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**HYDROGRAPHIC, CARBON DIOXIDE, NUTRIENT, AND PRODUCTIVITY
MEASUREMENTS FROM THE SOUTH ATLANTIC DURING JULY AND
AUGUST OF 1991**

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HYDROGRAPHIC, CARBON DIOXIDE, NUTRIENT, AND PRODUCTIVITY MEASUREMENTS
FROM THE SOUTH ATLANTIC DURING JULY AND AUGUST OF 1991

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ABSTRACT

From July 11 to September 2, 1991, the National Oceanic and Atmospheric Administration's (NOAA) Carbon Dioxide (CO₂) and Radiatively Important Trace Species (RITS) programs participated in an oceanographic research cruise conducted aboard the NOAA ship MALCOLM BALDRIGE. This report presents the research from that cruise that was conducted for the CO₂ program, which has recently been renamed the Ocean-Atmosphere Carbon Exchange Study (OACES). During Leg 1 of this cruise, (Fortaleza, Brazil to Montevideo, Uruguay), 33 CTD hydrographic casts and 17 Go-Flo™ hydrographic (productivity) casts were conducted. Samples were also collected while underway on Leg 1, for the determination of the fugacity of CO₂ (fCO₂) of the air and surface water. Leg 2, (Montevideo, Uruguay-Fortaleza, Brazil), collected 21 days of underway fCO₂ measurements, conducted five CTD hydrographic casts and nine Go-Flo™ hydrographic (productivity) casts. This report contains tables of the following data: hydrography from each CTD cast at the bottle trip depths, (including salinity, oxygen and nutrients), discrete carbon parameters, underway carbon parameter values, and data from productivity casts. Descriptions of the sampling techniques and analytical methods used in the collection and processing of these data are also presented in this report.

KEY WORDS: alkalinity, CO₂, carbon dioxide, chlorophyll , CTD, dissolved organic carbon, hydrography, nutrients, productivity, salinity, sigma-theta, South Atlantic, temperature

1. INTRODUCTION

Human activity is producing gases, most notably carbon dioxide (CO₂), and other trace gases including chlorofluorocarbons, nitrous oxide and methane, which are being released into the atmosphere and causing more of the radiation being emitted by the earth to be absorbed. This increased absorption is resulting in a net warming of the earth's atmosphere and creating a phenomenon commonly known as the "Green House Effect". Only about half of all of the anthropogenic CO₂ that is released into the atmosphere each year remains there. The global ocean is thought by many to be the ultimate destination, or "sink" for the 'missing' CO₂. The understanding of the absorption and storage properties of the oceans is therefore essential to assessing the potential for climatic change due to man's effect on the radiation balance of the atmosphere.

The National Oceanic and Atmospheric Administration's (NOAA) Carbon Dioxide (CO₂) program and Radiatively Important Trace Species (RITS) programs participated in a multifaceted oceanographic research cruise conducted aboard the NOAA ship MALCOLM BALDRIGE from July 11 to September 2, 1991. The NOAA CO₂ program has been recently renamed and is now called Ocean-Atmosphere Carbon Exchange Study (OACES). The two primary objectives of the cruise were to: (1) assess the role of biomass burning emissions from surrounding continents in controlling the distribution of ozone in the tropical South Atlantic atmospheric boundary layer for the RITS program and (2) to measure and establish baseline values and determine source and sink regions of CO₂ in the equatorial and the South Atlantic Ocean for OACES. This report presents only the OACES-related data from that cruise. These data include: hydrography, nutrients, discrete carbon, underway carbon parameters and productivity data from both legs of the cruise.

1.1. DESCRIPTION OF STUDY AREA

This study was conducted on two consecutive research cruise legs during 1991. Leg 1 sailed from Fortaleza, Brazil on July 11, 1991, proceeded NE to approximately 5° N and 25° W and then turned south and steamed along the 25° W line to 28° S. At 28° S, the track line turned SW to 32° W and continued South to 42° S before turning NW and ending in Montevideo, Uruguay on August 5, 1991. Leg 2 departed Montevideo, Uruguay on August 13, 1991 and proceeded NE to a point about 2° S and 4° W before subsequently steaming NW, and then SW ending in Fortaleza, Brazil on September 2, 1991. The cruise tracks for Legs 1 and 2 are shown on Figure 1.

