.3	183.0
302	34	26.60	36.408	2377	2042	* 376.3	10.2	1769.3	247.5	8.226	* 10.2	1769.4	247.4	5.961	8.225	2.641	202.3	182.0
303	54	26.61	36.406	2381	2036	* 361.4	9.8	1756.9	254.3	8.240	* 9.8	1757.1	254.1	5.772	8.239	2.712	208.9	188.6
304	86	23.37	35.810	2337	2127	* 577.5	17.0	1929.7	165.3	8.058	* 17.0	1929.9	165.1	8.798	8.056	1.733	119.4	98.9
305	104	21.85	36.161	2355	2210	* 801.6	24.5	2045.1	125.4	7.931	* 24.5	2045.3	125.2	11.820	7.927	1.327	79.4	58.8
306	146	17.46	35.647	2334	2243	* 925.9	32.1	2103.1	92.8	7.855	* 32.1	2103.4	92.6	14.142	7.850	0.967	46.2	25.4
307	166	16.57	35.622	2329	2263	* 1061.4	37.8	2131.7	79.4	7.796	* 37.7	2131.0	79.2	16.229	7.790	0.827	32.7	11.8
308	206	14.94	35.601	2332	2272	* 1041.9	39.0	2142.1	75.9	7.796	* 38.9	2142.5	75.6	16.263	7.789	0.789	28.7	7.8
309	235	13.75	35.483	2336	2274	* 977.9	38.0	2144.7	76.3	7.818	* 37.9	2145.1	76.0	15.524	7.809	0.791	28.8	7.8
310	306	12.64	35.430	2330	2274	* 974.5	39.2	2146.9	72.9	7.813	* 39.0	2147.5	72.5	15.785	7.802	0.753	24.7	3.5
311	387	11.81	35.410	2330	2281	* 993.6	41.0	2155.7	69.3	7.802	* 40.8	2156.4	68.8	16.326	7.787	0.714	20.4	-1.0
312	466	11.55	35.452	2338	2281	* 929.9	38.7	2154.3	73.0	7.829	* 38.5	2155.1	72.4	15.451	7.811	0.753	23.5	1.9
313	567	11.04	35.448	2341	2292	* 969.2	41.0	2166.8	69.2	7.810	* 40.7	2167.8	68.4	16.269	7.789	0.711	18.7	-3.1
314	622	10.63	35.410	2345	2307	* 1039.4	44.6	2183.2	64.2	7.781	* 44.3	2184.2	63.5	15.501	7.757	0.659	13.4	-8.6
315	698	10.23	35.422	2356	2302	* 910.4	39.5	2176.0	71.5	7.835	* 39.2	2177.2	70.6	15.560	7.808	0.733	19.9	-2.3
316	796	9.64	35.388	2354	2316	* 1003.9	44.5	2192.4	64.1	7.792	* 44.1	2193.8	63.1	17.325	7.761	0.655	11.6	-10.9
317	895	8.99	35.332	2360	2323	* 987.5	44.7	2199.8	63.5	7.797	* 44.3	2201.3	62.4	17.283	7.762	0.646	10.1	-12.6
318	994	8.25	35.264	2368	2323	* 904.3	42.0	2199.0	67.0	7.831	* 41.6	2200.7	65.7	16.125	7.792	0.679	12.5	-10.5
319	1096	7.71	35.223	2370	2336	* 964.												

STATION: 419 LEG: IV POSITION: 3° 57' N 56° 48' E DATE: 8 JAN 78

MEASURED PARAMETERS					CALCULATED PARAMETERS P = 1 ATM. T = INSITU					CALCULATED PARAMETERS P. T = INSITU					DELTA CO <sub>2</sub> <sup>*</sup>	DELTA CO <sub>3</sub> <sup>*</sup>		
SAMPLE NO.	DEPTH M	TEMP DEG C	SALINITY ‰	TITRATOR ALK μEQ/KG	TOTAL CO <sub>2</sub> μM/KG	PCO <sub>2</sub> μATM	H <sub>2</sub> CO <sub>3</sub> μM/KG	HCO <sub>3</sub> <sup>-</sup> μM/KG	CO <sub>3</sub> <sup>=</sup> μM/KG	PH	H <sub>2</sub> CO <sub>3</sub> μM/KG	HCO <sub>3</sub> <sup>-</sup> μM/KG	CO <sub>3</sub> <sup>=</sup> μM/KG	AH (10 <sup>3</sup> )	PH	ICP 10 <sup>3</sup> (M/KG) <sup>†</sup>	DELTA CO <sub>2</sub> <sup>*</sup> (CALC)	DELTA CO <sub>3</sub> <sup>*</sup> (ARAG)
301	5	27.34	35.337	2310	1975	* 353.7	9.5	1703.4	247.2	8.244	* 9.5	1703.4	247.1	5.709	8.243	2.560	202.0	181.7
302	16	27.24	35.344	2309	1977	* 356.8	9.6	1707.4	245.0	8.240	* 9.6	1707.4	245.0	5.758	8.240	2.538	199.8	179.5
303	116	18.66	35.222	2307	2115	* 503.3	16.9	1931.9	151.2	8.091	* 16.9	1932.1	151.0	8.185	8.087	1.559	104.8	84.1
304	166	16.95	35.264	2312	2156	* 580.7	20.5	1991.9	128.6	8.032	* 20.4	1992.2	128.3	9.422	8.026	1.326	81.7	60.9
305	217	13.60	35.226	2312	2205	* 691.6	27.0	2064.0	99.0	7.951	* 26.9	2064.4	98.6	11.394	7.943	1.018	51.5	30.5
306	283	11.99	35.200	2317	2217	* 680.1	27.9	2079.6	94.5	7.952	* 27.8	2080.1	94.0	11.432	7.942	0.970	46.4	25.1
307	316	11.27	35.118	2315	2212	* 644.9	27.1	2074.1	95.8	7.970	* 27.0	2074.7	95.3	11.001	7.959	0.980	47.3	26.0
308	404	10.10	35.027	2314	2227	* 686.7	30.0	2095.2	86.8	7.941	* 29.9	2095.9	86.2	11.866	7.926	0.885	37.6	16.0
309	475	9.95	35.061	2320	2239	* 715.5	31.4	2108.8	83.7	7.925	* 31.2	2109.7	83.0	12.387	7.907	0.853	33.9	12.2
310	525	9.94	35.134	2325	2263	* 828.0	36.4	2137.1	74.5	7.867	* 36.2	2138.1	73.8	14.221	7.847	0.760	24.3	2.4
311	589	9.81	35.151	2330	2266	* 813.9	35.9	2139.6	75.5	7.874	* 35.7	2140.6	74.7	14.068	7.852	0.770	24.7	2.8
312	625	9.29	35.097	2329	2273	* 844.9	37.9	2148.6	71.5	7.857	* 37.7	2149.7	70.6	14.692	7.833	0.727	20.3	-1.8
313	655	9.28	35.140	2337	2281	* 849.3	38.1	2156.2	71.6	7.856	* 37.8	2157.4	70.8	14.758	7.831	0.729	20.2	-1.9
314	694	8.92	35.117	2341	2288	* 858.3	39.0	2163.8	70.2	7.851	* 38.7	2165.0	69.3	14.987	7.824	0.714	18.5	-3.8
315	754	8.41	35.078	2344	2293	* 854.9	39.5	2169.2	69.2	7.851	* 39.2	2170.6	68.2	15.072	7.822	0.702	16.9	-5.5
316	785	8.51	35.110	2346	2295	* 859.5	39.6	2171.1	69.3	7.849	* 39.3	2172.5	68.3	15.164	7.819	0.703	16.7	-5.8
317	845	8.55	35.159	2350	2301	* 876.7	40.3	2177.2	68.5	7.842	* 40.0	2178.7	67.4	15.504	7.810	0.694	15.3	-7.3
318	908	7.90	35.122	2358	2309	* 857.6	40.4	2185.2	68.4	7.850	* 39.9	2186.8	67.3	15.328	7.815	0.692	14.7	-8.1
319	954	7.39	35.054	2358	2317	* 893.2	42.8	2194.5	64.7	7.831	* 42.3	2196.1	63.5	16.074	7.794	0.653	10.5	-12.5
320	1048	6.85	35.037	2365	2319	* 843.7	41.2	2195.9	66.9	7.853	* 40.7	2197.7	65.6	15.412	7.812	0.674	11.7	-11.5
321	1107	6.79	35.042	2368	2320	* 830.4	40.6	2196.4	67.9	7.860	* 40.1	2198.4	66.5	15.256	7.817	0.683	12.2	-11.2
322	1192	6.39	35.012	2382	2333	* 816.5	40.5	2208.9	68.6	7.867	* 40.0	2211.0	67.0	15.110	7.821	0.688	11.8	-11.7
323	1239	5.50	34.956	2378	2335	* 824.2	42.2	2212.1	65.6	7.859	* 41.6	2214.5	63.9	15.624	7.806	0.655	7.4	-16.6
324	1487	4.65	34.905	2384	2330	* 733.7	38.7	2205.7	70.6	7.904	* 38.1	2208.4	68.5	14.290	7.845	0.701	10.6	-13.9
101	1507	4.64	34.905	2387	2332	* 729.0	38.5	2207.4	71.1	7.907	* 37.8	2210.1	69.0	14.215	7.847	0.706	10.9	-13.7
102	1655	4.11	34.863	2389	2340	* 714.1	38.5	2209.5	71.0	7.913	* 37.7	2212.5	68.7	14.200	7.848	0.702	9.2	-15.8
103	1802	3.52	34.830	2398	2344	* 685.7	37.8	2214.6	72.6	7.929	* 37.0	2218.0	70.1	13.895	7.857	0.716	9.1	-16.4
104	1950	2.99	34.803	2400	2341	* 665.9	37.4	2215.7	72.9	7.939	* 36.5	2219.3	70.2	13.771	7.861	0.716	7.6	-18.4
105	2101	2.61	34.784	2414	2349	* 632.4	36.0	2221.8	76.1	7.961	* 35.1	2225.8	73.1	13.286	7.877	0.745	9.0	-17.5
106	2249	2.36	34.772	2409	2340	* 606.7	34.9	2212.1	78.0	7.975	* 33.9	2216.4	74.6	13.015	7.886	0.761	9.0	-18.0
107	2396	2.20	34.762	2409	2338	* 594.1	34.4	2209.7	78.9	7.983	* 33.3	2214.3	75.4	12.960	7.887	0.768	8.1	-19.4
108	2545	2.10	34.761	2409	2334	* 574.5	33.4	2204.7	80.9	7.996	* 32.3	2209.7	77.0	12.748	7.895	0.785	8.2	-19.8
109	2693	2.00	34.754	2410	2338	* 585.1	34.1	2209.5	79.4	7.989	* 33.0	2214.7	75.4	13.155	7.881	0.768	4.8	-23.6
110	2841	1.89	34.750	2411	2333	* 558.0	32.7	2202.9	82.4	8.007	* 31.5	2208.4	78.1	12.768	7.894	0.795	5.9	-23.1
111	2993	1.81	34.745	2408	2334	* 572.1	33.6	2205.0	80.4	7.997	* 32.3	2210.8	75.9	13.286	7.877	0.773	1.9	-27.6
112	3139	1.73	34.740	2409	2329	* 546.3	32.2	2198.3	83.5	8.015	* 30.9	2204.5	78.6	12.904	7.889	0.800	2.8	-27.2
114	3282	1.67	34.736	2407	2319	* 513.8	30.3	2186.2	87.5	8.039	* 29.0	2192.7	82.2	12.364	7.908	0.837	4.7	-25.8
115	3436	1.60	34.734	2404	2321	* 530.1	31.4	2189.8	84.8	8.026	* 30.0	2196.6	79.4	12.937	7.888	0.808	0.0	-31.1
116	3562	1.58	34.734	2407	2320	* 515.7	30.6	2187.5	86.9	8.037	* 29.1	2194.6	81.2	12.744	7.895	0.827	0.2	-31.3
117	3734	1.52	34.729	2405	2319	* 517.1	30.7	2187.0	86.3	8.035	* 29.2	2194.4	80.4	13.001	7.886	0.818	-2.9	-35.0
118	3884	1.50	34.729	2403	2323	* 539.2	32.1	2192.7	83.2	8.018	* 30.5	2200.3	77.2	13.727	7.862	0.786	-8.1	-40.8
119	4032	1.46	34.726	2403	2318	* 519.5	30.9	2186.3	85.8	8.033	* 29.3	2194.3	79.4	13.445	7.871	0.808	-7.9	-41.2
120	4182	1.42	34.722	2402	2314	* 507.1	30.2	2181.4	87.3	8.042	* 28.6	2189.8	80.6	13.340	7.875	0.820	-8.8	-42.7
121	4329	1.39	34.724	2405	2313	* 493.8	29.5	2179.0	89.5	8.053	* 27.8	2187.7	82.5	13.179	7.880	0.839	-9.0	-43.5
122	4430	1.38	34.722	2398	2313	* 516.2	30.8	2181.5	85.7	8.034	* 29.1	2190.2	78.7	13.912	7.857	0.801	-14.3	-49.2
123	4527	1.36	34.720	2398	2310	* 504.6	30.2	2177.7	87.2	8.043	* 28.4	2186.7	79.9	13.743	7.862	0.813	-14.5	-49.8
124	4626	1.34	34.720	2398	2306	* 490.6	29.3	2172.3	89.3	8.054	* 27.6	2181.6	81.8	13.511	7.869	0.832	-14.1	-49.8

STATION: 420 LEG: IV POSITION: 0° 3' S 50° 56' E DATE: 10 JAN 78

MEASURED PARAMETERS					CALCULATED PARAMETERS P = 1 ATM. T = INSITU					CALCULATED PARAMETERS P. T = INSITU					DELTA CO <sub>2</sub> <sup>*</sup>	DELTA CO <sub>3</sub> <sup>*</sup>		
SAMPLE NO.	DEPTH M	TEMP DEG C	SALINITY ‰	TITRATOR ALK μEQ/KG	TOTAL CO <sub>2</sub> μM/KG	PCO <sub>2</sub> μATM	H <sub>2</sub> CO <sub>3</sub> μM/KG	HCO <sub>3</sub> <sup>-</sup> μM/KG	CO <sub>3</sub> <sup>=</sup> μM/KG	PH	H <sub>2</sub> CO <sub>3</sub> μM/KG	HCO <sub>3</sub> <sup>-</sup> μM/KG	CO <sub>3</sub> <sup>=</sup> μM/KG	AH (10 <sup>3</sup> )	PH	ICP 10 <sup>3</sup> (M/KG) <sup>†</sup>	DELTA CO <sub>2</sub> <sup>*</sup> (CALC)	DELTA CO <sub>3</sub> <sup>*</sup> (ARAG)
401	1	27.12	35.230	2313	1993	* 375.4	10.1	1730.4	237.5	8.223	* 10.1	1730.4	237.5	5.979	8.223	2.452	192.3	172.0
402	14	27.13	35.229	2315	1991	* 369.9	10.0	1725.7	240.3	8.229	* 10.0	1725.7	240.3	5.912	8.228	2.482	195.1	174.8
403	53	26.08	35.311	2319	2016	* 392.8	10.8	1764.2	226.0	8.205	* 10.8	1764.3	225.9	6.258	8.204	2.338	180.4	160.0
404	75	21.65	35.200	2317	2070	* 428.4	13.3	1854.0	187.7	8.162	* 13.2	1854.2	187.5	6.934	8.159	1.935	141.7	121.2
405	120	17.52	35.201	2317	2128	* 491.3	17.1	1946.9	149.0	8.098	* 17.0	1947.2	148.8	8.058	8.094	1.535	102.5	81.8
406	187	14.52	35.188	2323	2168	* 530.8	20.2	2005.8	127.1	8.059	* 20.1	2006.2	126.7	8.859	8.053	1.307	79.9	58.9
407	245	12.44	35.096	2319	2187	* 558.7	22.6	2036.8	112.5	8.032	* 22.6	2037.3	112.1	9.491	8.023	1.154	64.7	43.6
408	297	11.83	35.078	2321	2214	* 644.1	26.6	2074.0	98.4	7.974	* 26.5	2074.6	97.9	10.883	7.963	1.007	50.1	28.9
409	362	10.52	35.001	2322	2225	* 653.1	28.2	2089.4	92.4	7.964	* 28.0	2090.1	91.9	11.208	7.950	0.943	43.5	22.1
410	457	9.99	35.000	2328	2246	* 714.0	31.3	2115.1	84.5	7.927	* 31.2	2116.0	83.8	12.295	7.910	0.860	34.8	13.1
411	523	9.64	35.009	2330	2261	* 775.7	34.4	2133.7	77.9	7.893	* 34.2	2134.6	77.1	13.384	7.873	0.792	27.6	5.8
412	596	9.31	35.002	2335	2263	* 751.5	33.7	2134.8	79.4	7.905	* 33.5	2135.9	78.6	13.100	7.883	0.805	28.5	6.5
414	716	8.98	35.099	2349	2291	* 831.2	37.7	2165.5	72.8	7.866	* 37.4							



STATION: 422 LEG: IV POSITION: 8° 50' S 52° 14' E DATE: 15 JAN 78

MEASURED PARAMETERS					CALCULATED PARAMETERS P = 1 ATM. T = INSITU					CALCULATED PARAMETERS P, T = INSITU					DELTA	DELTA		
SAMPLE NO.	DEPTH M	TEMP DEG C	SALINITY ‰	TITRATOR ALK μEQ/KG	TCO <sub>2</sub> μM/KG	PCO <sub>2</sub> μATM	H <sub>2</sub> CO <sub>3</sub> μM/KG	HCO <sub>3</sub> <sup>-</sup> μM/KG	CO <sub>3</sub> <sup>=</sup> μM/KG	PH	H <sub>2</sub> CO <sub>3</sub> μM/KG	HCO <sub>3</sub> <sup>-</sup> μM/KG	CO <sub>3</sub> <sup>=</sup> μM/KG	AH (10 <sup>-3</sup> )	PH	ICP 10 <sup>1</sup> (M/KG) <sup>2</sup>	DELTA CO <sub>2</sub> (CALC) μM/KG	DELTA CO <sub>2</sub> (ARAG) μM/KG
108	1687	2.99	34.744	2391	2314	578.9	32.5	2185.0	81.5	7.994	31.8	2188.2	79.0	11.828	7.927	0.804	18.9	-6.3
109	2087	2.37	34.752	2402	2326	573.5	33.0	2196.8	81.3	7.997	32.1	2200.8	78.1	12.196	7.914	0.795	14.0	-12.5
110	2485	2.04	34.747	2406	2336	593.6	34.6	2208.1	78.4	7.982	33.5	2212.8	74.7	13.097	7.883	0.761	6.4	-21.3
111	2879	1.84	34.742	2425	2344	549.5	32.2	2212.5	84.3	8.016	31.0	2218.2	79.8	12.565	7.901	0.813	7.2	-21.9
112	3273	1.68	34.736	2411	2332	550.1	32.5	2201.5	83.0	8.012	31.1	2207.9	77.9	13.144	7.881	0.794	0.6	-29.9
114	3585	1.52	34.729	2408	2324	525.4	31.2	2192.5	85.3	8.030	29.8	2199.6	79.7	12.998	7.886	0.811	-1.7	-33.3
115	3836	1.37	34.723	2399	2314	516.6	30.9	2182.4	85.7	8.034	29.3	2190.0	79.6	13.171	7.880	0.811	-5.0	-37.6
116	4033	1.14	34.717	2386	2297	493.8	29.8	2164.8	87.5	8.049	28.2	2172.8	81.0	12.961	7.887	0.824	-6.5	-39.9
117	4064	1.09	34.714	2385	2295	488.7	29.5	2162.6	87.9	8.053	28.0	2170.7	81.3	12.888	7.890	0.828	-6.6	-40.1
118	4085	1.07	34.714	2384	2296	495.5	29.9	2164.2	86.9	8.047	28.4	2172.3	80.3	13.089	7.883	0.818	-7.9	-41.5
119	4094	1.06	34.714	2383	2292	484.3	29.3	2159.3	88.4	8.056	27.7	2167.5	81.8	12.830	7.892	0.832	-6.6	-40.2
120	4109	1.04	34.713	2382	2303	527.4	31.9	2173.9	82.2	8.022	30.3	2181.9	75.9	13.929	7.856	0.772	-12.7	-46.4
121	4117	1.04	34.714	2382	2292	486.8	29.4	2159.7	87.8	8.054	27.9	2168.0	81.2	12.928	7.888	0.826	-7.6	-41.3
122	4128	1.05	34.714	2393	2309													
123	4137	1.05	34.713	2381	2292	490.5	29.7	2160.0	87.3	8.050	28.1	2168.2	80.7	13.051	7.884	0.821	-8.3	-42.1
124	4144	1.05	34.712	2381	2301	523.2	31.6	2171.7	82.7	8.025	30.0	2179.8	76.2	13.873	7.858	0.776	-12.9	-46.7