2. DATA COLLECTION AND ANALYTICAL METHODS

Thirty-three CTD hydrographic stations on Leg 1, and five CTD hydrographic stations on Leg 2 were occupied to collect discrete water sample data. A CTD/rosette unit with a Neil Brown™ CTD instrument equipped with 24, 10-L Niskin™ bottles was utilized for these casts. Water samples were collected from the Niskin™ bottles for salinity,

SOUTH ATLANTIC 1991 RITS/CO2 CRUISE TRACKLINES

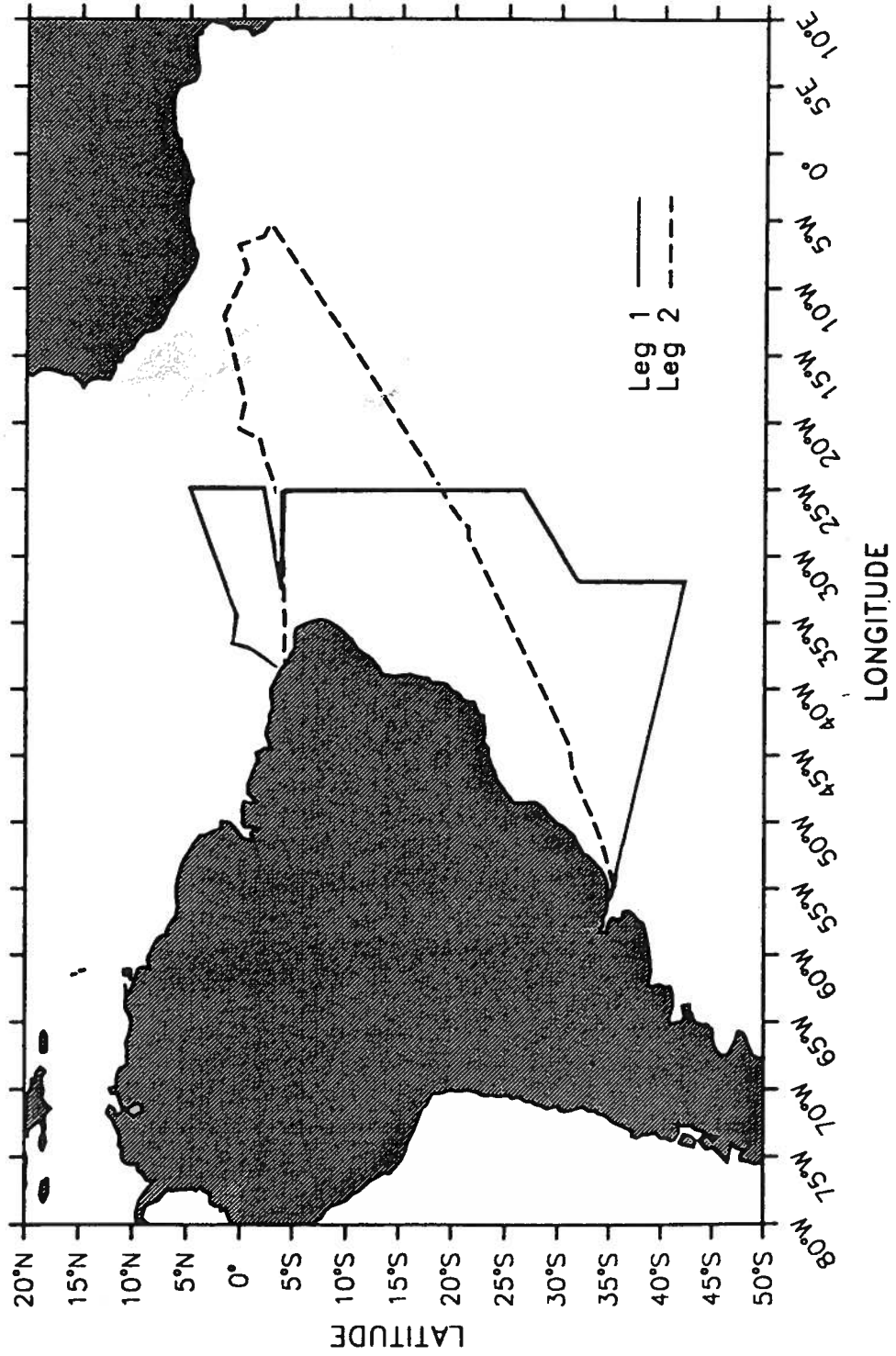


Figure 1: Study area and cruise track lines for NOAA Ship MALCOLM BALDRIGE.