STATION: 424 LEG: IV POSITION: 12° 18' S 53° 41' E DATE: 16 JAN 78

MEASURED PARAMETERS					CALCULATED PARAMETERS P = 1 ATM. T = INSITU					CALCULATED PARAMETERS P, T = INSITU					DELTA	DELTA		
SAMPLE NO.	DEPTH M	TEMP DEG C	SALINITY ‰	TITRATOR ALK μEQ/KG	TCO <sub>2</sub> μM/KG	PCO <sub>2</sub> μATM	H <sub>2</sub> CO <sub>3</sub> μM/KG	HCO <sub>3</sub> <sup>-</sup> μM/KG	CO <sub>3</sub> <sup>=</sup> μM/KG	PH	H <sub>2</sub> CO <sub>3</sub> μM/KG	HCO <sub>3</sub> <sup>-</sup> μM/KG	CO <sub>3</sub> <sup>=</sup> μM/KG	AH (10 <sup>-3</sup> )	PH	ICP 10 <sup>1</sup> (M/KG) <sup>2</sup>	DELTA CO <sub>2</sub> (CALC) μM/KG	DELTA CO <sub>2</sub> (ARAG) μM/KG
301	1	29.15	35.033	2291	1947	354.4	9.1	1669.6	253.3	8.247	9.1	1669.6	253.3	5.668	8.247	2.601	208.2	187.9
302	10	29.13	35.032	2289	1944	351.8	9.0	1666.1	253.8	8.249	9.0	1666.1	253.8	5.644	8.248	2.607	208.7	188.4
304	122	20.80	35.008	2293	2059	430.8	13.7	1852.0	178.4	8.154	13.6	1852.3	178.1	7.083	8.150	1.828	131.9	111.3
308	389	10.21	34.887	2304	2156	452.0	19.7	2000.9	120.3	8.103	19.6	2001.8	119.6	8.143	8.089	1.224	71.1	49.6
309	488	9.03	34.766	2309	2179	483.6	21.9	2032.3	109.7	8.074	21.8	2033.3	108.9	8.786	8.056	1.110	59.5	37.8
311	686	7.09	34.688	2322	2234	601.7	29.2	2103.3	86.5	7.984	28.9	2104.6	85.5	11.033	7.957	0.869	34.5	12.2
313	799	6.32	34.725	2348	2272	647.8	32.3	2144.0	80.8	7.955	31.9	2145.5	79.6	11.898	7.925	0.810	27.7	5.0
314	901	5.92	34.751	2351	2286	693.7	35.0	2160.7	75.3	7.927	34.7	2162.3	74.0	12.835	7.892	0.754	21.2	-1.7
315	1000	5.44	34.752	2355	2293	697.5	35.8	2168.4	73.7	7.923	35.4	2170.2	72.4	13.061	7.884	0.737	18.7	-4.5
316	1099	5.10	34.746	2358	2302	722.0	37.6	2178.5	70.9	7.908	37.1	2180.5	69.4	13.646	7.865	0.707	14.9	-8.5
317	1199	4.71	34.735	2360	2299	685.1	36.1	2174.6	73.3	7.928	35.6	2176.8	71.6	13.154	7.881	0.729	16.2	-7.6
319	1419	3.80	34.712	2367	2304	653.6	35.6	2179.1	74.2	7.945	35.0	2181.8	72.2	12.932	7.888	0.735	14.8	-9.7
321	1647	3.16	34.722	2377	2304	595.7	33.3	2176.4	79.3	7.981	32.6	2179.6	76.8	12.148	7.915	0.782	17.2	-7.9
322	1794	2.86	34.731	2380	2304	576.6	32.6	2175.7	80.8	7.993	31.8	2179.1	78.1	11.970	7.922	0.795	17.0	-8.6
324	2090	2.32	34.738	2391	2319	586.1	33.8	2191.2	79.1	7.986	32.9	2195.2	75.9	12.512	7.903	0.773	11.9	-14.7
101	2284	2.12	34.740	2395	2315	549.6	31.9	2185.0	83.1	8.012	31.0	2189.5	79.5	12.001	7.921	0.810	13.5	-13.7
102	2385	2.07	34.743	2401	2328	579.9	33.7	2199.5	79.8	7.991	32.7	2204.1	76.2	12.716	7.896	0.776	9.0	-18.4
104	2678	1.91	34.741	2401	2320	542.4	31.8	2189.5	83.8	8.016	30.7	2194.7	79.6	12.315	7.910	0.810	9.2	-19.2
105	2828	1.84	34.740	2402	2322	545.6	32.0	2191.8	83.2	8.015	30.8	2197.4	78.8	12.537	7.902	0.802	6.7	-22.2
107	3131	1.70	34.736	2402	2316	520.1	30.7	2184.0	86.3	8.033	29.4	2190.3	81.3	12.350	7.908	0.828	5.7	-24.3
109	3428	1.59	34.730	2404	2317	515.0	30.5	2184.6	86.9	8.037	29.1	2191.4	81.4	12.585	7.900	0.829	2.1	-28.9
110	3579	1.55	34.728	2398	2317	535.1	31.7	2186.6	83.7	8.021	30.3	2193.6	78.1	13.263	7.877	0.795	-3.1	-34.7
111	3731	1.52	34.727	2394	2325	582.2	34.6	2197.9	77.6	7.986	33.0	2205.0	72.0	14.609	7.836	0.733	-11.2	-43.4
112	3877	1.42	34.723	2395	2302	487.7	29.1	2168.1	89.8	8.056	27.6	2176.0	83.4	12.539	7.902	0.849	-1.8	-34.5
114	4036	1.35	34.719	2389	2306	520.7	31.1	2175.4	84.5	8.029	29.5	2183.3	78.1	13.578	7.867	0.795	-9.3	-42.6
115	4187	1.24	34.716	2383	2295	497.7	29.9	2163.3	86.8	8.046	28.3	2171.6	80.1	13.245	7.878	0.815	-9.5	-43.4
116	4337	1.22	34.716	2382	2288	476.4	28.6	2154.5	89.9	8.063	27.0	2163.2	82.8	12.900	7.889	0.843	-8.9	-43.5
117	4487	1.18	34.713	2386	2294	484.0	29.1	2160.8	89.0	8.057	27.4	2169.8	81.7	13.264	7.877	0.832	-12.2	-47.4
118	4528	1.17	34.714	2381	2297	510.8	30.7	2166.5	84.8	8.035	29.0	2175.4	77.6	14.038	7.853	0.790	-17.0	-52.3
119	4561	1.18	34.713	2379	2296	514.5	31.0	2165.8	84.3	8.032	29.2	2174.7	77.1	14.187	7.848	0.785	-18.0	-53.4
124	4659	1.17	34.714	2382	2292	489.3	29.5	2159.7	87.9	8.052	27.7	2169.0	80.3	13.640	7.865	0.817	-16.2	-52.1

STATION: 425 LEG: IV POSITION: 17° 18' S 55° 51' E DATE: 18 JAN 78

MEASURED PARAMETERS					CALCULATED PARAMETERS P = 1 ATM. T = INSITU					CALCULATED PARAMETERS P, T = INSITU					DELTA	DELTA		
SAMPLE NO.	DEPTH M	TEMP DEG C	SALINITY ‰	TITRATOR ALK μEQ/KG	TCO <sub>2</sub> μM/KG	PCO <sub>2</sub> μATM	H <sub>2</sub> CO <sub>3</sub> μM/KG	HCO <sub>3</sub> <sup>-</sup> μM/KG	CO <sub>3</sub> <sup>=</sup> μM/KG	PH	H <sub>2</sub> CO <sub>3</sub> μM/KG	HCO <sub>3</sub> <sup>-</sup> μM/KG	CO <sub>3</sub> <sup>=</sup> μM/KG	AH (10 <sup>-3</sup> )	PH	ICP 10 <sup>1</sup> (M/KG) <sup>2</sup>	DELTA CO <sub>2</sub> (CALC) μM/KG	DELTA CO <sub>2</sub> (ARAG) μM/KG
225	13	28.19	35.111	2309	1970	356.0	9.3	1695.4	250.3	8.245	9.3	1695.4	250.3	5.695	8.244	2.576	205.1	184.8
226	95	24.79	35.110	2313	1967	302.3	8.6	1689.4	254.0	8.293	8.6	1689.6	253.7	5.135	8.289	2.612	208.0	187.4
227	146	23.51	35.190	2316	1986	310.1	9.1	1719.1	242.7	8.281	9.1	1719.5	242.4	5.296	8.276	2.500	196.2	175.6
228	235	20.56	35.381	2326	2058	363.7	11.6	1822.6	203.8	8.218	11.5	1823.2	203.3	6.164	8.210	2.108	156.4	135.6
229	323	16.49	35.415	2325	2093	369.5	13.2	1891.2	178.5	8.202	13.1	1892.0	177.8	6.441	8.191	1.846	130.2	109.1
230	464	8.72	34.696	2305	2153	413.2	19.0	1996.8	122.3	8.134	18.8	1997.7	121.4	7.650	8.116	1.235	72.2	50.5
231	597	6.77	34.597	2324	2224	544.5	26.7	2089.5	92.8	8.023	26.5	2090.6	91.9	10.005	8.000	0.932	41.5	19.4
101	771	5.81	34.624	2339	2266	644.2	32.7	2139.4	78.9	7.954	32.4	2140.8	77.8	11.903	7.924	0.790	26.0	3.4
102	946	4.95	34.664	2361	2297	675.5	35.4	2171.8	74.8	7.935	34.9	2173.6	73.5	12.644	7.898	0.747	20.2	-2.9
103	1086	4.20	34.650	2360	2288	617.0	33.2	2161.3	78.6	7.968	32.7	2163.3	77.0	11.868	7.926	0.782	22.4	-1.1

STATION: 425 LEG: IV POSITION: 17° 18' S 55° 51' E DATE: 18 JAN 78

MEASURED PARAMETERS					CALCULATED PARAMETERS P = 1 ATM. T = INSITU									
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STATION: 428 LEG: V POSITION: 37° 46' S 57° 38' E DATE: 2 FEB 78

MEASURED PARAMETERS				CALCULATED PARAMETERS P = 1 ATM. T = INSITU				CALCULATED PARAMETERS P. T = INSITU				DELTA CO <sub>2</sub> =	DELTA CO <sub>2</sub> =					
SAMPLE NO.	DEPTH M	TEMP DEG C	SALINITY ‰	TITRATOR ALK μEQ/KG	TCO <sub>2</sub> μM/KG	PCO <sub>2</sub> μATM	H <sub>2</sub> CO <sub>3</sub> μM/KG	HCO <sub>3</sub> <sup>-</sup> μM/KG	CO <sub>3</sub> <sup>=</sup> μM/KG	PH	H <sub>2</sub> CO <sub>3</sub> μM/KG	HCO <sub>3</sub> <sup>-</sup> μM/KG	CO <sub>3</sub> <sup>=</sup> μM/KG	AH (10 <sup>-1</sup> )	PH	ICP 10 <sup>4</sup> (M/KG) <sup>2</sup>	DELTA CO <sub>2</sub> = (CALC)	DELTA CO <sub>2</sub> = (ARAG)
601	1	18.75	35.334	2324	2038	* 315.1	10.6	1801.3	211.2	8.264	* 10.6	1801.3	211.2	5.444	8.264	2.187	165.7	145.2
602	10	18.39	35.341	2325	2032	* 300.5	10.2	1791.3	215.5	8.280	* 10.2	1791.3	215.5	5.251	8.280	2.233	170.0	149.5
603	41	16.25	35.387	2330	2050	* 292.9	10.5	1818.8	205.6	8.285	* 10.5	1818.9	205.6	5.208	8.283	2.133	159.7	139.2
604	86	15.15	35.399	2328	2079	* 326.0	12.1	1866.7	185.1	8.243	* 12.1	1866.9	184.9	5.755	8.240	1.919	138.8	118.1
605	113	14.65	35.387	2325	2083	* 329.8	12.5	1875.3	180.3	8.237	* 12.4	1875.5	180.0	5.847	8.233	1.867	133.7	112.9
607	179	13.76	35.276	2325	2099	* 343.9	13.4	1900.9	169.8	8.220	* 13.3	1901.3	169.4	6.118	8.213	1.752	122.5	101.6
608	250	13.60	35.321	2326	2085	* 316.5	12.4	1878.5	179.1	8.250	* 12.3	1879.1	178.5	5.744	8.241	1.849	131.2	110.1
610	444	12.10	35.077	2314	2115	* 366.1	15.0	1933.0	152.0	8.190	* 14.9	1934.0	151.0	6.690	8.175	1.553	102.3	80.7
612	634	10.03	34.819	2306	2131	* 380.8	16.7	1962.8	136.4	8.169	* 16.6	1964.3	135.2	7.152	8.146	1.380	84.9	62.8
614	826	7.68	34.575	2305	2169	* 436.6	20.8	2020.6	112.6	8.109	* 20.5	2022.3	111.1	8.352	8.078	1.126	59.1	36.5
616	1014	5.39	34.403	2300	2197	* 494.2	25.5	2063.0	93.5	8.052	* 25.1	2065.0	91.8	9.709	8.013	0.926	38.1	14.8
617	1111	4.60	34.374	2310	2203	* 468.7	24.9	2067.4	95.7	8.071	* 24.5	2069.6	93.9	9.365	8.028	0.946	39.2	15.7
619	1296	3.57	34.412	2320	2234	* 527.5	29.1	2105.2	84.7	8.022	* 28.6	2107.7	82.7	10.685	7.971	0.834	26.3	2.2
620	1384	3.38	34.454	2325	2243	* 541.2	30.0	2115.3	82.6	8.012	* 29.5	2118.0	80.5	11.029	7.957	0.813	23.3	-1.0
621	1472	3.05	34.476	2331	2253	* 553.1	31.1	2126.2	80.8	8.003	* 30.5	2129.0	78.5	11.360	7.945	0.794	20.5	-4.2
623	1647	2.80	34.566	2343	2259	* 528.8	30.0	2130.0	84.0	8.022	* 29.3	2133.2	81.5	11.056	7.956	0.825	21.8	-3.4
624	1728	2.71	34.602	2344	2269	* 564.0	32.0	2142.5	79.4	7.996	* 31.3	2145.8	76.9	11.835	7.927	0.780	16.4	-9.0
401	1808	2.66	34.628	2349	2267	* 536.5	30.5	2138.4	83.1	8.016	* 29.8	2141.9	80.3	11.366	7.944	0.815	19.0	-6.6
402	2033	2.51	34.700	2350	2272	* 550.6	31.5	2144.5	81.0	8.005	* 30.7	2148.4	77.9	11.908	7.924	0.793	14.5	-11.8
403	2250	2.36	34.729	2359	2274	* 587.0	34.0	2131.0	90.0	8.055	* 27.2	2135.5	86.3	10.820	7.966	0.879	20.6	-6.4
405	2684	2.07	34.758	2363	2264	* 404.6	29.8	2124.7	86.9	8.040	* 28.3	2148.0	82.7	11.660	7.933	0.842	12.3	-16.1
407	3138	1.71	34.750	2370	2269	* 459.3	27.1	2133.5	93.4	8.077	* 25.9	2139.9	88.2	11.156	7.953	0.898	12.5	-17.5
408	3368	1.48	34.742	2369	2285	* 512.9	30.5	2155.1	84.4	8.032	* 29.2	2161.7	79.1	12.666	7.897	0.806	0.5	-30.3
409	3584	1.25	34.725	2373	2277	* 468.0	28.1	2143.1	90.8	8.068	* 26.8	2150.3	84.9	11.875	7.925	0.854	3.4	-28.2
411	4023	0.68	34.700	2372	2285	* 487.9	29.9	2154.0	86.0	8.050	* 28.4	2162.0	79.6	12.953	7.898	0.810	-8.0	-41.5
412	4250	0.57	34.691	2379	2281	* 451.2	27.8	2146.2	92.0	8.081	* 26.2	2154.9	84.9	12.278	7.911	0.863	-6.0	-40.4
414	4469	0.50	34.688	2372	2279	* 464.8	28.7	2146.0	89.3	8.068	* 27.0	2155.0	81.9	12.932	7.888	0.833	-12.3	-47.5
416	4918	0.47	34.684	2372	2285	* 484.0	29.9	2154.0	86.1	8.052	* 28.1	2163.8	78.2	14.016	7.853	0.795	-23.0	-60.1
418	5184	0.47	34.682	2373	2278	* 457.4	28.3	2144.4	90.3	8.075	* 26.4	2154.9	81.7	13.619	7.866	0.831	-23.8	-62.1
420	5245	0.47	34.682	2374	2285	* 477.8	29.6	2153.3	87.2	8.057	* 27.6	2163.7	78.7	14.268	7.846	0.800	-27.9	-66.4
421	5264	0.47	34.682	2371	2280	* 469.9	29.1	2147.8	88.1	8.064	* 27.1	2159.4	79.5	14.085	7.851	0.808	-27.4	-66.0
422	5281	0.47	34.681	2372	2285	* 484.3	30.0	2153.9	86.1	8.052	* 28.0	2164.4	77.6	14.515	7.838	0.789	-29.5	-68.2
423	5310	0.48	34.681	2371	2282	* 477.0	29.5	2150.4	87.1	8.058	* 27.5	2161.0	78.5	14.348	7.843	0.798	-29.1	-68.0
424	5323	0.48	34.681	2376	2278	* 448.9	27.8	2143.3	91.9	8.083	* 25.8	2154.1	83.0	13.537	7.868	0.844	-24.9	-63.7

STATION: 429 LEG: V POSITION: 47° 40' S 57° 52' E DATE: 6 FEB 78

MEASURED PARAMETERS				CALCULATED PARAMETERS P = 1 ATM. T = INSITU				CALCULATED PARAMETERS P. T = INSITU				DELTA CO <sub>2</sub> =	DELTA CO <sub>2</sub> =					
SAMPLE NO.	DEPTH M	TEMP DEG C	SALINITY ‰	TITRATOR ALK μEQ/KG	TCO <sub>2</sub> μM/KG	PCO <sub>2</sub> μATM	H <sub>2</sub> CO <sub>3</sub> μM/KG	HCO <sub>3</sub> <sup>-</sup> μM/KG	CO <sub>3</sub> <sup>=</sup> μM/KG	PH	H <sub>2</sub> CO <sub>3</sub> μM/KG	HCO <sub>3</sub> <sup>-</sup> μM/KG	CO <sub>3</sub> <sup>=</sup> μM/KG	AH (10 <sup>-1</sup> )	PH	ICP 10 <sup>4</sup> (M/KG) <sup>2</sup>	DELTA CO <sub>2</sub> = (CALC)	DELTA CO <sub>2</sub> = (ARAG)
301	4	6.49	33.726	2271	2108	* 334.0	16.6	1948.7	127.7	8.205	* 16.6	1948.7	127.7	6.237	8.205	1.262	81.6	60.9
302	30	6.45	33.743	2276	2109	* 327.0	16.3	1947.4	130.2	8.214	* 16.3	1947.5	130.2	6.128	8.213	1.288	84.0	63.2
303	70	6.30	33.759	2273	2100	* 312.3	15.7	1935.7	133.6	8.230	* 15.6	1935.9	133.5	5.920	8.228	1.321	86.9	66.1
304	144	4.25	33.808	2274	2135	* 357.9	19.3	1987.6	113.1	8.171	* 19.3	1987.9	112.8	6.831	8.166	1.118	65.7	44.6
305	195	3.13	33.896	2276	2152	* 379.7	21.3	2011.5	104.2	8.144	* 21.3	2011.9	103.9	7.301	8.137	1.032	56.3	35.0
306	243	3.10	34.036	2282	2164	* 398.5	22.4	2025.6	101.0	8.126	* 22.3	2026.1	100.5	7.652	8.116	1.003	52.6	31.2
307	295	3.00	34.123	2284	2179	* 436.7	24.6	2045.5	93.9	8.089	* 24.5	2046.1	93.4	8.359	8.078	0.934	45.0	23.5
308	386	2.56	34.184	2297	2189	* 424.5	24.3	2054.0	95.7	8.101	* 24.2	2054.8	95.1	8.207	8.086	0.953	46.0	24.2
310	522	2.57	34.314	2310	2245	* 590.0	33.8	2122.4	73.9	7.972	* 33.5	2123.4	73.1	11.194	7.951	0.735	23.0	0.9
311	600	2.52	34.374	2312	2247	* 590.1	33.8	2124.3	73.9	7.972	* 33.6	2125.4	73.0	11.279	7.948	0.736	22.2	-0.1
312	679	2.46	34.432	2322	2247	* 549.7	31.6	2121.4	79.0	8.002	* 31.3	2122.7	78.0	10.604	7.975	0.787	26.6	4.1
314	832	2.49	34.529	2331	2256	* 554.2	31.8	2130.1	79.1	8.000	* 31.4	2131.7	77.9	10.801	7.967	0.788	25.3	2.3
316	986	2.45	34.593	2336	2264	* 568.5	32.6	2138.6	77.7	7.990	* 32.2	2140.5	76.3	11.204	7.951	0.774	22.4	-1.0
317	1081	2.41	34.633	2336	2266	* 576.8	33.1	2141.1	76.7	7.984	* 32.7	2143.2	75.2	11.465	7.941	0.763	20.4	-3.2
319	1276	2.38	34.695	2340	2255	* 517.3	29.7	2125.9	84.3	8.028	* 29.2	2128.4	82.4	10.543	7.977	0.838	25.9	1.8
320	1372	2.33	34.720	2347	2257	* 500.0	28.8	2126.2	87.0	8.042	* 28.3	2128.9	84.9	10.285	7.988	0.864	27.6	3.2
322	1567	2.26	34.747	2342	2261	* 531.6	30.7	2133.0	82.3	8.016	* 30.1	2136.0	79.9	11.114	7.954	0.814	20.9	-4.1
323	1662	2.21	34.757	2342	2256	* 511.7	29.6	2126.5	84.9	8.031	* 29.0	2129.8	82.3	10.829	7.965	0.838	22.3	-2.9
324	1759	2.14	34.764	2347	2255	* 490.3	28.4	2123.5	88.1	8.049	* 27.8	2127.0	85.3	10.489	7.979	0.869	24.4	-1.2
101	1886	2.04	34.768	2344	2253	* 491.2	28.6	2121.9	87.5	8.047	* 27.9	2125.6	84.5	10.656	7.972	0.861	22.4	-3.6
102	2055	1.91	34.770	2350	2252	* 466.9	27.3	2118.4	91.3	8.068	* 26.6	2122.5	87.9	10.317	7.986	0.896	24.1	-2.3
103	2225	1.77	34.767	2356	2247	* 431.5	25.4	2109.3	97.3	8.099	* 24.6	2113.9	93.5	9.737	8.012	0.953	27.9	0.9
104	2394	1.63	34.758	2355	2257	* 463.1	27.4	2123.2	91.4	8.071	* 26.5	2128.0	87.5	10.573	7.976	0.891	20.1	-7.5
105	2564	1.47	34.749	2357	2259	* 460.6	27.4	2125.2	91.4	8.073	* 26.5	2130.4	87.2	10.693	7.971	0.888	17.9	-10.2
106	2732	1.32	34.740	2363	2275	* 493.4	29.5	2144.2	86.3	8.046	* 28.5	2149.6	81.9	11.568	7.937	0.835	10.8	-17.9
107	2903	1.16	34.730	2360	2263													

STATION: 431 LEG: V POSITION: 64° 11' S 83° 59' E DATE: 13 FEB 78

MEASURED PARAMETERS				CALCULATED PARAMETERS P = 1 ATM. T = INSITU				CALCULATED PARAMETERS P, T = INSITU				DELTA	DELTA					
SAMPLE NO.	DEPTH M	TEMP DEG C	SALINITY ‰	TITRATOR ALK μEQ/KG	TCO <sub>2</sub> μM/KG	PCO <sub>2</sub> μATM	H <sub>2</sub> CO <sub>3</sub> μM/KG	HCO <sub>3</sub> <sup>-</sup> μM/KG	CO <sub>3</sub> <sup>=</sup> μM/KG	PH	H <sub>2</sub> CO <sub>3</sub> μM/KG	HCO <sub>3</sub> <sup>-</sup> μM/KG	CO <sub>3</sub> <sup>=</sup> μM/KG	AH (10 <sup>-3</sup> )	PH	ICP 10 <sup>4</sup> (M/KG) <sup>2</sup>	DELTA CO <sub>2</sub> (CALC) μM/KG	DELTA CO <sub>2</sub> (ARAG) μM/KG
107	352	1.62	34.698	2353	2281	* 558.2	33.0	2154.9	78.1	7.996	* 32.9	2155.5	77.6	10.417	7.982	0.789	28.7	7.0
108	502	1.49	34.711	2354	2277	* 535.4	31.8	2149.6	80.6	8.013	* 31.6	2150.6	79.8	10.172	7.993	0.812	29.7	7.6
109	710	1.32	34.722	2362	2269	* 476.3	28.5	2136.5	89.0	8.060	* 28.2	2137.9	87.8	9.299	8.032	0.894	36.1	13.4
110	918	1.13	34.721	2364	2279	* 501.1	30.2	2149.0	84.8	8.039	* 29.8	2150.8	83.4	9.941	8.003	0.849	29.9	6.7
111	1126	0.98	34.718	2365	2281	* 502.5	30.5	2151.2	84.4	8.038	* 30.0	2153.4	82.6	10.170	7.993	0.841	27.3	3.5
112	1334	0.85	34.714	2365	2279	* 492.6	30.0	2148.6	85.4	8.045	* 29.5	2151.3	83.2	10.193	7.992	0.847	26.1	-1.7
114	1539	0.68	34.707	2364	2285	* 514.9	31.6	2156.6	81.8	8.027	* 30.9	2159.7	79.4	10.845	7.965	0.808	20.3	-4.7
115	1784	0.52	34.696	2365	2282	* 497.7	30.7	2152.4	83.9	8.040	* 30.0	2155.9	81.1	10.764	7.968	0.825	19.6	-6.1
116	2029	0.38	34.689	2366	2281	* 487.5	30.3	2150.9	84.9	8.048	* 29.4	2154.9	81.6	10.814	7.966	0.830	17.7	-8.9
117	2272	0.23	34.680	2366	2284	* 495.7	30.9	2154.7	83.4	8.040	* 30.0	2159.2	79.8	11.253	7.949	0.811	13.3	-14.1
118	2517	0.13	34.676	2364	2289	* 519.0	32.5	2161.7	79.8	8.021	* 31.5	2166.6	75.9	12.042	7.919	0.772	6.7	-21.4
119	2760	0.03	34.674	2366	2281	* 481.3	30.3	2150.8	84.9	8.051	* 29.2	2156.3	80.5	11.485	7.940	0.818	8.5	-20.4
120	2945	-0.04	34.674	2365	2278	* 473.0	29.8	2147.2	85.9	8.058	* 28.7	2153.1	81.2	11.511	7.939	0.825	7.0	-22.6
121	3129	-0.08	34.674	2360	2280	* 495.3	31.3	2151.5	82.2	8.038	* 30.0	2157.7	77.3	12.256	7.912	0.786	0.9	-29.4
122	3312	-0.12	34.675	2364	2269	* 445.0	28.2	2135.8	90.0	8.082	* 26.9	2142.6	84.5	11.268	7.948	0.859	5.9	-25.1
123	3485	-0.16	34.680	2360	2278	* 486.9	30.9	2148.9	83.2	8.045	* 29.5	2155.8	77.7	12.483	7.904	0.790	-3.2	-34.8
124	3605	-0.21	34.680	2363	2275	* 466.1	29.6	2144.0	86.4	8.063	* 28.2	2151.2	80.5	12.112	7.917	0.819	-1.9	-34.0

STATION: 432 LEG: V POSITION: 59° 19' S 92° 38' E DATE: 15 FEB 78

MEASURED PARAMETERS				CALCULATED PARAMETERS P = 1 ATM. T = INSITU				CALCULATED PARAMETERS P, T = INSITU				DELTA	DELTA					
SAMPLE NO.	DEPTH M	TEMP DEG C	SALINITY ‰	TITRATOR ALK μEQ/KG	TCO <sub>2</sub> μM/KG	PCO <sub>2</sub> μATM	H <sub>2</sub> CO <sub>3</sub> μM/KG	HCO <sub>3</sub> <sup>-</sup> μM/KG	CO <sub>3</sub> <sup>=</sup> μM/KG	PH	H <sub>2</sub> CO <sub>3</sub> μM/KG	HCO <sub>3</sub> <sup>-</sup> μM/KG	CO <sub>3</sub> <sup>=</sup> μM/KG	AH (10 <sup>-3</sup> )	PH	ICP 10 <sup>4</sup> (M/KG) <sup>2</sup>	DELTA CO <sub>2</sub> (CALC) μM/KG	DELTA CO <sub>2</sub> (ARAG) μM/KG
301	11	1.83	33.865	2306	2158	* 315.1	18.6	2005.8	118.6	8.217	* 18.6	2005.8	118.6	6.076	8.216	1.177	72.3	51.4
302	34	1.83	33.865	2307	2172	* 343.1	20.2	2025.6	111.1	8.184	* 20.2	2025.7	111.1	6.564	8.183	1.103	64.6	43.7
303	60	-0.05	33.953	2312	2187	* 344.1	21.8	2044.7	105.5	8.177	* 21.8	2044.9	105.4	6.695	8.174	1.049	58.6	37.6
304	91	-0.83	34.170	2323	2232	* 429.6	28.0	2101.8	87.2	8.087	* 28.0	2102.0	87.0	8.246	8.084	0.872	40.0	18.9
306	254	1.35	34.591	2353	2278	* 538.4	32.2	2151.2	79.5	8.010	* 32.1	2151.7	79.2	10.002	8.000	0.803	31.0	9.5
307	333	1.30	34.628	2352	2276	* 534.0	32.0	2149.0	80.0	8.013	* 31.9	2149.6	79.5	10.011	8.000	0.807	30.8	9.1
308	413	1.53	34.675	2356	2281	* 544.4	32.3	2154.0	79.6	8.007	* 32.2	2154.8	79.0	10.231	7.990	0.803	29.6	7.8
309	489	1.63	34.706	2366	2277	* 496.7	29.4	2145.6	87.0	8.045	* 29.2	2146.6	86.2	9.424	8.026	0.877	36.3	14.2
310	563	1.59	34.714	2359	2273	* 504.3	29.9	2142.9	85.2	8.038	* 29.6	2144.0	84.3	9.650	8.015	0.858	33.8	11.5
311	643	1.53	34.718	2369	2282	* 502.8	29.8	2151.2	86.0	8.040	* 29.6	2152.4	85.0	9.663	8.015	0.865	33.8	11.3
312	721	1.53	34.728	2365	2280	* 509.5	30.2	2149.8	84.9	8.034	* 30.0	2151.3	83.8	9.870	8.006	0.853	32.0	9.3
313	797	1.56	34.740	2365	2284	* 525.1	31.1	2155.0	82.9	8.022	* 30.8	2156.5	81.6	10.218	7.991	0.831	29.2	6.3
314	892	1.47	34.735	2365	2275	* 489.4	29.1	2143.5	87.4	8.050	* 28.8	2145.3	85.9	9.667	8.015	0.875	32.7	9.6
315	988	1.36	34.735	2374	2278	* 470.3	28.1	2144.1	90.8	8.067	* 27.7	2146.1	89.2	9.378	8.028	0.908	35.1	11.7
316	1082	1.27	34.732	2367	2279	* 494.1	29.6	2147.9	86.5	8.046	* 29.2	2150.1	84.7	9.937	8.003	0.863	29.9	6.2
317	1178	1.18	34.727	2369	2288	* 518.6	31.2	2158.9	82.9	8.027	* 30.7	2161.2	81.1	10.484	7.979	0.825	25.4	1.4
318	1273	1.10	34.724	2370	2279	* 481.4	29.1	2146.8	88.1	8.056	* 28.6	2149.4	86.0	9.878	8.005	0.876	29.5	5.2
319	1368	1.02	34.723	2378	2283	* 468.3	28.4	2149.3	90.3	8.068	* 27.8	2152.1	88.1	9.691	8.014	0.897	30.6	6.1
320	1465	0.93	34.716	2368	2284	* 501.9	30.5	2154.1	84.4	8.039	* 29.9	2157.0	82.1	10.474	7.980	0.835	23.7	-1.1
321	1559	0.86	34.712	2371	2292	* 520.4	31.7	2163.3	82.0	8.024	* 31.1	2166.4	79.5	10.923	7.962	0.809	20.3	-4.8
322	1654	0.81	34.712	2372	2285	* 490.7	29.9	2154.0	86.1	8.048	* 29.3	2157.3	83.4	10.436	7.981	0.849	23.3	-2.1
323	1750	0.74	34.707	2371	2295	* 529.7	32.4	2167.1	80.5	8.017	* 31.7	2170.5	77.8	11.317	7.946	0.791	16.7	-9.0
324	1844	0.67	34.703	2370	2291	* 516.5	31.7	2162.4	82.0	8.026	* 30.9	2166.0	79.1	11.163	7.952	0.804	17.1	-8.9
101	1950	0.59	34.701	2373	2282	* 472.6	29.1	2149.8	88.1	8.062	* 28.3	2153.7	84.9	10.377	7.984	0.864	21.8	-4.4
102	2111	0.51	34.696	2371	2285	* 488.5	30.2	2154.2	85.6	8.048	* 29.3	2158.5	82.2	10.882	7.963	0.836	17.5	-9.3
103	2270	0.41	34.690	2372	2296	* 523.3	32.4	2168.1	80.5	8.020	* 31.5	2172.5	77.0	11.782	7.929	0.783	10.6	-16.8
104	2433	0.32	34.688	2369	2288	* 502.1	31.2	2158.8	82.9	8.036	* 30.2	2163.6	79.1	11.535	7.938	0.805	10.9	-16.9
105	2592	0.25	34.684	2369	2295	* 526.5	32.8	2167.8	79.4	8.017	* 31.8	2172.9	75.4	12.249	7.912	0.766	5.4	-23.0
106	2753	0.18	34.682	2371	2282	* 471.9	29.5	2150.4	87.1	8.061	* 28.4	2155.9	82.6	11.227	7.950	0.840	10.8	-18.1
107	2913	0.11	34.680	2371	2279	* 480.6	28.9	2146.5	88.7	8.070	* 27.8	2152.4	83.9	11.148	7.953	0.853	10.2	-19.3
108	3073	0.06	34.680	2368	2284	* 485.9	30.5	2154.0	84.4	8.048	* 29.3	2160.2	79.5	11.917	7.924	0.808	3.9	-26.2
109	3233	0.02	34.680	2371	2281	* 465.4	29.3	2149.2	87.6	8.066	* 28.0	2155.7	82.3	11.608	7.935	0.837	4.7	-26.0
110	3394	-0.01	34.678	2367	2280	* 473.8	29.9	2149.2	85.9	8.058	* 28.5	2156.0	80.5	12.010	7.920	0.818	0.8	-30.4
111	3553	-0.04	34.679	2367	2280	* 473.8	29.9	2149.1	86.0	8.057	* 28.5	2156.2	80.3	12.194	7.914	0.816	-1.4	-33.3
112	3712	-0.06	34.678	2368	2293	* 516.6	32.6	2165.5	79.9	8.023	* 31.1	2172.7	74.2	13.423	7.872	0.754	-9.6	-42.1
114	3874	-0.09	34.678	2370	2283	* 473.6	29.9	2152.0	86.0	8.058	* 28.4	2159.8	79.8	12.553	7.901	0.811	-6.2	-39.3
115	4034	-0.10	34.678	2373	2267	* 414.9	26.2	2129.6	96.2	8.111	* 24.8	2138.0	89.2	11.252	7.949	0.906	0.9	-32.8
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STATION: 435 LEG: V POSITION: 39° 57' S 109° 58' E DATE: 22 FEB 78

SAMPLE NO.	MEASURED PARAMETERS				CALCULATED PARAMETERS P = 1 ATM. T = INSITU					CALCULATED PARAMETERS P, T = INSITU					DELTA CO <sub>2</sub> <sup>*</sup> (CALC) μM/KG	DELTA CO <sub>2</sub> <sup>*</sup> (ARAG) μM/KG		
	DEPTH M	TEMP DEG C	SALINITY ‰	TITRATOR ALK μEQ/KG	TCO <sub>2</sub> μM/KG	PCO <sub>2</sub> μATM	H <sub>2</sub> CO <sub>3</sub> μM/KG	HCO <sub>3</sub> <sup>-</sup> μM/KG	CO <sub>3</sub> <sup>=</sup> μM/KG	PH	H <sub>2</sub> CO <sub>3</sub> μM/KG	HCO <sub>3</sub> <sup>-</sup> μM/KG	CO <sub>3</sub> <sup>=</sup> μM/KG	AH (10 <sup>-3</sup> )			PH	ICP 10 <sup>4</sup> (M/KG)
110	3444	1.18	34.724	2372	2287	504.5	30.4	2156.6	85.0	8.038	29.0	2163.4	79.6	12.589	7.900	0.810	-0.1	-31.3
111	3614	1.04	34.718	2370	2282	490.3	29.7	2150.8	86.5	8.049	28.3	2158.0	80.7	12.482	7.904	0.821	-1.2	-33.1
112	3783	0.94	34.712	2371	2282	485.5	29.5	2150.4	87.1	8.052	28.0	2158.0	81.0	12.575	7.900	0.824	-3.2	-35.7
114	3954	0.90	34.710	2376	2284	476.0	29.0	2151.3	88.8	8.061	27.5	2159.2	82.3	12.523	7.902	0.838	-4.2	-37.3
116	4291	0.85	34.706	2370	2292	523.6	31.9	2163.7	81.4	8.022	30.2	2172.0	74.8	14.177	7.848	0.761	-16.5	-51.0
118	4500	0.85	34.705	2383	2292	480.6	29.3	2159.3	88.4	8.058	27.6	2168.3	81.1	13.262	7.877	0.825	-13.3	-48.6
119	4530	0.85	34.705	2374	2282	474.4	28.9	2149.4	88.7	8.062	27.2	2158.4	81.3	13.190	7.880	0.827	-13.5	-48.9
121	4583	0.85	34.705	2368	2288	515.5	31.4	2159.2	82.4	8.028	29.6	2168.1	75.3	14.370	7.843	0.766	-20.4	-56.0
122	4594	0.85	34.705	2373	2281	474.1	28.9	2148.4	88.7	8.062	27.2	2158.6	81.2	13.266	7.877	0.826	-14.6	-50.3
123	4609	0.85	34.705	2374	2292	509.8	31.1	2162.4	83.5	8.033	29.3	2171.4	76.3	14.217	7.847	0.776	-19.7	-55.4
124	4621	0.85	34.705	2374	2284	481.4	29.3	2152.0	87.7	8.056	27.6	2161.2	80.2	13.485	7.870	0.816	-16.0	-51.8

STATION: 436 LEG: VI POSITION: 29° 15' S 109° 58' E DATE: 8 MAR 78

SAMPLE NO.	MEASURED PARAMETERS				CALCULATED PARAMETERS P = 1 ATM. T = INSITU					CALCULATED PARAMETERS P, T = INSITU					DELTA CO <sub>2</sub> <sup>*</sup> (CALC) μM/KG	DELTA CO <sub>2</sub> <sup>*</sup> (ARAG) μM/KG		
	DEPTH M	TEMP DEG C	SALINITY ‰	TITRATOR ALK μEQ/KG	TCO <sub>2</sub> μM/KG	PCO <sub>2</sub> μATM	H <sub>2</sub> CO <sub>3</sub> μM/KG	HCO <sub>3</sub> <sup>-</sup> μM/KG	CO <sub>3</sub> <sup>=</sup> μM/KG	PH	H <sub>2</sub> CO <sub>3</sub> μM/KG	HCO <sub>3</sub> <sup>-</sup> μM/KG	CO <sub>3</sub> <sup>=</sup> μM/KG	AH (10 <sup>-3</sup> )			PH	ICP 10 <sup>4</sup> (M/KG)
301	10	24.52	35.734	2349	2007	320.9	9.2	1731.3	251.5	8.274	9.2	1731.3	251.5	5.326	8.274	2.635	206.3	185.9
302	35	21.50	35.880	2355	2035	315.4	9.8	1774.9	235.3	8.273	9.8	1775.0	235.2	5.348	8.272	2.474	189.7	169.3
303	65	20.44	35.918	2354	2044	315.8	10.1	1790.9	228.0	8.270	10.1	1791.1	227.8	5.402	8.267	2.399	182.1	161.6
304	86	18.09	35.788	2349	2053	302.4	10.3	1810.3	217.4	8.279	10.3	1810.6	217.2	5.294	8.276	2.278	171.2	150.6
305	120	15.68	35.715	2347	2068	307.5	10.9	1836.6	205.5	8.270	10.9	1836.9	205.2	5.426	8.266	2.148	158.9	138.2
306	166	15.28	35.574	2336	2086	330.2	12.2	1872.9	185.9	8.239	12.2	1873.3	185.5	5.842	8.233	1.935	138.9	118.0
307	208	14.08	35.395	2331	2086	318.9	12.3	1876.6	182.1	8.249	12.2	1877.1	181.6	5.738	8.241	1.885	134.6	113.6
308	254	12.83	35.220	2322	2095	327.9	13.1	1896.9	169.9	8.234	13.1	1897.6	169.4	5.955	8.225	1.749	122.0	100.8
309	298	11.71	35.056	2311	2103	341.8	14.2	1916.5	157.5	8.214	14.1	1917.2	156.7	6.257	8.204	1.610	108.9	87.6
310	355	10.49	34.890	2304	2120	368.1	15.9	1947.2	141.9	8.182	15.8	1948.0	141.2	6.768	8.170	1.444	92.9	71.5

311	425	9.65	34.764	2303	2123	362.4	16.1	1952.7	139.2	8.186	16.0	1953.6	138.4	6.754	8.170	1.410	89.5	67.9
312	534	8.72	34.640	2294	2138	398.8	18.3	1980.4	124.3	8.145	18.2	1981.5	123.3	7.488	8.126	1.252	73.6	51.7
313	669	7.01	34.489	2295	2170	452.6	22.0	2027.0	105.9	8.091	21.8	2028.4	104.8	8.891	8.066	1.059	53.9	31.6
314	796	5.06	34.404	2307	2214	526.8	27.5	2083.2	88.3	8.026	27.2	2084.7	87.1	10.101	7.998	0.878	35.0	12.3
315	917	4.16	34.456	2328	2244	550.2	29.7	2115.5	83.8	8.009	29.3	2117.2	82.4	10.636	7.973	0.833	29.3	6.2
316	1038	3.80	34.504	2342	2269	595.1	32.5	2142.9	78.6	7.979	32.1	2144.8	77.1	11.544	7.938	0.780	22.9	-0.5
317	1164	3.54	34.553	2357	2282	610.6	32.2	2143.5	74.5	7.959	34.6	2174.0	72.4	12.522	7.902	0.735	14.9	-9.5
319	1410	2.93	34.629	2360	2296	624.0	35.2	2171.4	74.5	7.959	34.6	2174.0	72.4	12.522	7.902	0.735	14.9	-9.5
320	1540	2.79	34.662	2370	2301	602.1	34.1	2174.7	77.2	7.974	33.4	2177.7	74.9	12.229	7.913	0.761	16.2	-8.7
321	1659	2.64	34.685	2376	2294	546.0	31.1	2164.1	83.8	8.013	30.4	2167.3	81.2	11.282	7.948	0.826	21.4	-3.8
322	1786	2.47	34.704	2380	2302	560.0	32.1	2173.1	81.8	8.003	31.3	2176.6	79.1	11.687	7.932	0.804	18.0	-7.6