oxygen and nutrient measurements as well as carbon related parameters including total dissolved inorganic CO₂ (TCO₂), fugacity of CO₂ (fCO₂), total alkalinity (TALK) and Dissolved Organic Carbon (DOC). Continuous underway air and seawater surface samples for fugacity of CO₂ (fCO₂) analysis were collected during both legs of the cruise. Go-Flo™ hydrographic casts were also conducted on both legs for productivity measurements. These casts were made using 10-L Go-Flo™ bottles mounted on Kevlar™ hydrowire. Salinities and sea surface temperatures were also measured continuously during the entire cruise by a thermosalinograph. In most cases, if there was no bottle salinity value available for a given sample position, the electronically derived CTD value was used in calculations requiring a salinity measurement. More detailed information on individual data collection, or analyses procedures may be found in the respective data sections.

2.1 HYDROGRAPHIC METHODS

2.1.1 CTD and Hydrographic Operations

All CTD operations were conducted using the same Neil Brown™ Instrument Systems Mark III CTD equipped with standard temperature and conductivity sensors, a Beckman™ polarographic dissolved oxygen sensor, and an auxiliary Seabird™ temperature sensor. Laboratory calibrations were performed, before and after the cruise, and were used in conjunction with Niskin™ bottle data, to calibrate the CTD data. Pressure and temperature data listed in this report are based on the post-cruise calibration. Temperature accuracy is estimated to be ± .005°C, and pressure accuracy to be ± 5 decibars.

Water sampling

Water samples were collected in 10-L sampling bottles using a General Oceanics 24-place rosette system. Bottles were electronically fired during the upcast, with markers placed in the digital file for use in determining exact bottle trip CTD values for calibration. Once on deck, aliquots were taken for laboratory analyses. Figure 2 shows the CTD cast bottle trip locations used for hydrographic and other discrete water sample measurements collected during Leg 1 of the cruise. More detailed information about the subsampling and analysis procedures for the various water property measurements may be found below. Tables with the hydrographic data from this study may be found in Appendix B.

Oxygen

Dissolved oxygen samples were the first samples collected from 10-L Niskin™ bottles once the CTD unit was back on deck. The oxygen samples were collected, in 150-mL ground-glass stoppered sample bottles and were analyzed using the method described by Carpenter (1965), with computer-controlled colorimetric endpoint determination as described in Friederich, Sherman, and Codispoti (1984). Oxygen samples that have been collected and analyzed using the above methodology have a precision greater than one percent. Values are marked as questionable by italicizing them in the data tables for any of the following reasons: High or low photometric endpoints in the titration process due to improper light levels; possible contamination during processing (air bubbles seen in bottle, etc.); inexplicable large differences between bottle sample data values and apparently valid electronic CTD values.