323	1909	2.35	34.716	2389	2314	572.4	33.0	2185.6	80.4	7.995	32.2	2189.3	77.6	12.039	7.919	0.789	15.3	-10.7
324	2032	2.23	34.722	2394	2306	520.6	30.1	2173.7	87.2	8.034	29.3	2177.8	84.0	11.139	7.953	0.855	20.4	-5.9
101	2085	2.19	34.724	2391	2317	574.3	33.3	2188.7	80.0	7.994	32.4	2192.8	76.8	12.286	7.911	0.782	12.8	-13.7
102	2284	2.04	34.726	2395	2315	548.0	31.9	2185.0	83.1	8.013	31.0	2189.5	79.6	11.979	7.922	0.810	13.5	-13.7
103	2486	1.92	34.729	2397	2313	529.9	31.0	2181.9	85.1	8.026	30.0	2186.8	81.2	11.833	7.927	0.826	12.9	-14.9
104	2685	1.80	34.729	2397	2311	520.3	30.6	2179.2	86.2	8.033	29.5	2184.6	81.9	11.868	7.926	0.834	11.4	-17.0
105	2935	1.66	34.729	2397	2309	510.7	30.2	2176.6	87.3	8.039	29.0	2182.4	82.5	11.953	7.923	0.840	9.2	-20.1
106	3184	1.54	34.727	2396	2310	515.3	30.6	2178.2	86.2	8.035	29.3	2184.6	81.1	12.358	7.908	0.826	4.8	-25.4
107	3435	1.44	34.727	2395	2313	524.5	31.2	2182.1	84.6	8.028	29.9	2188.9	79.2	12.877	7.890	0.806	-0.2	-31.3
108	3683	1.35	34.724	2396	2312	518.9	31.0	2180.8	85.1	8.032	29.6	2188.1	79.3	13.058	7.884	0.807	-3.4	-35.4
109	3930	1.26	34.719	2397	2305	488.5	29.3	2171.5	89.2	8.056	27.8	2179.4	82.8	12.632	7.899	0.843	-3.2	-36.1

110	4180	1.21	34.718	2397	2305	487.1	29.3	2171.5	89.2	8.057	27.7	2179.9	82.4	12.901	7.889	0.838	-7.1	-41.0
111	4430	1.17	34.717	2394	2300	479.4	28.9	2165.9	90.3	8.062	27.2	2174.8	83.0	13.033	7.885	0.845	-10.1	-45.0
112	4430	1.17	34.718	2394	2302	485.9	29.2	2168.6	89.2	8.057	27.6	2177.5	82.0	13.200	7.879	0.834	-11.2	-46.1
114	4937	1.10	34.714	2387	2294	478.9	28.9	2160.6	89.5	8.061	27.1	2170.5	81.4	13.703	7.863	0.829	-19.5	-56.5
115	5184	1.10	34.713	2386	2295	486.2	29.3	2162.1	88.5	8.055	27.4	2172.5	80.1	14.229	7.847	0.815	-24.8	-62.9
116	5184	1.10	34.713	2384	2296	496.1	29.9	2164.1	86.9	8.047	28.0	2174.4	78.6	14.515	7.838	0.800	-26.4	-64.4
117	5431	1.11	34.712	2383	2292	484.9	29.3	2159.4	88.4	8.056	27.3	2170.2	79.6	14.539	7.837	0.810	-29.6	-68.7
118	5460	1.11	34.714	2383	2293	488.3	29.5	2160.7	87.9	8.053	27.4	2171.5	79.0	14.677	7.833	0.804	-30.6	-69.8
119	5480	1.11	34.711	2383	2297	502.7	30.3	2165.8	85.8	8.041	28.3	2176.6	77.1	15.114	7.821	0.785	-32.9	-72.2
120	5495	1.11	34.711	2385	2292	479.0	28.9	2158.6	89.5	8.061	26.9	2169.6	80.5	14.447	7.840	0.820	-29.7	-69.1
124	5504	1.11	34.711	2384	2291	478.6	28.9	2157.6	89.5	8.061	26.9	2168.6	80.5	14.454	7.840	0.819	-29.9	-69.3

121	5525	1.11	34.714	2380	2292	494.9	29.9	2160.3	86.8	8.047	27.8	2171.3	77.9	14.974	7.825	0.793	-32.8	-72.3
122	5541	1.11	34.714	2382	2297	506.0	30.5	2166.2	85.3	8.038	28.4	2177.1	76.5	15.300	7.815	0.778	-34.6	-74.2
123	5556	1.12	34.714	2384	2295	492.7	29.7	2162.9	87.4	8.049	27.7	2173.9	78.5	14.927	7.826	0.799	-32.8	-72.5

STATION: 437 LEG: VI POSITION: 24° 29' S 104° 56' E DATE: 11 MAR 78

SAMPLE NO.	MEASURED PARAMETERS				CALCULATED PARAMETERS P = 1 ATM. T = INSITU					CALCULATED PARAMETERS P, T = INSITU					DELTA CO <sub>2</sub> <sup>*</sup> (CALC) μM/KG	DELTA CO <sub>2</sub> <sup>*</sup> (ARAG) μM/KG
	DEPTH M	TEMP DEG C	SALINITY ‰	TITRATOR ALK μEQ/KG	TCO <sub>2</sub> μM/KG	PCO <sub>2</sub> μATM	H <sub>2</sub> CO <sub>3</sub> μM/KG	HCO <sub>3</sub> <sup>-</sup> μM/KG	CO <sub>3</sub> <sup>=</sup> μM/KG	PH	H <sub>2</sub> CO <sub>3</sub> μM/KG	HCO				

STATION: 439 LEG: VI POSITION: 13° 2' S 97° 9' E DATE: 15 MAR 78

MEASURED PARAMETERS					CALCULATED PARAMETERS P = 1 ATM. T = INSITU					CALCULATED PARAMETERS P, T = INSITU					DELTA	DELTA		
SAMPLE NO.	DEPTH M	TEMP DEG C	SALINITY ‰	TITRATOR ALK μEQ/KG	TCO <sub>2</sub> μM/KG	PCO <sub>2</sub> μATM	H <sub>2</sub> CO <sub>3</sub> μM/KG	HCO <sub>3</sub> <sup>-</sup> μM/KG	CO <sub>3</sub> <sup>=</sup> μM/KG	PH	H <sub>2</sub> CO <sub>3</sub> μM/KG	HCO <sub>3</sub> <sup>-</sup> μM/KG	CO <sub>3</sub> <sup>=</sup> μM/KG	AH (10 <sup>3</sup> )	PH	ICP 10 <sup>3</sup> (M/KG)	DELTA CO <sub>2</sub> (CALC) μM/KG	DELTA CO <sub>2</sub> (ARAG) μM/KG
101	21	28.75	34.423	2251	1915	342.2	8.9	1643.7	247.4	8.254	8.9	1643.7	247.4	5.580	8.253	2.496	202.2	181.9
102	45	28.64	34.578	2265	1928	345.3	9.0	1655.8	248.4	8.252	9.0	1655.8	248.3	5.615	8.251	2.516	202.9	182.5
103	55	27.24	34.647	2272	1929	320.9	8.6	1653.2	252.1	8.274	8.6	1653.4	252.0	5.341	8.272	2.560	206.5	186.1
104	70	24.48	34.742	2274	1951	316.5	9.1	1689.1	237.8	8.271	9.1	1689.3	237.6	5.380	8.269	2.420	192.0	171.5
105	90	23.57	34.847	2285	1972	323.8	9.5	1716.4	231.0	8.263	9.5	1716.6	230.8	5.501	8.260	2.358	185.0	164.4
106	151	18.43	34.950	2293	2094	470.6	15.9	1907.8	155.2	8.114	15.9	1908.2	154.9	7.784	8.109	1.587	108.5	87.7
107	251	13.36	35.046	2324	2142	429.0	16.9	1967.4	142.7	8.137	16.8	1967.9	142.2	7.449	8.128	1.461	94.8	73.7
108	275	13.20	35.227	2319	2120	387.0	15.3	1937.1	152.6	8.173	15.2	1937.7	152.1	6.860	8.164	1.570	104.5	83.4
109	325	11.37	35.050	2309	2122	378.3	15.9	1947.0	144.1	8.175	15.8	1947.7	143.5	6.863	8.163	1.474	95.5	74.1
110	377	9.60	34.821	2297	2132	394.1	17.5	1969.5	130.0	8.153	17.4	1970.3	129.2	7.263	8.139	1.319	80.7	59.2
111	425	8.67	34.692	2298	2172	485.0	22.3	2027.6	107.1	8.070	22.2	2028.4	106.4	8.822	8.054	1.082	57.5	35.8
112	473	8.27	34.669	2308	2199	538.5	25.1	2061.1	97.8	8.030	24.9	2062.1	97.0	9.729	8.012	0.986	47.7	25.9
113	520	7.80	34.668	2318	2223	586.9	27.8	2089.9	90.3	7.996	27.6	2090.9	89.5	10.569	7.976	0.910	39.8	17.9
114	593	7.14	34.660	2336	2269	709.9	34.4	2143.3	76.3	7.920	34.1	2144.4	75.5	12.666	7.897	0.767	25.2	3.1
115	670	6.34	34.633	2349	2288	724.3	36.1	2163.5	73.4	7.911	35.8	2164.7	72.5	13.029	7.885	0.736	21.6	-0.7
116	755	5.89	34.644	2355	2295	719.2	36.4	2170.6	73.0	7.913	36.1	2172.0	71.9	13.074	7.884	0.730	20.3	-2.3
117	843	5.43	34.632	2361	2305	731.1	37.6	2181.2	71.2	7.906	37.2	2182.8	70.0	13.413	7.872	0.711	17.6	-5.2
118	930	5.01	34.630	2370	2310	731.7	36.6	2185.1	73.2	7.922	36.2	2186.8	71.9	13.024	7.895	0.730	18.8	-4.2
119	1022	4.71	34.644	2375	2318	710.9	37.5	2193.7	71.8	7.916	37.1	2195.5	70.4	13.308	7.876	0.715	16.4	-6.9
120	1111	4.42	34.652	2379	2318	683.8	36.5	2192.8	73.8	7.931	36.0	2194.8	72.2	12.861	7.887	0.733	17.5	-6.1
121	1200	4.19	34.662	2379	2319	683.0	36.7	2194.1	73.2	7.931	36.2	2196.3	71.5	13.084	7.883	0.727	16.0	-7.8
122	1290	3.97	34.677	2381	2315	648.4	35.2	2188.7	76.1	7.951	34.6	2191.1	74.3	12.590	7.900	0.755	18.0	-6.1
123	1390	3.69	34.692	2383	2317	642.2	35.2	2190.7	76.1	7.954	34.6	2193.3	74.1	12.619	7.899	0.754	16.9	-7.5
124	1487	3.47	34.706	2384	2325	671.4	37.1	2200.2	72.7	7.935	36.4	2203.0	70.6	13.303	7.876	0.718	12.5	-12.2

STATION: 440 LEG: VI POSITION: 9° 22' S 95° 2' E DATE: 17 MAR 78

MEASURED PARAMETERS					CALCULATED PARAMETERS P = 1 ATM. T = INSITU					CALCULATED PARAMETERS P, T = INSITU					DELTA	DELTA		
SAMPLE NO.	DEPTH M	TEMP DEG C	SALINITY ‰	TITRATOR ALK μEQ/KG	TCO <sub>2</sub> μM/KG	PCO <sub>2</sub> μATM	H <sub>2</sub> CO <sub>3</sub> μM/KG	HCO <sub>3</sub> <sup>-</sup> μM/KG	CO <sub>3</sub> <sup>=</sup> μM/KG	PH	H <sub>2</sub> CO <sub>3</sub> μM/KG	HCO <sub>3</sub> <sup>-</sup> μM/KG	CO <sub>3</sub> <sup>=</sup> μM/KG	AH (10 <sup>3</sup> )	PH	ICP 10 <sup>3</sup> (M/KG)	DELTA CO <sub>2</sub> (CALC) μM/KG	DELTA CO <sub>2</sub> (ARAG) μM/KG
301	17	29.13	34.188	2249	1904	330.4	8.5	1626.5	253.9	8.268	8.5	1626.6	253.9	5.404	8.267	2.545	208.7	188.4
302	63	23.60	34.606	2278	1991	419.9	10.7	1751.3	214.0	8.224	10.7	1751.5	213.9	6.001	8.222	2.170	168.2	147.7
303	80	20.54	34.522	2280	2070	473.6	15.2	1876.5	163.4	8.118	15.1	1876.7	163.2	7.667	8.115	1.652	117.3	96.7
304	100	18.92	34.639	2283	2112	555.2	18.6	1940.1	138.4	8.053	18.6	1940.3	138.2	8.917	8.050	1.403	92.0	71.4
305	128	15.78	34.713	2298	2165	623.4	22.8	2012.6	114.6	8.000	22.8	2012.8	114.4	10.113	7.995	1.164	67.9	47.1
306	163	13.87	34.687	2304	2183	624.4	24.3	2036.8	106.9	7.993	24.2	2037.2	106.6	10.306	7.987	1.084	59.8	38.9
307	200	12.16	34.736	2313	2213	676.2	27.7	2075.6	94.7	7.956	27.6	2076.0	94.4	11.250	7.949	0.961	47.3	26.2
308	257	11.42	34.884	2314	2221	691.3	29.0	2086.5	90.5	7.944	28.9	2087.0	90.1	11.624	7.935	0.922	42.6	21.4
309	351	10.27	34.882	2314	2229	698.7	30.4	2097.8	85.8	7.935	30.3	2098.4	85.3	11.965	7.922	0.873	37.1	15.6
310	470	9.03	34.807	2322	2243	696.6	31.6	2113.9	82.5	7.933	31.4	2114.7	81.8	12.159	7.915	0.835	32.6	10.9
311	591	7.95	34.748	2331	2265	737.7	34.7	2139.4	75.9	7.907	34.5	2140.4	75.1	13.048	7.884	0.765	24.9	2.8
312	698	7.22	34.743	2346	2285	751.3	36.3	2160.4	73.7	7.899	36.0	2161.3	72.7	13.418	7.872	0.741	21.7	-0.7
314	895	5.92	34.711	2365	2317	795.6	40.2	2194.1	67.7	7.874	39.8	2195.7	66.5	14.496	7.839	0.676	13.7	-9.2
315	993	5.40	34.696	2375	2319	737.4	38.0	2194.5	71.5	7.904	37.5	2196.3	70.2	13.642	7.865	0.714	16.6	-6.6
316	1092	5.01	34.701	2380	2327	744.0	38.8	2203.1	70.0	7.900	38.3	2205.1	68.5	13.909	7.857	0.697	14.1	-9.4
317	1191	4.65	34.696	2384	2327	713.6	37.7	2202.3	72.0	7.916	37.2	2204.5	70.3	13.529	7.869	0.715	15.0	-8.8
318	1292	4.31	34.707	2387	2333	721.8	38.6	2208.8	70.6	7.910	38.1	2211.1	68.8	13.839	7.859	0.700	12.5	-11.5
319	1393	4.13	34.728	2390	2339	735.2	39.6	2215.1	69.2	7.902	39.0	2217.7	67.3	14.225	7.847	0.686	10.2	-14.2
320	1489	3.83	34.741	2393	2329	659.0	35.9	2202.8	75.3	7.946	35.3	2205.6	73.2	12.980	7.897	0.745	15.1	-9.5
321	1637	3.24	34.738	2397	2332	641.3	35.7	2205.5	75.8	7.955	35.0	2208.6	73.5	12.887	7.890	0.748	13.9	-11.1
322	1736	2.96	34.748	2399	2333	630.2	35.4	2206.3	76.3	7.961	34.7	2209.7	73.7	12.884	7.890	0.751	12.7	-12.8
323	1934	2.70	34.740	2402	2333	611.3	34.7	2205.5	77.8	7.973	33.9	2209.2	75.0	12.715	7.896	0.763	12.5	-13.5
324	2081	2.42	34.735	2402	2328	582.8	33.5	2199.3	80.2	7.991	32.6	2203.3	77.1	12.354	7.908	0.785	13.1	-13.3
101	2087	2.41	34.739	2404	2327	570.9	32.8	2197.4	81.8	7.999	31.9	2201.5	78.6	12.127	7.916	0.801	10.1	-11.9
102	2336	2.13	34.738	2403	2332	590.0	34.2	2203.9	78.8	7.985	33.2	2208.4	75.3	12.845	7.891	0.767	8.7	-18.6
103	2585	1.94	34.735	2405	2329	564.8	33.0	2199.7	81.3	8.002	31.9	2204.7	77.3	12.634	7.898	0.787	8.0	-20.1
104	2833	1.76	34.734	2406	2328	554.1	32.6	2198.0	82.4	8.009	31.4	2203.6	78.0	12.718	7.896	0.794	5.9	-23.1
105	3081	1.63	34.726	2409	2325	528.8	31.3	2193.2	85.5	8.027	30.0	2199.3	80.6	12.461	7.904	0.821	5.6	-24.3
106	3328	1.49	34.723	2407	2326	536.2	31.9	2195.3	83.8	8.021	30.5	2201.8	78.6	12.947	7.888	0.800	0.5	-30.2
107	3580	1.33	34.718	2403	2321	528.0	31.6	2190.1	84.3	8.026	30.2	2197.2	78.6	13.112	7.882	0.800	-2.7	-34.4
108	3828	1.24	34.716	2403	2310	485.9	29.2	2175.9	89.9	8.059	27.7	2183.7	83.6	12.426	7.906	0.851	-1.1	-33.6
109	4078	1.18	34.716	2401	2306	477.9	28.8	2171.3	90.9	8.065	27.2	2179.6	84.2	12.540	7.902	0.857	-3.9	-37.4
110	4328	1.15	34.714	2396	2307	496.9	29.9	2174.4	87.7	8.048	28.3	2183.0	80.7	13.344	7.875	0.821	-10.9	-45.4
111	4576	1.16	34.714	2395	2300	476.1	28.7	2165.5	90.8	8.065	27.0	2174.8	83.3	13.122	7.882	0.847	-15.0	-47.5
112	4823	1.18	34.714	2394	2297	469.3	28.2	2161.9	91.8	8.071	26.5	2171.7	83.8	13.249	7.878	0.853	-15.3	-51.8
116	5073	1.21	34.714	2394	2303	489.9	29.4	2169.9	88.7	8.054	27.6	2180.0	80.4	14.114	7.850	0.818	-22.6	-60.2
115	5075	1.21	34.714	2398	2307	491.1	29.5	2173.7	88.8	8								

STATION: 442 LEG: VI POSITION: 1° 12' S 90° 45' E DATE: 22 MAR 78

MEASURED PARAMETERS					CALCULATED PARAMETERS P = 1 ATM. T = INSITU					CALCULATED PARAMETERS P. T = INSITU					DELTA CO <sub>2</sub> <sup>*</sup> (CALC)	DELTA CO <sub>2</sub> <sup>*</sup> (ARAG)		
SAMPLE NO.	DEPTH M	TEMP DEG C	SALINITY ‰	TITRATOR ALK μEQ/KG	TCO <sub>2</sub> μM/KG	PCO <sub>2</sub> μATM	H <sub>2</sub> CO <sub>3</sub> μM/KG	HCO <sub>3</sub> <sup>-</sup> μM/KG	CO <sub>3</sub> <sup>=</sup> μM/KG	PH	H <sub>2</sub> CO <sub>3</sub> μM/KG	HCO <sub>3</sub> <sup>-</sup> μM/KG	CO <sub>3</sub> <sup>=</sup> μM/KG	AH (10°)	PH	ICP 10 <sup>4</sup> (M/KG)	DELTA CO <sub>2</sub> <sup>*</sup> (CALC) μM/KG	DELTA CO <sub>2</sub> <sup>*</sup> (ARAG) μM/KG
106	2785	1.82	34.740	2412	2338	* 573.2	33.7	2208.9	80.5	7.997	* 32.5	2214.3	76.2	13.032	7.885	0.776	4.6	-24.2
107	2984	1.70	34.737	2416	2328	* 516.8	30.5	2194.9	87.6	8.038	* 29.3	2200.9	82.8	12.042	7.919	0.844	8.9	-20.5
108	3229	1.61	34.730	2418	2333	* 527.3	31.2	2200.6	86.2	8.030	* 29.9	2207.0	81.1	12.557	7.901	0.826	4.2	-26.1
109	3478	1.42	34.725	2413	2326	* 514.1	30.7	2193.3	87.1	8.039	* 29.3	2200.2	81.5	12.603	7.900	0.830	1.5	-29.8
110	3726	1.18	34.721	2404	2314	* 496.3	29.9	2180.7	88.4	8.050	* 28.4	2188.2	82.4	12.559	7.901	0.838	-1.0	-33.2
111	3977	1.15	34.718	2401	2304	* 470.7	28.4	2168.7	92.0	8.071	* 26.9	2176.8	85.4	12.253	7.912	0.869	-1.4	-34.5
112	4222	1.15	34.718	2401	2300	* 458.1	27.6	2163.3	94.1	8.081	* 26.0	2172.0	87.0	12.219	7.913	0.885	-3.1	-37.2
115	4455	1.16	34.718	2399	2301	* 467.3	28.1	2165.4	92.5	8.073	* 26.5	2174.5	85.0	12.730	7.895	0.866	-8.5	-43.5
116	4455	1.16	34.718	2396	2301	* 476.4	28.7	2166.5	90.8	8.065	* 27.0	2175.5	83.5	12.977	7.887	0.850	-10.0	-45.0
117	4482	1.17	34.717	2397	2303	* 480.3	28.9	2168.7	90.4	8.062	* 27.2	2177.8	83.0	13.104	7.883	0.845	-10.9	-46.0
119	4506	1.17	34.718	2397	2303	* 479.9	28.9	2168.8	90.3	8.062	* 27.2	2177.9	82.9	13.124	7.882	0.844	-11.4	-46.6
121	4556	1.17	34.718	2395	2302	* 483.2	29.1	2168.1	89.8	8.059	* 27.4	2177.3	82.3	13.280	7.877	0.838	-12.7	-48.1
124	4604	1.18	34.717	2394	2306	* 500.7	30.1	2173.7	87.2	8.045	* 28.4	2182.8	79.8	13.799	7.860	0.812	-15.9	-51.5

STATION: 443 LEG: VI POSITION: 0° 2' N 90° 29' E DATE: 23 MAR 78

MEASURED PARAMETERS					CALCULATED PARAMETERS P = 1 ATM. T = INSITU					CALCULATED PARAMETERS P. T = INSITU					DELTA CO <sub>2</sub> <sup>*</sup> (CALC)	DELTA CO <sub>2</sub> <sup>*</sup> (ARAG)			
SAMPLE NO.	DEPTH M	TEMP DEG C	SALINITY ‰	TITRATOR ALK μEQ/KG	TCO <sub>2</sub> μM/KG	GC TCO <sub>2</sub> μM/KG	PCO <sub>2</sub> μATM	H <sub>2</sub> CO <sub>3</sub> μM/KG	HCO <sub>3</sub> <sup>-</sup> μM/KG	CO <sub>3</sub> <sup>=</sup> μM/KG	PH	H <sub>2</sub> CO <sub>3</sub> μM/KG	HCO <sub>3</sub> <sup>-</sup> μM/KG	CO <sub>3</sub> <sup>=</sup> μM/KG	AH (10°)	PH	ICP 10 <sup>4</sup> (M/KG)	DELTA CO <sub>2</sub> <sup>*</sup> (CALC) μM/KG	DELTA CO <sub>2</sub> <sup>*</sup> (ARAG) μM/KG
115	798	8.15	34.991	2349	2302	* 872.7	40.8	2178.8	67.4	7.843	* 40.4	2180.2	66.4	15.428	7.812	0.681	14.6	-7.9	
124	3737	1.17	34.719	2402	2319	* 521.4	31.4	2187.8	84.8	8.030	* 29.9	2195.2	78.9	13.181	7.880	0.803	-4.6	-36.8	

STATION: 444 LEG: VI POSITION: 0° 36' N 88° 36' E DATE: 24 MAR 78

MEASURED PARAMETERS					CALCULATED PARAMETERS P = 1 ATM. T = INSITU					CALCULATED PARAMETERS P. T = INSITU					DELTA CO <sub>2</sub> <sup>*</sup> (CALC)	DELTA CO <sub>2</sub> <sup>*</sup> (ARAG)		
SAMPLE NO.	DEPTH M	TEMP DEG C	SALINITY ‰	TITRATOR ALK μEQ/KG	TCO <sub>2</sub> μM/KG	PCO <sub>2</sub> μATM	H <sub>2</sub> CO <sub>3</sub> μM/KG	HCO <sub>3</sub> <sup>-</sup> μM/KG	CO <sub>3</sub> <sup>=</sup> μM/KG	PH	H <sub>2</sub> CO <sub>3</sub> μM/KG	HCO <sub>3</sub> <sup>-</sup> μM/KG	CO <sub>3</sub> <sup>=</sup> μM/KG	AH (10°)	PH	ICP 10 <sup>4</sup> (M/KG)	DELTA CO <sub>2</sub> <sup>*</sup> (CALC) μM/KG	DELTA CO <sub>2</sub> <sup>*</sup> (ARAG) μM/KG
201	2286	2.19	34.753	2411	2328	* 544.7	31.5	2196.4	85.0	8.018	* 30.6	2201.0	81.5	11.819	7.927	0.830	15.4	-11.8
202	2436	2.06	34.747	2412	2337	* 574.7	33.4	2207.5	81.0	7.996	* 32.4	2212.3	77.3	12.614	7.899	0.787	9.6	-18.0
203	2586	1.94	34.745	2412	2334	* 559.3	32.7	2203.8	82.5	8.007	* 31.6	2208.9	78.5	12.486	7.904	0.799	9.1	-19.0
204	2736	1.81	34.736	2414	2333	* 545.3	32.0	2201.9	84.0	8.017	* 30.9	2207.3	79.8	12.370	7.908	0.812	8.7	-19.9
205	2886	1.75	34.734	2416	2329	* 521.9	30.7	2196.1	87.2	8.034	* 29.6	2201.8	82.6	12.040	7.919	0.841	9.8	-19.3
206	3036	1.65	34.732	2418	2332	* 524.4	31.0	2199.3	86.7	8.032	* 29.8	2205.3	81.9	12.265	7.911	0.834	7.3	-22.3
207	3235	1.54	34.729	2417	2335	* 536.4	31.8	2203.6	84.6	8.023	* 30.5	2210.0	79.5	12.781	7.893	0.809	2.5	-27.8
208	3335	1.50	34.726	2419	2329	* 506.8	30.1	2195.1	88.8	8.046	* 28.8	2201.8	83.4	12.229	7.913	0.849	5.2	-25.5
209	3535	1.39	34.724	2419	2324	* 487.5	29.1	2188.5	91.4	8.061	* 27.7	2195.7	85.6	12.030	7.920	0.871	4.9	-26.6
210	3735	1.36	34.721	2422	2321	* 467.7	27.9	2183.4	94.7	8.077	* 26.5	2191.1	88.4	11.779	7.929	0.899	5.0	-27.2
211	3935	1.37	34.720	2419	2327	* 496.6	29.7	2192.6	89.8	8.053	* 28.1	2200.5	83.3	12.703	7.896	0.848	-2.7	-35.6
212	4134	1.39	34.719	2424	2324	* 513.1	30.6	2202.6	87.8	8.041	* 28.9	2211.1	80.9	13.493	7.870	0.824	-9.9	-44.2
215	4281	1.40	34.720	2424	2336	* 499.0	29.8	2196.3	89.9	8.052	* 28.1	2205.0	82.9	13.151	7.881	0.844	-7.9	-42.2
216	4282	1.41	34.720	2423	2331	* 482.2	28.8	2189.6	92.6	8.066	* 27.1	2198.4	85.4	12.761	7.894	0.870	-5.7	-40.1
217	4305	1.41	34.719	2423	2326	* 495.2	29.5	2194.1	90.4	8.055	* 27.8	2203.0	83.2	13.209	7.879	0.847	-9.4	-44.1
221	4404	1.41	34.718	2422	2329	* 499.2	29.8	2197.3	89.9	8.052	* 28.1	2206.3	82.7	13.326	7.875	0.841	-10.3	-45.1
222	4428	1.42	34.718	2424	2332	* 459.2	27.4	2179.3	96.3	8.085	* 25.8	2188.5	88.7	12.363	7.908	0.903	-4.6	-39.5
224	4453	1.42	34.717	2422	2318													

STATION: 445 LEG: VI POSITION: 8° 31' N 86° 3' E DATE: 26 MAR 78

MEASURED PARAMETERS					CALCULATED PARAMETERS P = 1 ATM. T = INSITU					CALCULATED PARAMETERS P. T = INSITU					DELTA CO <sub>2</sub> <sup>*</sup> (CALC)	DELTA CO <sub>2</sub> <sup>*</sup> (ARAG)		
SAMPLE NO.	DEPTH M	TEMP DEG C	SALINITY ‰	TITRATOR ALK μEQ/KG	TCO <sub>2</sub> μM/KG	PCO <sub>2</sub> μATM	H <sub>2</sub> CO <sub>3</sub> μM/KG	HCO <sub>3</sub> <sup>-</sup> μM/KG	CO <sub>3</sub> <sup>=</sup> μM/KG	PH	H <sub>2</sub> CO <sub>3</sub> μM/KG	HCO <sub>3</sub> <sup>-</sup> μM/KG	CO <sub>3</sub> <sup>=</sup> μM/KG	AH (10°)	PH	ICP 10 <sup>4</sup> (M/KG)	DELTA CO <sub>2</sub> <sup>*</sup> (CALC) μM/KG	DELTA CO <sub>2</sub> <sup>*</sup> (ARAG) μM/KG
301	19	29.08	34.225	2252	1909	* 333.9	8.6	1632.8	252.6	8.264	* 8.6	1632.9	252.5	5.447	8.264	2.534	207.4	187.0
302	59	25.72	34.285	2256	1999	* 445.6	12.5	1776.3	195.3	8.154	* 12.5	1776.4	195.1	7.047	8.152	1.961	149.6	129.1
303	90	21.41	34.809	2285	2140	* 724.7	22.6	1978.3	124.1	7.961	* 22.6	1978.4	124.0	11.020	7.958	1.265	78.0	57.4
304	125	17.72	34.867	2295	2198	* 859.4	29.7	2058.0	95.3	7.881	* 29.7	2058.2	95.1	13.283	7.877	0.972	48.8	28.0
305	140	16.58	34.877	2297	2205	* 851.7	30.5	2067.4	92.2	7.880	* 30.4	2067.6	92.0	13.330	7.875	0.940	45.5	24.7
306	160	15.34	34.924	2303	2227	* 912.6	33.8	2094.7	83.4	7.848	* 33.8	2095.0	83.2	14.371	7.843	0.852	36.5	15.6
307	180	14.09	34.951	2310	2250	* 980.5	37.8	2122.2	75.0	7.815	* 37.7	2122.5	74.8	15.536	7.809	0.766	27.9	7.0
308	200	13.34	34.986	2312	2251	* 946.6	37.3	2123.4	75.3	7.826	* 37.2	2123.8	75.0	15.177	7.819	0.769	27.9	6.9
309	240	12.21	35.016	2322	2266	* 944.4	38.6	2139.9	72.5	7.824	* 38.5	2140.3	72.2	15.314	7.815	0.741	24.8	3.7
310	280	11.55	35.048	2321	2272	* 971.0	40.5	2147.5	69.0	7.810	* 40.4	2148.0	68.6	15.888	7.799	0.705	20.9	-0.3
311	321	11.02	35.035	2326	2274	* 931.2	39.5	2149.2	70.3	7.825	* 39.4	2149.8	69.9	15.390	7.813	0.717	21.8	0.5
312	381	10.56	35.034	2328	2283	* 966.2	41.6	2159.4	67.0	7.808	* 41.4	2160.1	66.5	16.079	7.794	0.683	18.0	-3.4
313	445	10.03	35.024	2336	2291	* 949.6	41.6	2167.4	66.9	7.814	* 41.4	2168.2	66.4	15.947	7.797	0.681	17.4	-4.2
314	545	9.39	35.011	2339	2295	* 934.3	41.8	2171.9	66.3	7.819	* 41.6	2172.8	65.6	15.933	7.798	0.673	15.9	-6.0
316	745	7.98	34.978	2355	2317	* 933.4	43.8	2194.6	63.6	7.816	* 43.5	2195.9	62.6	16.345	7.787	0.642	11.3	-11.1

STATION: 445 LEG: VI POSITION: 8° 31' N 86° 3' E DATE: 26 MAR 78

MEASURED PARAMETERS					CALCULATED PARAMETERS P = 1 ATM. T = INSITU					CALCULATED PARAMETERS P. T = INSITU					DELTA CO <sub>2</sub> <sup>*</sup> (CALC)	DELTA CO <sub>2</sub> <sup>*</sup> (ARAG)		
SAMPLE NO.	DEPTH M	TEMP DEG C	SALINITY ‰	TITRATOR ALK μEQ/KG	TCO <sub>2</sub> μM/KG	PCO <sub>2</sub> μATM	H <sub>2</sub> CO <sub>3</sub> μM/KG	HCO <sub>3</sub> <sup>-</sup> μM/KG	CO <sub>3</sub> <sup>=</sup> μM/KG	PH	H <sub>2</sub> CO <sub>3</sub> μM/KG	HCO <sub>3</sub> <sup>-</sup> μM/KG	CO <sub>3</sub> <sup>=</sup> μM/KG	AH (10°)	PH	ICP 10 <sup>4</sup> (M/KG)	DELTA CO <sub>2</sub> <sup>*</sup> (CALC) μM/KG	DELTA CO <sub>2</sub> <sup>*</sup> (ARAG) μM/KG
317	844	7.41	34.961	2362	2328	* 943.6	45.2	2206.0	61.8	7.810	* 44.8	2207.5	60.7	16.716	7.777	0.622	8.6	-14.1
318	943	6.86	34.940	2368	2327	* 877.5	42.8	2204.3	64.8	7.838	* 42.4	2206.0	63.6	15.808	7.801	0.652	10.6	-12.3
319	1041	6.41	34.927	2372	2337	* 904.4	44.9	2215.0										

STATION: 447 LEG: VII POSITION: 4° 60' N 79° 57' E DATE: 5 APR 78

MEASURED PARAMETERS				CALCULATED PARAMETERS P = 1 ATM. T = INSITU					CALCULATED PARAMETERS P. T = INSITU					DELTA CO <sub>2</sub> (CALC)		DELTA CO <sub>2</sub> (ARAG)		
SAMPLE NO.	DEPTH M	TEMP DEG C	SALINITY ‰	TITRATOR ALK μEQ/KG	TCO <sub>2</sub> μM/KG	PCO <sub>2</sub> μATM	H <sub>2</sub> CO <sub>3</sub> μM/KG	HCO <sub>3</sub> <sup>-</sup> μM/KG	CO <sub>3</sub> <sup>=</sup> μM/KG	PH	H <sub>2</sub> CO <sub>3</sub> μM/KG	HCO <sub>3</sub> <sup>-</sup> μM/KG	CO <sub>3</sub> <sup>=</sup> μM/KG	AH (10 <sup>3</sup> )	PH	ICP 10 <sup>4</sup> (M/KG) <sup>2</sup>	DELTA CO <sub>2</sub> (CALC) μM/KG	DELTA CO <sub>2</sub> (ARAG) μM/KG
301	2	29.99	33.917	2241	1903	* 346.9	8.8	1629.7	249.6	8.254	* 8.8	1629.7	249.6	5.575	8.254	2.481	204.5	184.3
302	2	29.99	33.913	2237	1900	* 347.2	8.8	1627.5	248.8	8.253	* 8.8	1627.5	248.7	5.587	8.253	2.473	203.7	183.5
303	5	29.43	34.297	2255	1914	* 343.2	8.8	1639.0	251.3	8.256	* 8.8	1639.0	251.2	5.545	8.256	2.526	206.2	185.9
304	46	28.50	35.200	2306	1966	* 359.0	9.3	1690.8	250.8	8.242	* 9.3	1690.9	250.7	5.750	8.240	2.587	205.4	185.0
305	85	21.83	34.819	2286	2115	* 631.1	19.5	1940.7	139.9	8.015	* 19.5	1940.8	139.7	9.720	8.012	1.426	93.8	73.2
306	123	17.08	34.850	2297	2198	* 826.7	29.1	2057.8	96.1	7.894	* 29.1	2058.0	95.9	12.888	7.890	0.980	49.6	28.8
307	148	14.42	34.975	2310	2234	* 883.7	33.7	2102.2	83.1	7.858	* 33.6	2102.4	82.9	14.035	7.853	0.850	36.3	15.4
308	198	12.82	35.082	2315	2282	* 915.1	36.7	2124.3	76.0	7.837	* 36.6	2124.7	75.7	14.791	7.830	0.779	28.6	7.6
309	247	11.97	35.108	2320	2251	* 849.1	34.9	2122.5	78.6	7.865	* 34.8	2122.9	78.3	13.941	7.856	0.805	30.8	9.7
310	297	11.60	35.097	2318	2246	* 817.1	34.0	2117.1	79.9	7.878	* 33.9	2117.6	79.5	13.974	7.867	0.818	31.7	10.4
311	328	11.28	35.081	2327	2251	* 786.4	33.1	2121.0	81.9	7.894	* 33.0	2121.6	81.5	13.130	7.882	0.838	33.4	12.1
312	359	10.91	35.073	2321	2247	* 783.6	33.4	2118.0	80.6	7.893	* 33.2	2118.7	80.1	13.203	7.879	0.824	31.8	10.4
313	427	10.57	35.054	2317	2243	* 771.0	33.2	2114.4	80.4	7.897	* 33.0	2115.2	79.8	13.149	7.881	0.820	31.0	9.5
314	499	10.12	35.059	2328	2262	* 809.2	35.4	2135.1	76.6	7.878	* 35.1	2136.0	75.9	13.839	7.859	0.780	26.6	4.8
315	599	9.48	35.038	2334	2293	* 957.3	42.7	2170.4	64.0	7.808	* 42.5	2171.4	64.1	16.399	7.785	0.658	14.0	-8.0
316	696	8.78	35.019	2344	2305	* 950.4	43.4	2182.6	64.0	7.810	* 43.1	2183.8	63.1	16.485	7.783	0.648	12.2	-10.1
317	796	8.06	34.983	2351	2311	* 919.1	43.0	2188.7	64.3	7.822	* 42.7	2190.0	63.3	16.195	7.791	0.649	11.6	-11.0
318	897	7.56	34.968	2361	2321	* 906.7	43.2	2198.3	64.5	7.827	* 42.8	2199.9	63.3	16.159	7.792	0.649	10.8	-12.0
319	996	6.93	34.949	2367	2329	* 899.8	43.8	2206.7	63.5	7.828	* 43.4	2208.4	62.2	16.259	7.789	0.638	8.8	-14.3
320	1094	6.32	34.927	2374	2331	* 847.6	42.2	2208.1	65.7	7.851	* 41.7	2210.1	64.3	15.565	7.808	0.658	10.0	-13.4
321	1193	5.85	34.913	2371	2338	* 899.0	45.5	2216.3	61.2	7.824	* 44.9	2218.3	59.7	16.714	7.777	0.611	4.6	-19.1
323	1342	5.17	34.880	2385	2340	* 801.6	41.6	2216.9	66.5	7.871	* 40.9	2219.3	64.8	15.229	7.817	0.662	8.2	-15.9
322	1342	5.17	34.884	2387	2341	* 796.2	41.3	2217.7	67.0	7.874	* 40.7	2220.1	65.3	15.120	7.820	0.667	8.7	-15.4
101	1387	5.12	34.877	2392	2322	* 665.6	34.6	2193.9	78.6	7.947	* 34.0	2196.5	76.5	12.816	7.892	0.783	19.6	-4.6
324	1498	4.47	34.855	2393	2345	* 765.1	40.7	2221.4	67.9	7.888	* 40.0	2224.1	65.9	14.852	7.828	0.674	7.9	-16.7
102	1539	4.51	34.857	2393	2345	* 766.2	40.7	2221.4	67.9	7.887	* 40.0	2224.2	65.9	14.919	7.826	0.673	7.5	-17.2
103	1686	3.83	34.827	2401	2349	* 726.2	39.5	2224.6	69.8	7.908	* 38.8	2227.7	67.5	14.440	7.840	0.689	7.7	-17.5
104	1838	3.10	34.800	2411	2342	* 625.0	35.0	2213.9	78.1	7.967	* 34.2	2217.5	75.4	12.770	7.894	0.769	14.0	-11.7
106	2184	2.39	34.765	2418	2346	* 597.2	34.3	2217.0	79.7	7.983	* 33.4	2221.2	76.4	12.697	7.896	0.779	11.4	-15.4
107	2384	2.15	34.756	2428	2335	* 511.6	29.7	2199.7	90.6	8.046	* 28.7	2204.6	86.7	11.180	7.952	0.884	19.6	-7.8
108	2579	1.96	34.745	2425	2342	* 544.1	31.8	2209.9	85.4	8.020	* 30.7	2215.0	81.3	12.095	7.917	0.828	12.0	-16.1
109	2781	1.80	34.738	2427	2343	* 537.6	31.6	2210.5	85.9	8.025	* 30.4	2216.1	81.5	12.194	7.914	0.830	9.9	-18.9
110	2969	1.69	34.733	2424	2341	* 537.9	31.7	2209.0	85.3	8.023	* 30.5	2214.9	80.6	12.447	7.905	0.820	6.8	-22.6
111	3176	1.61	34.730	2434	2350	* 535.7	31.7	2217.2	86.0	8.026	* 30.4	2223.6	81.0	12.600	7.900	0.825	4.8	-25.4
112	3376	1.53	34.727	2435	2353	* 541.7	32.2	2220.8	85.0	8.022	* 30.8	2227.6	79.7	12.977	7.887	0.811	1.0	-29.9
114	3634	1.46	34.725	2439	2340	* 480.9	28.6	2202.3	94.0	8.070	* 27.2	2209.8	87.9	11.880	7.925	0.895	5.9	-25.9
116	3952	1.39	34.720	2433	2339	* 495.0	29.5	2203.2	91.2	8.057	* 28.0	2211.3	84.7	12.608	7.899	0.862	-1.5	-34.5
117	3999	1.39	34.721	2429	2333	* 486.5	29.0	2196.8	92.2	8.063	* 27.5	2205.0	85.5	12.482	7.904	0.870	-1.4	-34.5
118	4000	1.39	34.720	2429	2338	* 504.1	30.1	2203.3	89.6	8.049	* 28.5	2211.4	83.0	12.905	7.889	0.845	-3.9	-37.0
119	4073	1.39	34.720	2430	2339	* 503.9	30.1	2204.4	89.5	8.049	* 28.5	2212.7	82.9	12.980	7.887	0.843	-5.0	-38.5
120	4113	1.39	34.722	2433	2335	* 481.1	28.7	2198.0	93.3	8.068	* 27.1	2206.4	86.4	12.462	7.904	0.880	-2.0	-35.6
121	4153	1.39	34.720	2432	2334	* 480.8	28.7	2197.0	93.3	8.068	* 27.1	2205.6	86.3	12.504	7.903	0.879	-2.7	-36.4
122	4172	1.40	34.719	2430	2335	* 490.8	29.3	2199.0	91.7	8.060	* 27.7	2207.5	84.8	12.780	7.893	0.863	-4.5	-38.3
123	4187	1.40	34.721	2430	2335	* 491.0	29.3	2199.0	91.7	8.060	* 27.7	2207.5	84.8	12.803	7.893	0.863	-4.7	-38.6

STATION: 448 LEG: VII POSITION: 0° 1' N 80° 3' E DATE: 6 APR 78

MEASURED PARAMETERS				CALCULATED PARAMETERS P = 1 ATM. T = INSITU					CALCULATED PARAMETERS P. T = INSITU					DELTA CO <sub>2</sub> (CALC)		DELTA CO <sub>2</sub> (ARAG)		
SAMPLE NO.	DEPTH M	TEMP DEG C	SALINITY ‰	TITRATOR ALK μEQ/KG	TCO <sub>2</sub> μM/KG	PCO <sub>2</sub> μATM	H <sub>2</sub> CO <sub>3</sub> μM/KG	HCO <sub>3</sub> <sup>-</sup> μM/KG	CO <sub>3</sub> <sup>=</sup> μM/KG	PH	H <sub>2</sub> CO <sub>3</sub> μM/KG	HCO <sub>3</sub> <sup>-</sup> μM/KG	CO <sub>3</sub> <sup>=</sup> μM/KG	AH (10 <sup>3</sup> )	PH	ICP 10 <sup>4</sup> (M/KG) <sup>2</sup>	DELTA CO <sub>2</sub> (CALC) μM/KG	DELTA CO <sub>2</sub> (ARAG) μM/KG
301	1	29.84	34.328	2252	1904	* 336.7	8.5	1624.7	255.7	8.263	* 8.5	1624.7	255.7	5.453	8.263	2.574	210.7	190.4
302	1	29.84	34.328	2250	1901	* 334.5	8.5	1621.2	256.3	8.265	* 8.5	1621.2	256.3	5.429	8.265	2.579	211.3	191.0
303	22	29.62	34.343	2253	1905	* 334.5	8.5	1625.7	255.8	8.265	* 8.5	1625.8	255.7	5.441	8.264	2.574	210.5	190.2
304	75	23.61	35.320	2310	2062	* 461.3	13.5	1844.5	189.0	8.139	* 13.5	1844.7	188.8	7.299	8.137	1.955	143.1	122.6
305	125	20.30	35.280	2311	2120	* 544.8	17.5	1935.9	151.6	8.067	* 17.5	1936.2	151.3	8.648	8.063	1.565	105.2	84.5
306	166	15.90	35.166	2311	2181	* 651.8	23.7	2029.3	113.0	7.983	* 23.7	2029.6	112.7	10.531	7.978	1.162	66.0	45.2
307	218	13.88	35.145	2316	2202	* 667.7	25.9	2058.1	103.1	7.967	* 25.8	2058.5	102.7	10.984	7.959	1.058	55.6	34.6
308	298	11.68	35.066	2315	2213	* 659.2	27.4	2075.2	95.4	7.964	* 27.3	2075.8	94.9	11.155	7.953	0.976	47.1	25.9
309	371	10.89	35.026	2322	2230	* 687.6	29.3	2095.7	90.0	7.945	* 29.2	2096.4	89.4	11.717	7.931	0.918	41.0	19.6
310	425	10.49	34.997	2322	2222	* 638.4	27.6	2085.4	94.0	7.973	* 27.4	2086.2	93.3	11.041	7.957	0.958	44.6	23.0
311	518	9.52	34.963	2321	2247	* 738.9	33.0	2119.0	80.1	7.911	* 32.7	2119.9	79.4	12.850	7.891	0.813	29.8	8.0
312	599	8.47	34.965	2332	2265	* 763.7	34.8	2138.5	76.7	7.897	* 34.6	2139.6	75.9	13.373	7.874	0.777	25.7	3.6
313	687	8.46	35.000	2343	2296	* 881.4	40.7	2172.9	67.4	7.839	* 40.4	2174.1	66.5	15.406	7.812	0.683	15.7	-6.6
314	747	8.35	34.996	2345	2290	* 826.2	39.3	2165.6	71.1	7.865	* 38.0	2166.9	70.1	14.522	7.815	0.684	14.8	-7.8
315	827	7.06	34.986	2347	2299	* 862.3	40.4	2175.8	67.8	7.847	* 40.0	2177.2	66.7	15.322	7.815	0.684	14.6	-8.3
316	902	6.59	34.985	2358	2309	* 844.5	40.2	2185.5	68.3	7.855	*							

STATION: 450 LEG: VII POSITION: 10° 1' S 79° 59' E DATE: 10 APR 78

MEASURED PARAMETERS				CALCULATED PARAMETERS P = 1 ATM. T = INSITU					CALCULATED PARAMETERS P. T = INSITU					DELTA	DELTA			
SAMPLE NO.	DEPTH M	TEMP DEG C	SALINITY ‰	TITRATOR ALK μEQ/KG	TCO <sub>2</sub> μM/KG	PCO <sub>2</sub> μATM	H <sub>2</sub> CO <sub>3</sub> μM/KG	HCO <sub>3</sub> <sup>-</sup> μM/KG	CO <sub>3</sub> <sup>=</sup> μM/KG	PH	H <sub>2</sub> CO <sub>3</sub> μM/KG	HCO <sub>3</sub> <sup>-</sup> μM/KG	CO <sub>3</sub> <sup>=</sup> μM/KG	AH (10 <sup>-3</sup> )	PH	ICP 10 <sup>3</sup> (M/KG)	DELTA CO <sub>2</sub> (CALC) μM/KG	DELTA CO <sub>2</sub> (ARAG) μM/KG
301	1	28.23	34.231	2248	1908	* 326.2	8.6	1634.2	250.2	8.269	* 8.6	1634.2	250.2	5.377	8.269	2.510	205.1	184.8
302	1	28.23	34.232	2248	1907	* 324.7	8.6	1632.6	250.8	8.271	* 8.5	1632.6	250.8	5.358	8.271	2.517	205.7	185.4
303	19	28.20	34.602	2271	1931	* 337.1	8.9	1656.7	250.4	8.260	* 8.9	1656.7	250.4	5.505	8.259	2.540	205.2	184.8
304	63	24.20	34.922	2297	2035	* 431.1	12.5	1809.1	198.4	8.165	* 12.5	1809.3	198.3	6.873	8.163	2.030	152.6	132.1
305	105	19.40	34.757	2287	2110	* 550.2	18.2	1934.6	142.3	8.058	* 18.1	1934.8	142.1	8.813	8.055	1.448	96.0	75.3
306	134	17.44	34.938	2300	2146	* 589.4	20.5	1982.9	127.5	8.027	* 20.5	1983.2	127.3	9.499	8.022	1.304	80.9	60.1
307	166	14.32	34.673	2300	2171	* 601.8	23.1	2021.4	111.6	8.008	* 23.0	2021.7	111.3	9.948	8.002	1.131	64.5	43.6
308	246	11.51	34.737	2315	2209	* 631.7	26.4	2069.9	97.6	7.981	* 26.3	2070.4	97.2	10.673	7.972	0.990	49.8	28.6
309	318	10.27	34.782	2316	2219	* 640.5	27.9	2083.8	92.3	7.970	* 27.8	2084.4	91.8	11.004	7.958	0.936	43.7	22.4
310	405	9.13	34.738	2314	2215	* 601.3	27.2	2080.0	92.8	7.991	* 27.1	2080.8	92.2	10.585	7.975	0.939	43.4	21.8
312	575	7.51	34.705	2338	2271	* 721.7	34.5	2145.1	76.4	7.915	* 34.3	2146.1	75.6	12.785	7.893	0.769	25.5	3.5
313	685	6.88	34.728	2348	2296	* 794.2	38.8	2172.9	69.3	7.876	* 38.5	2174.1	68.4	14.153	7.849	0.697	17.4	-4.9
314	775	6.41	34.739	2357	2309	* 808.1	40.1	2186.3	67.6	7.868	* 39.8	2187.7	66.6	14.523	7.838	0.678	14.8	-7.8
315	875	5.63	34.693	2368	2312	* 740.0	37.8	2187.9	71.3	7.903	* 37.4	2189.5	70.1	13.544	7.868	0.713	17.5	-5.4
316	986	5.14	34.690	2375	2321	* 740.2	38.5	2197.1	70.5	7.902	* 38.0	2198.9	69.1	13.719	7.863	0.703	15.5	-7.6
317	1104	4.78	34.720	2380	2323	* 715.2	37.6	2198.5	71.8	7.915	* 37.2	2200.5	70.3	13.455	7.871	0.716	15.7	-7.8
318	1162	4.68	34.743	2381	2327	* 731.0	38.6	2202.8	70.5	7.905	* 38.1	2205.0	69.0	13.820	7.859	0.702	13.9	-9.8
319	1262	4.39	34.755	2385	2329	* 713.1	38.1	2204.5	71.5	7.915	* 37.5	2206.8	69.7	13.648	7.865	0.710	13.7	-10.2
320	1360	4.07	34.754	2389	2330	* 689.4	37.2	2204.9	72.8	7.928	* 36.6	2207.5	70.9	13.366	7.874	0.723	14.1	-10.2
322	1598	3.31	34.757	2395	2322	* 605.6	33.6	2193.6	79.7	7.978	* 32.9	2196.7	77.3	12.176	7.914	0.788	18.2	-6.8
323	1719	2.99	34.752	2395	2324	* 606.5	34.1	2196.3	78.6	7.976	* 33.3	2199.6	76.1	12.371	7.908	0.775	15.8	-9.6
101	1789	2.86	34.748	2396	2327	* 613.1	34.6	2199.7	77.7	7.971	* 33.8	2203.1	75.0	12.588	7.900	0.764	14.0	-11.5
124	1836	2.75	34.754	2397	2328	* 611.2	34.6	2200.6	77.7	7.972	* 33.9	2204.1	75.0	12.619	7.899	0.764	13.5	-12.2
102	1987	2.54	34.745	2399	2323	* 576.1	32.9	2193.9	81.2	7.995	* 32.1	2197.7	78.2	12.126	7.916	0.796	15.2	-11.0
103	2186	2.28	34.744	2400	2329	* 592.1	34.2	2201.1	78.7	7.983	* 33.2	2205.3	75.4	12.703	7.896	0.768	10.4	-16.4
104	2383	2.08	34.738	2404	2314	* 513.1	29.8	2180.7	88.4	8.040	* 28.9	2185.5	84.6	11.325	7.946	0.861	17.4	-10.0
105	2582	1.90	34.734	2401	2318	* 535.2	31.3	2186.9	84.8	8.022	* 30.3	2192.0	80.7	12.036	7.920	0.822	11.4	-16.7
106	2778	1.79	34.730	2403	2316	* 518.3	30.5	2183.7	86.8	8.035	* 29.4	2189.2	82.4	11.899	7.924	0.839	10.9	-17.9
107	2979	1.68	34.727	2404	2312	* 498.7	29.4	2178.1	89.5	8.050	* 28.3	2184.1	84.6	11.704	7.932	0.850	10.8	-18.7
108	3176	1.58	34.723	2410	2321	* 509.4	30.2	2187.7	88.1	8.042	* 28.9	2194.1	83.0	12.142	7.916	0.845	6.8	-23.4
109	3376	1.48	34.720	2415	2326	* 508.1	30.2	2192.7	88.1	8.044	* 28.9	2199.5	82.6	12.327	7.909	0.841	3.9	-26.9
110	3673	1.39	34.717	2421	2326	* 488.1	29.1	2190.4	91.5	8.060	* 27.7	2197.9	85.4	12.187	7.914	0.869	2.9	-29.1
111	3970	1.36	34.716	2412	2318	* 487.9	29.2	2183.1	90.7	8.059	* 27.6	2191.2	84.2	12.573	7.901	0.857	-2.3	-35.4
112	4270	1.36	34.717	2415	2321	* 488.7	29.2	2186.0	90.8	8.059	* 27.6	2194.7	83.7	12.931	7.888	0.852	-6.9	-41.2
114	4577	1.37	34.716	2414	2323	* 499.1	29.8	2189.0	89.2	8.050	* 28.1	2198.2	81.7	13.573	7.867	0.832	-13.4	-48.9
115	4874	1.40	34.716	2412	2316	* 482.1	28.8	2180.4	91.8	8.064	* 26.9	2190.3	83.7	13.512	7.869	0.852	-16.0	-52.6
116	5123	1.43	34.716	2412	2319	* 492.7	29.4	2184.5	90.2	8.055	* 27.4	2194.8	81.8	14.106	7.851	0.832	-21.9	-59.6
118	5193	1.44	34.716	2410	2324	* 517.4	30.8	2191.7	86.5	8.036	* 28.8	2202.0	78.2	14.880	7.827	0.796	-26.6	-64.6
117	5194	1.44	34.715	2412	2321	* 500.2	29.8	2187.0	89.2	8.049	* 27.8	2197.4	80.8	14.403	7.842	0.822	-24.1	-62.0
119	5243	1.45	34.716	2410	2316	* 488.7	29.1	2181.3	90.6	8.058	* 27.2	2191.8	82.0	14.163	7.849	0.835	-23.6	-61.8
120	5274	1.45	34.715	2413	2317	* 483.2	28.8	2181.4	91.8	8.063	* 26.8	2192.1	83.1	14.036	7.853	0.845	-23.1	-61.4
121	5298	1.46	34.716	2409	2321	* 509.8	30.4	2188.2	87.5	8.041	* 28.3	2198.7	79.0	14.823	7.829	0.804	-27.6	-66.0
122	5317	1.46	34.715	2411	2316	* 486.0	28.9	2180.8	91.2	8.061	* 27.0	2191.6	82.4	14.181	7.848	0.839	-24.4	-62.9
123	5333	1.46	34.715	2411	2317	* 489.6	29.1	2182.1	90.7	8.058	* 27.2	2192.9	82.0	14.301	7.845	0.834	-25.2	-63.7
124	5334	1.46	34.716	2415	2320	* 487.1	29.0	2184.7	91.3	8.061	* 27.0	2195.5	82.5	14.209	7.847	0.840	-24.7	-63.2

STATION: 451 LEG: VII POSITION: 14° 59' S 79° 58' E DATE: 13 APR 78

MEASURED PARAMETERS				CALCULATED PARAMETERS P = 1 ATM. T = INSITU					CALCULATED PARAMETERS P. T = INSITU					DELTA	DELTA			
SAMPLE NO.	DEPTH M	TEMP DEG C	SALINITY ‰	TITRATOR ALK μEQ/KG	TCO <sub>2</sub> μM/KG	PCO <sub>2</sub> μATM	H <sub>2</sub> CO <sub>3</sub> μM/KG	HCO <sub>3</sub> <sup>-</sup> μM/KG	CO <sub>3</sub> <sup>=</sup> μM/KG	PH	H <sub>2</sub> CO <sub>3</sub> μM/KG	HCO <sub>3</sub> <sup>-</sup> μM/KG	CO <sub>3</sub> <sup>=</sup> μM/KG	AH (10 <sup>-3</sup> )	PH	ICP 10 <sup>3</sup> (M/KG)	DELTA CO <sub>2</sub> (CALC) μM/KG	DELTA CO <sub>2</sub> (ARAG) μM/KG
301	1	27.82	34.550	2262	1926	* 335.2	8.9	1654.6	247.5	8.260	* 8.9	1654.6	247.5	5.502	8.259	2.507	202.4	182.1
302	1	27.82	34.547	2264	1923	* 328.2	8.7	1648.3	250.9	8.267	* 8.7	1648.3	250.9	5.407	8.267	2.541	205.8	185.5
303	45	27.83	34.548	2263	1924	* 330.6	8.8	1650.8	249.5	8.265	* 8.8	1650.9	249.4	5.456	8.263	2.525	204.0	183.6
304	98	24.03	34.918	2289	1984	* 344.5	10.0	1733.0	226.0	8.243	* 10.0	1733.3	225.7	5.763	8.239	2.311	179.9	159.3
305	141	21.00	35.073	2301	2047	* 395.7	12.5	1828.0	191.5	8.186	* 12.4	1828.3	191.2	6.586	8.181	1.966	145.0	124.3
306	197	17.13	34.893	2300	2124	* 509.6	17.9	1950.5	140.6	8.081	* 17.9	1950.9	140.3	8.426	8.074	1.435	93.4	72.5
307	248	14.45	34.842	2307	2143	* 490.2	18.7	1977.2	132.1	8.188	* 18.6	1977.7	131.7	8.333	8.079	1.345	84.3	63.3
308	278	15.40	35.393	2326	2117	* 406.5	15.0	1926.8	160.2	8.162	* 14.9	1927.5	159.6	7.035	8.153	1.656	112.2	91.1
309	319	13.87	35.394	2324	2103	* 356.2	13.8	1907.6	166.6	8.206	* 13.7	1908.4	165.9	6.381	8.195	1.722	118.2	96.9
310	379	11.99	35.139	2316	2108	* 348.0	14.3	1921.2	157.5	8.209	* 14.2	1922.1	156.7	6.374	8.196	1.614	108.3	86.9
311	459	10.00	34.840	2308	2166	* 466.4	20.5	2013.6	117.0	8.092	* 20.4	2014.5	116.1	8.421	8.075	1.186	67.1	45.4
312	551	8.82	34.711	2305	2181	* 497.1	22.7	2037.0	106.2	8.062	* 22.6	2038.2	105.3	9.082	8.042	1.071	55.5	33.5
313	657	7.10	34.595	2309	2213	* 562.4	27.3	2080.3	90.4	8.008	* 27.0	2081.5	89.4	10.389	7.983	0.907	38.6	16.4
314	761	6.27	34.635	2331	2264	* 683.8	34.1	2138.9	76.0	7.931	* 33.8	2140.3	74.9	12.552	7.901	0.760	23.2	0.7
315	856	5.83	34.674	2353	2287	* 685.6	34.8	2161.4	75.8	7.932	* 34.4	2163.0	74.6	12.639				



STATION: 453 LEG: VII POSITION: 23° 0' S 74° 1' E DATE: 18 APR 78

MEASURED PARAMETERS				CALCULATED PARAMETERS P = 1 ATM. T = INSITU				CALCULATED PARAMETERS P, T = INSITU				DELTA CO <sub>2</sub> <sup>*</sup>	DELTA CO <sub>2</sub> <sup>†</sup>					
SAMPLE NO.	DEPTH M	TEMP DEG C	SALINITY ‰	TITRATOR ALK μEQ/KG	TCO <sub>2</sub> μM/KG	PCO <sub>2</sub> μATM	H <sub>2</sub> CO <sub>3</sub> μM/KG	HCO <sub>3</sub> <sup>-</sup> μM/KG	CO <sub>3</sub> <sup>=</sup> μM/KG	PH	H <sub>2</sub> CO <sub>3</sub> μM/KG	HCO <sub>3</sub> <sup>-</sup> μM/KG	CO <sub>3</sub> <sup>=</sup> μM/KG	AH (10 <sup>-3</sup> )	PH	ICP 10 <sup>3</sup> (M/KG)	DELTA CO <sub>2</sub> <sup>*</sup> (CALC) μM/KG	DELTA CO <sub>2</sub> <sup>†</sup> (ARAG) μM/KG
513	7	24.79	35.528	2331	1989	* 316.7	9.0	1713.8	251.2	8.277	* 9.0	1713.8	251.2	5.282	8.277	2.616	205.9	185.6
514	7	24.79	35.525	2328	1987	* 317.5	9.0	1712.5	250.5	8.276	* 9.0	1712.5	250.5	5.299	8.276	2.609	205.2	184.9
515	29	24.79	35.529	2327	1990	* 323.1	9.2	1718.0	247.8	8.270	* 9.2	1718.1	247.8	5.385	8.269	2.580	202.4	182.0
516	78	21.01	35.692	2339	2022	* 306.7	9.6	1764.7	232.7	8.280	* 9.6	1764.9	232.5	5.280	8.277	2.432	186.7	166.1
517	145	18.17	35.724	2345	2059	* 316.5	10.8	1822.4	210.9	8.263	* 10.7	1822.8	210.5	5.521	8.258	2.205	164.2	143.4
518	192	15.98	35.569	2336	2083	* 334.8	12.1	1867.7	188.2	8.236	* 12.1	1868.1	187.8	5.894	8.230	1.958	141.0	120.1
519	245	14.65	35.453	2333	2089	* 329.2	12.4	1879.8	181.7	8.239	* 12.4	1880.4	181.2	5.887	8.230	1.883	134.0	112.9
520	295	13.27	35.250	2319	2099	* 346.1	13.7	1904.7	165.6	8.215	* 13.6	1905.4	165.0	6.243	8.205	1.705	117.3	96.1
521	384	12.18	35.115	2313	2103	* 345.9	14.1	1915.1	158.8	8.211	* 14.1	1916.0	158.0	6.342	8.198	1.626	109.6	88.2
522	453	11.53	35.035	2310	2108	* 350.4	14.6	1924.8	153.5	8.204	* 14.5	1925.9	152.6	6.483	8.188	1.567	103.7	82.1
523	523	10.85	34.944	2307	2119	* 366.6	15.6	1943.8	144.6	8.185	* 15.5	1945.0	143.5	6.816	8.166	1.470	94.1	72.3
524	594	10.35	34.880	2301	2126	* 384.6	16.7	1958.0	136.3	8.165	* 16.5	1959.3	135.1	7.188	8.143	1.382	85.1	63.2
313	696	9.17	34.723	2297	2141	* 408.4	18.4	1983.0	124.6	8.138	* 18.3	1984.5	123.3	7.720	8.112	1.255	72.4	50.1
314	786	7.90	34.587	2296	2156	* 426.7	20.1	2006.1	114.8	8.117	* 19.9	2007.7	113.4	8.170	8.088	1.149	61.7	39.1
315	868	6.52	34.485	2298	2184	* 479.6	23.8	2045.5	99.8	8.067	* 23.5	2047.7	98.3	9.242	8.034	0.994	45.9	23.1
316	930	5.53	34.437	2306	2199	* 485.6	24.9	2063.2	95.8	8.060	* 24.6	2065.1	94.3	9.453	8.024	0.952	41.2	18.2
317	1020	4.65	34.454	2320	2240	* 575.2	30.5	2112.8	81.8	7.992	* 30.1	2114.7	80.2	11.165	7.952	0.810	26.3	3.0
318	1122	4.15	34.526	2340	2273	* 630.3	34.0	2148.4	75.6	7.957	* 33.5	2150.4	74.0	12.239	7.912	0.749	19.2	-4.4
319	1220	3.85	34.568	2348	2284	* 640.8	34.9	2159.8	74.3	7.950	* 34.4	2162.0	72.6	12.543	7.902	0.735	16.8	-7.0
320	1318	3.57	34.606	2358	2295	* 643.4	35.4	2170.6	74.0	7.949	* 34.8	2173.0	72.2	12.694	7.896	0.732	15.6	-8.6
321	1443	3.28	34.644	2366	2302	* 634.3	35.3	2177.1	74.6	7.955	* 34.7	2179.8	72.5	12.674	7.897	0.737	14.8	-9.8
322	1566	3.17	34.689	2375	2303	* 598.8	33.4	2175.8	78.7	7.978	* 32.8	2178.8	76.4	12.123	7.916	0.777	17.5	-7.4
323	1688	2.99	34.711	2380	2310	* 606.0	34.1	2183.1	77.9	7.974	* 33.3	2186.3	75.4	12.399	7.907	0.767	15.4	-9.9
101	1789	2.79	34.716	2380	2309	* 596.5	33.8	2181.9	78.3	7.979	* 33.0	2185.4	75.6	12.358	7.908	0.770	14.6	-11.0
324	1811	2.73	34.716	2383	2299	* 542.0	30.8	2168.4	84.9	8.018	* 30.0	2171.9	82.1	11.319	7.946	0.835	20.8	-4.8
102	1990	2.45	34.721	2385	2302	* 541.3	31.0	2171.5	85.4	8.017	* 30.2	2175.4	81.4	11.521	7.939	0.828	18.3	-7.9
103	2190	2.15	34.723	2385	2298	* 519.7	30.1	2166.4	86.4	8.033	* 29.3	2170.8	83.0	11.336	7.946	0.844	17.8	-9.0
104	2387	1.93	34.728	2380	2289	* 500.0	29.2	2156.3	88.4	8.046	* 28.3	2161.1	84.6	11.186	7.951	0.861	17.4	-10.1
105	2538	1.82	34.729	2378	2286	* 493.3	29.0	2153.2	88.9	8.051	* 28.0	2158.3	84.7	11.226	7.950	0.863	15.9	-12.1
106	2684	1.72	34.732	2376	2284	* 490.9	28.9	2151.3	88.8	8.052	* 27.9	2156.6	84.4	11.349	7.945	0.860	13.9	-14.5
107	2835	1.63	34.736	2379	2290	* 500.9	29.6	2158.1	87.3	8.044	* 28.5	2163.7	82.8	11.723	7.931	0.843	10.5	-18.5
108	2981	1.54	34.733	2381	2291	* 495.9	29.4	2158.7	87.8	8.048	* 28.3	2164.7	83.0	11.774	7.929	0.845	9.1	-20.4
109	3132	1.47	34.730	2387	2292	* 479.4	28.5	2157.9	90.6	8.062	* 27.3	2164.2	85.5	11.549	7.937	0.870	9.7	-20.3
110	3279	1.45	34.730	2391	2296	* 480.4	28.6	2161.6	90.8	8.062	* 27.4	2168.3	85.4	11.714	7.931	0.869	7.8	-22.7
111	3424	1.43	34.726	2395	2297	* 471.1	28.1	2161.5	92.4	8.070	* 26.8	2168.5	86.7	11.642	7.934	0.883	7.4	-23.7
112	3577	1.42	34.725	2399	2303	* 479.0	28.6	2167.9	91.5	8.064	* 27.2	2175.2	85.6	11.975	7.922	0.871	4.3	-27.3
114	3784	1.42	34.724	2400	2303	* 476.0	28.4	2167.5	92.1	8.067	* 27.0	2175.3	85.8	12.128	7.916	0.873	1.8	-30.5
115	3848	1.42	34.724	2404	2307	* 477.0	28.4	2171.4	92.1	8.067	* 27.0	2179.3	85.7	12.204	7.914	0.873	0.9	-31.7
116	3947	1.43	34.723	2404	2310	* 487.1	29.0	2175.4	90.5	8.059	* 27.5	2183.4	84.0	12.558	7.901	0.855	-2.1	-35.1
118	4014	1.44	34.723	2403	2307	* 480.1	28.6	2171.8	91.6	8.064	* 27.1	2180.0	84.9	12.470	7.904	0.864	-2.1	-35.4
117	4015	1.44	34.724	2406	2302	* 455.0	27.1	2164.0	95.9	8.086	* 25.7	2172.3	89.1	11.848	7.926	0.906	2.0	-31.2
119	4063	1.44	34.723	2405	2310	* 484.3	28.9	2175.0	91.1	8.061	* 27.3	2183.3	84.4	12.619	7.899	0.859	-3.3	-36.7
120	4093	1.44	34.723	2402	2311	* 497.1	29.6	2177.5	88.9	8.050	* 28.0	2185.7	82.3	12.982	7.887	0.837	-5.9	-39.4
121	4117	1.44	34.723	2407	2305	* 461.7	27.5	2167.6	94.9	8.080	* 26.0	2176.1	87.9	12.118	7.917	0.895	-0.6	-34.2
122	4138	1.45	34.723	2405	2311	* 487.2	29.0	2176.5	90.5	8.059	* 27.5	2184.9	83.7	12.775	7.894	0.852	-5.1	-38.8
124	4151	1.45	34.724	2405	2307	* 474.3	28.2	2171.1	92.7	8.069	* 26.7	2179.5	85.8	12.474	7.904	0.873	-3.2	-36.9
123	4153	1.45	34.724	2400	2308	* 493.2	29.4	2174.2	89.4	8.053	* 27.8	2182.6	82.6	12.987	7.887	0.841	-6.4	-40.1

STATION: 454 LEG: VII POSITION: 26° 60' S 67° 6' E DATE: 21 APR 78

MEASURED PARAMETERS				CALCULATED PARAMETERS P = 1 ATM. T = INSITU				CALCULATED PARAMETERS P, T = INSITU				DELTA CO <sub>2</sub> <sup>*</sup>	DELTA CO <sub>2</sub> <sup>†</sup>					
SAMPLE NO.	DEPTH M	TEMP DEG C	SALINITY ‰	TITRATOR ALK μEQ/KG	TCO <sub>2</sub> μM/KG	PCO <sub>2</sub> μATM	H <sub>2</sub> CO <sub>3</sub> μM/KG	HCO <sub>3</sub> <sup>-</sup> μM/KG	CO <sub>3</sub> <sup>=</sup> μM/KG	PH	H <sub>2</sub> CO <sub>3</sub> μM/KG	HCO <sub>3</sub> <sup>-</sup> μM/KG	CO <sub>3</sub> <sup>=</sup> μM/KG	AH (10 <sup>-3</sup> )	PH	ICP 10 <sup>3</sup> (M/KG)	DELTA CO <sub>2</sub> <sup>*</sup> (CALC) μM/KG	DELTA CO <sub>2</sub> <sup>†</sup> (ARAG) μM/KG
301	1	24.50	35.513	2329	1989	* 314.9	9.0	1715.3	249.6	8.278	* 9.0	1715.3	249.6	5.267	8.278	2.599	204.4	184.1
302	1	24.50	35.509	2327	1989	* 317.2	9.1	1716.6	248.3	8.276	* 9.1	1716.6	248.3	5.302	8.276	2.584	203.0	182.7
303	25	24.45	35.545	2329	1992	* 319.1	9.2	1720.2	247.6	8.274	* 9.2	1720.3	247.6	5.335	8.273	2.580	202.2	181.8
304	70	24.18	35.595	2335	1996	* 315.1	9.1	1722.9	249.0	8.278	* 9.1	1723.1	248.8	5.300	8.276	2.596	203.2	182.7
305	111	19.48	35.573	2335	2038	* 313.5	10.3	1794.0	218.7	8.269	* 10.3	1794.3	218.5	5.435	8.265	2.278	172.4	151.7
306	160	17.66	35.590	2336	2071	* 339.3	11.7	1847.3	197.0	8.236	* 11.7	1847.7	196.6	5.885	8.230	2.051	150.1	129.3
307	220	15.90	35.523	2335	2084	* 336.7	12.2	1869.7	187.0	8.234	* 12.2	1870.3	186.5	5.940	8.226	1.942	139.5	118.6
308	276	14.41	35.401	2330	2105	* 358.6	13.6	1906.7	169.6	8.206	* 13.6	1907.4	169.0	6.357	8.197	1.754	121.6	100.5
309	366	13.25	35.267	2320	2110	* 365.8	14.4	1921.1	159.5	8.195	* 14.4	1921.9	158.7	6.584	8.182	1.641	110.6	89.2
310	462	12.11	35.104	2319	2117	* 361.8	14.8	1933.2	153.9	8.196	* 14.7	1934.3	153.0	6.621	8.179	1.574	104.1	82.5
311	545	11.43	35.019	2309	2121	* 376.7	15.8	1945.4	144.8	8.177	* 15.6	1946.7	143.7	6.959	8.157	1.475	94.1	72.3
312	618	10.77	34.934	2303	2130	* 397.4	17.0	1962.6	135.3	8.154	* 16.9	1964.0	134.1	7.385	8.132	1.374	84.0	62.0
313	702	10.17	34.851	2300	2131	* 395.1</												

RADON DATA

BOTTOM RADON STATION: 415 LEG: IV POSITION: 17° 14' N 60° 41' E DATE: 30 DEC 77

SAMPLE NO.	DEPTH M	TEMP DEG C	POTENTIAL TEMP	SALINITY 0/00	SIGMA 4	RADON DPM/100KG	1 SIG ERROR	METERS ABOVE BOTTOM	COMMENTS
116	3768	1.681	1.372	34.740	45.927	29.9	0.7	178	
117	3796	1.673	1.361	34.738	45.928	31.3	0.8	147	
118	3826	1.662	1.347	34.741	45.933	33.2	1.3	118	
119	3856	1.645	1.327	34.736	45.932	34.4	0.9	88	
120	3881	1.636	1.315	34.734	45.933	35.6	0.9	62	
121	3902	1.632	1.309	34.736	45.935	33.5	0.8	44	
122	3915	1.627	1.303	34.734	45.935	73.0	5.1	30	
123	3925	1.628	1.303	34.734	45.935	86.1	1.2	21	
124	3933	1.629	1.303	34.735	45.936	83.9	1.2	14	

BOTTOM RADON STATION: 417 LEG: IV POSITION: 12° 58' N 64° 28' E DATE: 2 JAN 78

SAMPLE NO.	DEPTH M	TEMP DEG C	POTENTIAL TEMP	SALINITY 0/00	SIGMA 4	RADON DPM/100KG	1 SIG ERROR	METERS ABOVE BOTTOM	COMMENTS
116	3922	1.689	1.362	34.735	45.925	31.9	0.8	190	
117	3974	1.693	1.360	34.734	45.925	30.9	1.4	140	
118	4013	1.697	1.359	34.736	45.926	34.7	0.8	102	
119	4043	1.697	1.356	34.734	45.925	67.0	1.1	72	
120	4063	1.700	1.357	34.734	45.925	68.1	1.0	52	
121	4077	1.700	1.355	34.738	45.929	72.8	1.4	38	
122	4087	1.703	1.357	34.734	45.925	74.3	1.0	28	
123	4097	1.703	1.356	34.734	45.925	73.4	2.1	18	
124	4102	1.704	1.356	34.735	45.926	79.6	1.8	13	

BOTTOM RADON STATION: 420 LEG: IV POSITION: 0° 3' S 50° 55' E DATE: 10 JAN 78

SAMPLE NO.	DEPTH M	TEMP DEG C	POTENTIAL TEMP	SALINITY 0/00	SIGMA 4	RADON DPM/100KG	1 SIG ERROR	METERS ABOVE BOTTOM	COMMENTS
216	4929	1.339	0.903	34.717	45.992	30.4	0.7	150	
217	4955	1.340	0.901	34.716	45.992	28.4	0.8	126	
218	4979	1.336	0.894	34.717	45.994	27.8	0.8	102	
219	5005	1.334	0.889	34.717	45.995	26.0	0.8	77	
220	5026	1.334	0.886	34.716	45.994	31.7	0.7	57	
221	5040	1.331	0.881	34.716	45.995	31.7	0.7	43	
222	5050	1.331	0.880	34.716	45.995	36.3	0.8	34	
223	5060	1.332	0.880	34.716	45.996	41.0	1.2	24	
224	5070	1.333	0.879	34.717	45.996	46.2	0.9	14	

BOTTOM RADON STATION: 422 LEG: IV POSITION: 8° 49' S 52° 14' E DATE: 15 JAN 78

SAMPLE NO.	DEPTH M	TEMP DEG C	POTENTIAL TEMP	SALINITY 0/00	SIGMA 4	RADON DPM/100KG	1 SIG ERROR	METERS ABOVE BOTTOM	COMMENTS
116	4033	1.143	0.821	34.717	46.006	32.9	1.1	132	
117	4064	1.093	0.769	34.714	46.013	37.3	0.9	102	
118	4085	1.071	0.745	34.714	46.017	31.9	0.7	83	
120	4109	1.045	0.718	34.713	46.021	38.6	1.5	53	
121	4117	1.045	0.717	34.714	46.022	45.2	1.3	45	
122	4128	1.046	0.716	34.714	46.022	41.5	0.9	35	
123	4137	1.047	0.716	34.713	46.021	45.7	0.9	26	
124	4144	1.048	0.717	34.712	46.021	44.8	1.3	21	

BOTTOM RADON STATION: 423 LEG: IV POSITION: 9° 1' S 53° 15' E DATE: 15 JAN 78

SAMPLE NO.	DEPTH M	TEMP DEG C	POTENTIAL TEMP	SALINITY 0/00	SIGMA 4	RADON DPM/100KG	1 SIG ERROR	METERS ABOVE BOTTOM	COMMENTS
117	4942	1.185	0.753	34.714	46.016	40.3	0.9	211	
118	4994	1.185	0.747	34.714	46.017	40.1	0.9	159	
119	5035	1.193	0.749	34.714	46.017	39.9	1.8	119	
120	5065	1.190	0.743	34.714	46.018	44.0	0.9	90	
121	5091	1.189	0.738	34.714	46.018	42.1	1.3	67	
122	5111	1.191	0.737	34.714	46.018	45.8	1.0	45	
123	5127	1.186	0.731	34.713	46.019	43.6	1.4	31	
124	5136	1.189	0.732	34.714	46.019	47.2	1.0	17	

BOTTOM RADON STATION: 424 LEG: IV POSITION: 12° 18' S 53° 41' E DATE: 16 JAN 78

SAMPLE NO.	DEPTH M	TEMP DEG C	POTENTIAL TEMP	SALINITY 0/00	SIGMA 4	RADON DPM/100KG	1 SIG ERROR	METERS ABOVE BOTTOM	COMMENTS
117	4487	1.177	0.801	34.713	46.007	29.6	0.9	184	
118	4528	1.174	0.793	34.714	46.009	31.7	0.8	147	
119	4561	1.176	0.791	34.713	46.008	29.5	0.8	111	
120	4592	1.177	0.789	34.713	46.009	33.5	0.8	83	
121	4617	1.174	0.783	34.713	46.010	34.4	1.2	58	
122	4634	1.174	0.781	34.713	46.010	38.1	0.9	39	
123	4649	1.172	0.777	34.714	46.012	52.6	1.2	25	
124	4659	1.173	0.777	34.714	46.012	58.5	0.9	15	

BOTTOM RADON STATION: 428 LEG: V POSITION: 37° 45' S 57° 37' E DATE: 2 FEB 78

SAMPLE NO.	DEPTH M	TEMP DEG C	POTENTIAL TEMP	SALINITY 0/00	SIGMA 4	RADON DPM/100KG	1 SIG ERROR	METERS ABOVE BOTTOM	COMMENTS
417	5144	0.470	0.040	34.682	46.112	22.3	0.9	224	
418	5184	0.470	0.035	34.682	46.113	26.9	1.1	169	
419	5216	0.471	0.032	34.682	46.113	27.4	0.8	144	
420	5245	0.472	0.029	34.682	46.114	34.3	1.1	103	
421	5264	0.473	0.028	34.682	46.114	38.4	0.8	82	
422	5281	0.475	0.028	34.681	46.113	95.1	2.1	57	
423	5310	0.478	0.027	34.681	46.113	97.8	2.5	27	
424	5323	0.479	0.026	34.681	46.113	101.8	4.3	19	

BOTTOM RADON STATION: 429 LEG: V POSITION: 47° 40' S 57° 51' E DATE: 6 FEB 78

SAMPLE NO.	DEPTH M	TEMP DEG C	POTENTIAL TEMP	SALINITY 0/00	SIGMA 4	RADON DPM/100KG	1 SIG ERROR	METERS ABOVE BOTTOM	COMMENTS
117	4405	0.163	-0.169	34.674	46.140	27.1	0.8	174	
118	4443	0.148	-0.187	34.673	46.142	32.1	0.7	140	
119	4474	0.137	-0.201	34.673	46.145	37.5	0.8	111	
120	4500	0.128	-0.213	34.673	46.146	42.8	0.8	86	
121	4519	0.101	-0.241	34.671	46.149	56.7	0.9	67	
122	4537	0.089	-0.255	34.670	46.151	53.9	0.8	49	
123	4553	0.083	-0.262	34.670	46.152	50.3	0.8	36	
124	4563	0.081	-0.265	34.670	46.153	43.4	0.8	23	

BOTTOM RADON STATION: 430 LEG: V POSITION: 59° 59' S 60° 58' E DATE: 10 FEB 78

SAMPLE NO.	DEPTH M	TEMP DEG C	POTENTIAL TEMP	SALINITY 0/00	SIGMA 4	RADON DPM/100KG	1 SIG ERROR	METERS ABOVE BOTTOM	COMMENTS
117	4554	-0.208	-0.543	34.661	46.190	20.5	1.1	177	
118	4594	-0.218	-0.557	34.662	46.193	22.2	0.7	138	
119	4625	-0.227	-0.569	34.658	46.192	20.4	0.8	112	
120	4650	-0.233	-0.578	34.660	46.195	20.9	0.8	86	
121	4669	-0.242	-0.589	34.659	46.196	20.8	0.8	65	
122	4684	-0.254	-0.602	34.658	46.197	19.0	0.6	52	
123	4697	-0.256	-0.606	34.660	46.200	24.9	0.7	39	
124	4709	-0.264	-0.615	34.659	46.200	19.3	0.6	28	

BOTTOM RADON STATION: 432 LEG: V POSITION: 59° 19' S 92° 38' E DATE: 15 FEB 78

SAMPLE NO.	DEPTH M	TEMP DEG C	POTENTIAL TEMP	SALINITY 0/00	SIGMA 4	RADON DPM/100KG	1 SIG ERROR	METERS ABOVE BOTTOM	COMMENTS
118	4380	-0.142	-0.461	34.680	46.192	21.2	1.0	85	
119	4400	-0.151	-0.471	34.679	46.193	20.4	1.1	66	
120	4414	-0.155	-0.477	34.679	46.194	24.0	0.8	52	
121	4424	-0.156	-0.479	34.680	46.195	20.4	1.1	42	
122	4432	-0.159	-0.483	34.678	46.194	25.0	0.8	37	
123	4441	-0.158	-0.483	34.678	46.194	25.0	0.7	26	
124	4452	-0.156	-0.482	34.679	46.194	30.0	1.1	16	

**BOTTOM RADON** STATION: 435 LEG: V POSITION: 39° 57' S 109° 58' E DATE: 22 FEB 78

SAMPLE NO.	DEPTH M	TEMP DEG C	POTENTIAL TEMP	SALINITY 0/00	SIGMA 4	RADON DPM/100KG	1 SIG ERROR	METERS ABOVE BOTTOM	COMMENTS
117	4459	0.857	0.495	34.705	46.053	22.7	0.7	164	
118	4500	0.854	0.487	34.705	46.054	23.4	0.9	125	
119	4530	0.850	0.480	34.705	46.056	29.5	0.9	97	
120	4558	0.849	0.475	34.705	46.057	67.7	1.2	75	
121	4583	0.850	0.474	34.705	46.057	115.8	1.7	53	
122	4594	0.851	0.473	34.705	46.057	224.7	1.3	45	
123	4609	0.852	0.472	34.705	46.057	220.7	1.5	28	
124	4621	0.854	0.473	34.705	46.057	216.6	2.1	17	

**BOTTOM RADON** STATION: 436 LEG: VI POSITION: 29° 15' S 109° 58' E DATE: 8 MAR 78

SAMPLE NO.	DEPTH M	TEMP DEG C	POTENTIAL TEMP	SALINITY 0/00	SIGMA 4	RADON DPM/100KG	1 SIG ERROR	METERS ABOVE BOTTOM	COMMENTS
117	5431	1.110	0.617	34.712	46.038	25.4	1.9	141	
118	5460	1.110	0.614	34.714	46.040	30.6	2.0	112	
119	5480	1.106	0.607	34.711	46.039	37.0	2.3	92	
120	5495	1.108	0.607	34.711	46.039	42.4	2.6	77	
124	5504	1.110	0.608	34.711	46.039	33.5	2.2	68	
121	5525	1.113	0.608	34.714	46.041	43.6	2.2	47	
122	5541	1.114	0.606	34.714	46.041	31.8	2.0	31	
123	5556	1.117	0.607	34.714	46.041	32.4	2.1	16	

**SURFACE RADON** STATION: 437 LEG: IV POSITION: 24° 28' S 104° 55' E DATE: 11 MAR 78

SAMPLE NO.	DEPTH M	TEMP DEG C	POTENTIAL TEMP	SALINITY 0/00	SIGMA THETA	RADON DPM/100KG	1 SIG ERROR	OXYGEN μM/KG	SiO <sub>2</sub> μM/KG	PO <sub>4</sub> μM/KG	NO <sub>3</sub> μM/KG	COMMENTS
313	2	24.30	24.29	35.74	24.14	6.0	0.7					
314	9	24.30	24.30	35.74	24.13	5.7	0.7	213(I)	3.4(I)	0.07(I)	0.0(I)	
318	16	24.25	24.25	35.74	24.15	5.8	0.7	215(I)	3.4(I)	0.07(I)	0.0(I)	
319	23	24.23	24.23	35.73	24.16	5.8	0.7	216(I)	3.3(I)	0.06(I)	0.0(I)	
320	27	24.22	24.21	35.73	24.16	5.5	0.7	217(I)	3.3(I)	0.06(I)	0.0(I)	
321	30	24.16	24.16	35.69	24.14	7.9	0.8	218(I)	3.3(I)	0.06(I)	0.0(I)	
322	33	23.75	23.74	35.69	24.26	8.4	0.8	219(I)	3.3(I)	0.06(I)	0.0(I)	
324	95	20.07	20.05	35.68	25.29	5.4	0.7	218(I)	3.0(I)	0.16(I)	0.1(I)	

**BOTTOM RADON** STATION: 438 LEG: VI POSITION: 19° 29' S 101° 17' E DATE: 12 MAR 78

SAMPLE NO.	DEPTH M	TEMP DEG C	POTENTIAL TEMP	SALINITY 0/00	SIGMA 4	RADON DPM/100KG	1 SIG ERROR	METERS ABOVE BOTTOM	COMMENTS
116	5577	1.220	0.704	34.714	46.024	28.1	2.3	265	
117	5618	1.224	0.702	34.713	46.024	25.2	2.1	224	
119	5697	1.232	0.699	34.713	46.024	36.7	2.2	145	
120	5732	1.237	0.699	34.713	46.024	58.4	3.0	110	
121	5763	1.241	0.699	34.712	46.024	59.4	2.4	79	
122	5793	1.245	0.698	34.714	46.025	87.8	2.6	49	
123	5825	1.248	0.697	34.715	46.026	151.5	4.9	17	

**SURFACE RADON** STATION: 440 LEG: VI POSITION: 9° 21' S 95° 1' E DATE: 17 MAR 78

SAMPLE NO.	DEPTH M	TEMP DEG C	POTENTIAL TEMP	SALINITY 0/00	SIGMA THETA	RADON DPM/100KG	1 SIG ERROR	OXYGEN μM/KG	SiO <sub>2</sub> μM/KG	PO <sub>4</sub> μM/KG	NO <sub>3</sub> μM/KG	COMMENTS
715	21	29.14	29.14	34.25	21.51	6.3	0.4	209(I)	1.4(I)	0.13(I)	0.2(I)	
716	24	29.15	29.14	34.25	21.52	6.2	0.8	207(I)	1.7(I)	0.15(I)	0.4(I)	
717	30	29.13	29.13	34.25	21.52	5.4	0.8	203(I)	2.2(I)	0.19(I)	0.7(I)	
718	34	28.88	28.87	34.26	21.61	5.7	0.8	200(I)	2.5(I)	0.22(I)	1.0(I)	
719	37	28.76	28.75	34.32	21.69	7.1	0.8	198(I)	2.8(I)	0.24(I)	1.1(I)	
720	44	26.97	26.96	34.42	22.33	8.7	0.8	193(I)	3.4(I)	0.28(I)	1.5(I)	
721	47	26.40	26.39	34.44	22.52	8.7	0.7	191(I)	3.6(I)	0.30(I)	1.7(I)	
722	47	26.40	26.39	34.44	22.52	8.4	0.8	191(I)	3.6(I)	0.30(I)	1.7(I)	

**BOTTOM RADON**

SAMPLE NO.	DEPTH M	TEMP DEG C	POTENTIAL TEMP	SALINITY 0/00	SIGMA 4	RADON DPM/100KG	1 SIG ERROR	METERS ABOVE BOTTOM	COMMENTS
116	5073	1.205	0.756	34.714	46.015	30.0	2.4	182	
117	5113	1.210	0.756	34.713	46.015	28.1	2.3	142	
118	5141	1.212	0.754	34.715	46.017	31.9	2.4	114	
119	5169	1.215	0.753	34.714	46.016	38.4	2.6	86	
120	5186	1.217	0.753	34.713	46.015	44.3	2.4	69	
121	5202	1.219	0.753	34.716	46.017	46.6	2.4	53	
122	5218	1.221	0.753	34.714	46.016	45.9	2.6	37	
123	5238	1.223	0.752	34.714	46.016	42.8	2.6	17	

**BOTTOM RADON** STATION: 441 LEG: VI POSITION: 5° 1' S 91° 46' E DATE: 20 MAR 78

SAMPLE NO.	DEPTH M	TEMP DEG C	POTENTIAL TEMP	SALINITY 0/00	SIGMA 4	RADON DPM/100KG	1 SIG ERROR	METERS ABOVE BOTTOM	COMMENTS
116	4701	1.180	0.778	34.714	46.012	27.4	2.2	241	
117	4741	1.184	0.777	34.713	46.011	29.9	2.4	201	
118	4763	1.184	0.775	34.714	46.012	30.5	2.4	179	
119	4807	1.189	0.774	34.713	46.012	32.9	2.4	135	
120	4840	1.191	0.772	34.714	46.013	62.2	2.7	102	
121	4870	1.195	0.772	34.713	46.012	51.7	2.4	72	

**BOTTOM RADON** STATION: 442 LEG: VI POSITION: 1° 12' S 90° 45' E DATE: 22 MAR 78

SAMPLE NO.	DEPTH M	TEMP DEG C	POTENTIAL TEMP	SALINITY 0/00	SIGMA 4	RADON DPM/100KG	1 SIG ERROR	METERS ABOVE BOTTOM	COMMENTS
117	4482	1.166	0.791	34.717	46.012	39.7	2.3	137	
119	4506	1.167	0.789	34.718	46.013	46.4	2.7	113	
118	4521	1.169	0.790	34.718	46.013	44.9	2.6	98	
121	4556	1.170	0.786	34.718	46.013	55.7	2.5	63	
122	4579	1.173	0.786	34.717	46.012	67.0	2.5	40	
123	4606	1.175	0.785	34.716	46.012	74.3	3.2	13	

**BOTTOM RADON** STATION: 443 LEG: VI POSITION: 0° 1' N 90° 28' E DATE: 23 MAR 78

SAMPLE NO.	DEPTH M	TEMP DEG C	POTENTIAL TEMP	SALINITY 0/00	SIGMA 4	RADON DPM/100KG	1 SIG ERROR	METERS ABOVE BOTTOM	COMMENTS
117	4380	1.173	0.810	34.716	46.008	30.0	2.4	161	
119	4427	1.174	0.806	34.717	46.009	36.8	2.6	114	
121	4480	1.177	0.802	34.717	46.010	57.0	2.6	61	
123	4527	1.184	0.803	34.716	46.009	58.3	2.9	13	

(I) INTERPOLATED DATA

**BOTTOM RADON** STATION: 444 LEG: VI POSITION: 0° 35' N 88° 38' E DATE: 24 MAR 78

SAMPLE NO.	DEPTH M	TEMP DEG C	POTENTIAL TEMP	SALINITY 0/00	SIGMA 4	RADON DPM/100KG	1 SIG ERROR	METERS ABOVE BOTTOM	COMMENTS
217	4305	1.407	1.045	34.719	45.969	31.7	2.6	159	
218	4329	1.408	1.043	34.718	45.969	33.3	2.5	135	
219	4354	1.409	1.041	34.718	45.969	40.2	2.7	110	
221	4404	1.414	1.040	34.718	45.969	46.7	2.9	60	
222	4428	1.417	1.040	34.718	45.969	39.4	2.5	36	
223	4453	1.420	1.040	34.718	45.969	38.0	2.5	11	

**BOTTOM RADON** STATION: 445 LEG: VI POSITION: 8° 31' N 86° 2' E DATE: 26 MAR 78

SAMPLE NO.	DEPTH M	TEMP DEG C	POTENTIAL TEMP	SALINITY 0/00	SIGMA 4	RADON DPM/100KG	1 SIG ERROR	METERS ABOVE BOTTOM	COMMENTS
116	3541	1.435	1.158	34.723	45.952	29.0	2.4	118	
117	3555	1.428	1.150	34.723	45.954	34.9	2.3	104	
118	3566	1.424	1.145	34.723	45.955	34.4	2.5	93	
119	3575	1.424	1.144	34.722	45.954	37.0	2.6	84	
121	3606	1.424	1.140	34.722	45.954	50.1	2.7	53	
122	3624	1.425	1.139	34.722	45.955	54.5	2.6	35	
123	3642	1.426	1.138	34.723	45.956	61.6	3.1	17	

**SURFACE RADON** STATION: 446 LEG: VI POSITION: 12° 29' N 84° 29' E DATE: 28 MAR 78

SAMPLE NO.	DEPTH M	TEMP DEG C	POTENTIAL TEMP	SALINITY 0/00	SIGMA THETA	RADON DPM/100KG	1 SIG ERROR	OXYGEN μM/KG	SiO <sub>2</sub> μM/KG	PO <sub>4</sub> μM/KG	NO <sub>3</sub> μM/KG	COMMENTS
714	5	28.24	28.24	33.33	21.12	8.1	0.9					
715	5	28.24	28.24	33.33	21.12	7.5	0.9					
716	15	28.46	28.46	33.67	21.30	8.3	0.8	209(I)	1.9(I)0.05(I)	0.0(I)		
717	15	28.46	28.46	33.67	21.30	9.1	0.9	209(I)	1.9(I)0.05(I)	0.0(I)		
718	30	28.04	28.04	33.72	21.47	8.6	0.9	209(I)	1.7(I)0.06(I)	0.0(I)		
719	30	28.04	28.04	33.72	21.47	9.6	0.9	209(I)	1.7(I)0.06(I)	0.0(I)		
720	45	28.00	27.98	33.71	21.48	8.9	1.1	206(I)	1.6(I)0.08(I)	0.0(I)		
721	45	28.00	27.98	33.71	21.48	10.2	1.1	206(I)	1.6(I)0.08(I)	0.0(I)		

**BOTTOM RADON** STATION: 447 LEG: VII POSITION: 4° 59' N 79° 57' E DATE: 5 APR 78

SAMPLE NO.	DEPTH M	TEMP DEG C	POTENTIAL TEMP	SALINITY 0/00	SIGMA 4	RADON DPM/100KG	1 SIG ERROR	METERS ABOVE BOTTOM	COMMENTS
216	3185	1.502	1.260	34.727	45.937	28.2	2.3	136	
217	3199	1.490	1.247	34.726	45.939	30.6	2.3	122	
218	3215	1.472	1.228	34.725	45.941	30.6	2.3	106	
219	3226	1.465	1.220	34.725	45.943	36.7	2.5	95	
220	3239	1.466	1.220	34.724	45.942	36.0	2.4	82	
221	3264	1.469	1.220	34.725	45.943	44.9	2.6	57	
222	3287	1.471	1.220	34.725	45.943	39.1	2.5	34	
223	3308	1.473	1.219	34.724	45.942	43.8	2.6	13	

**BOTTOM RADON** STATION: 447 LEG: VII POSITION: 4° 59' N 79° 57' E DATE: 5 APR 78

SAMPLE NO.	DEPTH M	TEMP DEG C	POTENTIAL TEMP	SALINITY 0/00	SIGMA 4	RADON DPM/100KG	1 SIG ERROR	METERS ABOVE BOTTOM	COMMENTS
115	3738	1.434	1.136	34.721	45.954	27.9	2.4	460	
116	3952	1.394	1.073	34.720	45.965	30.3	2.3	246	
117	3999	1.389	1.063	34.721	45.967	34.6	2.5	199	
119	4073	1.389	1.055	34.720	45.968	28.0	2.4	125	
120	4113	1.393	1.054	34.722	45.970	32.3	2.4	85	
121	4153	1.395	1.051	34.720	45.969	37.1	2.4	45	
122	4172	1.398	1.052	34.719	45.968	51.5	2.4	26	
123	4187	1.400	1.052	34.721	45.969	56.7	2.9	11	

**SURFACE RADON** STATION: 448 LEG: VII POSITION: 0° 1' N 80° 3' E DATE: 6 APR 78

SAMPLE NO.	DEPTH M	TEMP DEG C	POTENTIAL TEMP	SALINITY 0/00	SIGMA THETA	RADON DPM/100KG	1 SIG ERROR	OXYGEN μM/KG	SiO <sub>2</sub> μM/KG	PO <sub>4</sub> μM/KG	NO <sub>3</sub> μM/KG	COMMENTS
615	4	29.70	29.70	34.32	21.39	6.6	1.0	206(I)	1.4(I)0.12(I)	0.0(I)		
616	11	29.66	29.65	34.32	21.40	6.1	0.8	204(I)	1.4(I)0.12(I)	0.0(I)		
617	27	29.62	29.61	34.35	21.44	7.1	0.8	196(I)	1.6(I)0.16(I)	0.5(I)		
618	35	29.61	29.60	34.44	21.51	7.6	0.8	189(I)	2.1(I)0.24(I)	1.4(I)		
619	49	25.03	25.01	34.54	23.02	7.3	0.8	174(I)	3.3(I)0.40(I)	3.3(I)		
620	59	24.37	24.36	35.32	23.81	8.6	0.9	163(I)	4.3(I)0.53(I)	5.0(I)		
621	75	23.61	23.59	35.32	24.03	8.3	0.9	144(I)	6.2(I)0.76(I)	8.0(I)		
622	93	22.67	22.65	35.31	24.29	9.4	0.8	127(I)	7.4(I)0.91(I)	10.7(I)		
623	121	20.73	20.71	35.28	24.81	9.8	0.9	104(I)	10.0(I)1.13(I)	15.2(I)		

**BOTTOM RADON** STATION: 448 LEG: VII POSITION: 0° 1' N 80° 3' E DATE: 6 APR 78

SAMPLE NO.	DEPTH M	TEMP DEG C	POTENTIAL TEMP	SALINITY 0/00	SIGMA 4	RADON DPM/100KG	1 SIG ERROR	METERS ABOVE BOTTOM	COMMENTS
115	4330	1.402	1.037	34.719	45.970	29.3	2.4	321	
116	4429	1.407	1.030	34.718	45.971	28.4	2.4	222	
117	4500	1.412	1.027	34.721	45.974	31.9	2.6	151	
119	4550	1.414	1.022	34.718	45.972	31.2	2.5	101	
122	4625	1.422	1.021	34.718	45.972	38.5	2.7	26	
123	4640	1.423	1.020	34.720	45.974	45.3	2.7	11	

**BOTTOM RADON** STATION: 449 LEG: VII POSITION: 5° 0' S 79° 59' E DATE: 8 APR 78

SAMPLE NO.	DEPTH M	TEMP DEG C	POTENTIAL TEMP	SALINITY 0/00	SIGMA 4	RADON DPM/100KG	1 SIG ERROR	METERS ABOVE BOTTOM	COMMENTS
117	4974	1.417	0.972	34.722	45.984	30.6	2.4	148	
119	5023	1.412	0.961	34.720	45.984	27.4	2.5	99	
120	5052	1.411	0.957	34.721	45.986	34.4	2.4	70	
121	5077	1.413	0.955	34.720	45.985	52.2	2.8	45	
122	5098	1.415	0.954	34.720	45.986	67.8	2.4	24	
123	5107	1.416	0.954	34.720	45.986	65.5	2.9	15	

**BOTTOM RADON** STATION: 450 LEG: VII POSITION: 10° 0' S 79° 59' E DATE: 10 APR 78

SAMPLE NO.	DEPTH M	TEMP DEG C	POTENTIAL TEMP	SALINITY 0/00	SIGMA 4	RADON DPM/100KG	1 SIG ERROR	METERS ABOVE BOTTOM	COMMENTS
117	5194	1.442	0.968	34.715	45.979	29.2	2.5	153	
119	5243	1.448	0.967	34.716	45.980	46.0	2.7	104	
120	5274	1.452	0.967	34.715	45.979	46.5	2.4	73	
121	5298	1.455	0.967	34.716	45.980	40.4	2.7	49	
122	5317	1.458	0.967	34.715	45.979	45.2	2.4	30	
123	5333	1.460	0.967	34.715	45.979	60.5	2.6	14	

**BOTTOM RADON** STATION: 451 LEG: VII POSITION: 14° 59' S 79° 57' E DATE: 13 APR 78

SAMPLE NO.	DEPTH M	TEMP DEG C	POTENTIAL TEMP	SALINITY 0/00	SIGMA 4	RADON DPM/100KG	1 SIG ERROR	METERS ABOVE BOTTOM	COMMENTS
116	4750	1.417	1.001	34.719	45.977	31.3	2.5	266	
117	4848	1.429	1.000	34.720	45.978	32.1	2.4	168	
119	4915	1.437	0.999	34.719	45.977	36.9	2.5	101	
120	4943	1.440	0.998	34.721	45.979	46.6	2.8	73	
121	4967	1.443	0.998	34.719	45.977	80.2	2.7	49	
122	4986	1.445	0.998	34.718	45.976	92.4	3.5	30	
123	5001	1.447	0.998	34.721	45.979	165.0	5.1	15	

(I) INTERPOLATED DATA

BOTTOM RADON STATION: 452 LEG: VII POSITION: 20° 5' S 79° 59' E DATE: 15 APR 78

SAMPLE NO.	DEPTH M	TEMP DEG C	POTENTIAL TEMP	SALINITY ‰	SIGMA 4	RADON DPM/100KG	1 SIG ERROR	METERS ABOVE BOTTOM	COMMENTS
115	4418	1.380	1.005	34.718	45.975	32.4	2.7	403	
116	4525	1.390	1.002	34.717	45.975	30.3	2.6	296	
117	4613	1.397	0.998	34.719	45.977	32.4	2.5	208	
119	4684	1.405	0.997	34.718	45.977	54.2	2.7	137	
120	4722	1.410	0.997	34.726	45.983	67.4	2.7	99	
121	4753	1.414	0.997	34.718	45.977	90.8	3.6	68	
122	4772	1.416	0.997	34.718	45.977	98.5	3.0	49	
123	4791	1.418	0.996	34.720	45.978	112.7	4.2	30	

SURFACE RADON STATION: 453 LEG: VII POSITION: 23° 0' S 74° 1' E DATE: 18 APR 78

SAMPLE NO.	DEPTH M	TEMP DEG C	POTENTIAL TEMP	SALINITY ‰	SIGMA THETA	RADON DPM/100KG	1 SIG ERROR	OXYGEN μM/KG	SiO <sub>2</sub> μM/KG	PO <sub>4</sub> μM/KG	NO <sub>3</sub> μM/KG	COMMENTS
815	4	24.75	24.75	35.41	23.76	4.8	0.7					
816	9	24.74	24.74	35.41	23.76	5.4	0.7	212(I)	2.1(I)O.	12(I)	0.0(I)	
817	23	24.74	24.74	35.42	23.76	5.2	0.7	212(I)	2.1(I)O.	12(I)	0.0(I)	
818	34	24.72	24.71	35.60	23.91	7.6	0.7	214(I)	2.1(I)O.	12(I)	0.0(I)	
819	43	24.44	24.43	35.68	24.05	7.1	0.7	218(I)	2.1(I)O.	12(I)	0.0(I)	
820	54	24.36	24.34	35.69	24.08	6.8	0.7	223(I)	2.1(I)O.	12(I)	0.0(I)	
821	70	23.93	23.92	35.70	24.22	7.3	0.7	232(I)	2.1(I)O.	13(I)	0.0(I)	
822	84	20.96	20.94	35.69	25.06	8.3	0.8	235(I)	2.0(I)O.	13(I)	0.0(I)	
823	135	18.50	18.48	35.70	25.71	7.9	0.7	228(I)	1.6(I)O.	19(I)	0.0(I)	
824	245	14.49	14.45	35.44	26.46	8.6	0.8	217(I)	2.9(I)O.	54(I)	5.5(I)	

BOTTOM RADON

SAMPLE NO.	DEPTH M	TEMP DEG C	POTENTIAL TEMP	SALINITY ‰	SIGMA 4	RADON DPM/100KG	1 SIG ERROR	METERS ABOVE BOTTOM	COMMENTS
115	3848	1.425	1.115	34.724	45.961	52.8	2.9	313	
116	3947	1.433	1.111	34.723	45.960	86.7	3.0	214	
117	4015	1.439	1.109	34.724	45.961	81.7	3.1	146	
119	4063	1.440	1.105	34.723	45.962	112.7	4.4	98	
120	4093	1.443	1.104	34.723	45.962	135.1	3.5	68	
121	4117	1.444	1.102	34.723	45.962	97.7	3.4	44	
122	4138	1.446	1.102	34.723	45.962	91.3	3.7	23	
123	4153	1.447	1.101	34.724	45.963	126.3	4.4	8	

BOTTOM RADON STATION: 454 LEG: VII POSITION: 26° 59' S 67° 5' E DATE: 21 APR 78

SAMPLE NO.	DEPTH M	TEMP DEG C	POTENTIAL TEMP	SALINITY ‰	SIGMA 4	RADON DPM/100KG	1 SIG ERROR	METERS ABOVE BOTTOM	COMMENTS
114	3986	1.575	1.244	34.722	45.936	25.9	2.0	987	
116	4205	1.578	1.222	34.720	45.939	23.1	2.0	768	
117	4455	1.601	1.214	34.722	45.941	30.5	2.0	518	
119	4603	1.616	1.210	34.720	45.941	32.2	2.3	370	
121	4754	1.629	1.204	34.721	45.942	31.2	2.1	219	
122	4803	1.634	1.202	34.720	45.942	31.3	2.0	170	
123	4834	1.637	1.201	34.722	45.944	31.2	2.3	139	

(I) INTERPOLATED DATA