SOUTH ATLANTIC 1991 RITS/CO2 CRUISE
 HYDROGRAPHIC AND DISCRETE CARBON DATA SAMPLE POSITIONS

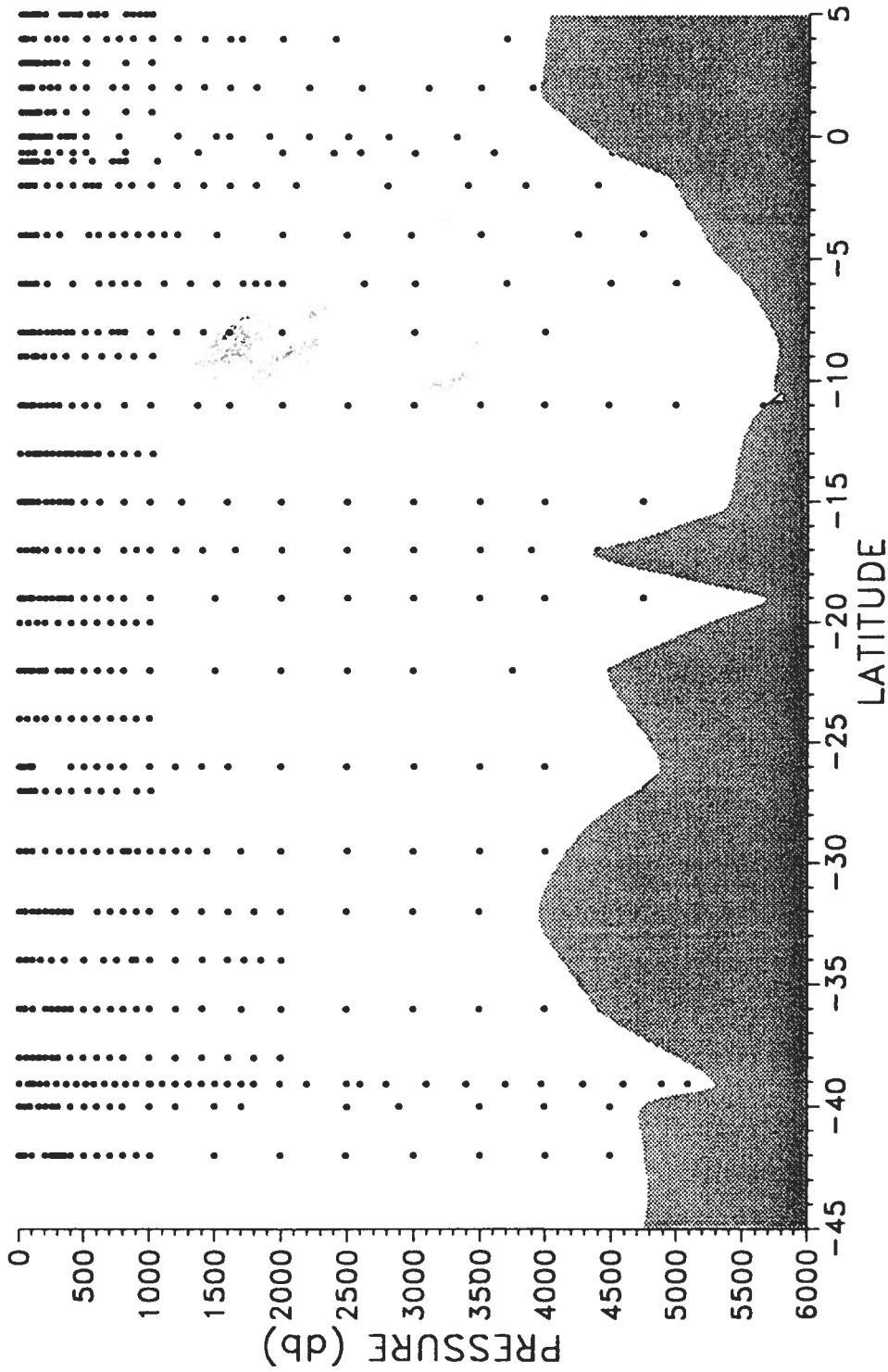


Figure 2: Sampling positions for all Niskin™ Bottle derived data. The coarse smoothing grid for bottom topography causes sharp topographic features, such as the mid Atlantic Ridge at 0° N, to be eliminated.

Salinity

Salinity samples were collected in 200-mL bottles. New caps were used for each sample. Bottle salinities were measured using a Guildline™ 8400 Autosol and P114 standard seawater in a temperature controlled van. Conductivity ratios were converted to salinities conforming to the PSS78 standard. Since CTD conductivity was relatively stable (except casts 32 and 33), bottle salinities that differed substantially from CTD salinity measurements are marked as questionable in the data tables.

Temperature Density and Depth

Depth, Potential Temperature and Density (σ - θ) values listed in the tables were calculated using standard Woods Hole Oceanographic Institute (W.H.O.I.) hydrographic subroutines. Depth is calculated from pressure using methods based on Saunders and Fofonoff (1976); density is determined by methods presented in F. Millero and A. Poisson (1981); and potential temperature referenced to zero pressure (θ) is calculated by integrating the adiabatic lapse rate using a fourth-order Runge-Kutta algorithm. σ - θ values, (ten meter averages), from the Leg 1 CTD casts are contoured and presented in Figure 3.

2.1.2 Nutrient Analysis Methods

Nutrient samples were collected from 10-L Niskin™ bottles in aged 60-mL linear polyethylene bottles after three complete seawater rinses and stored in the dark at 4°C until analysis was completed (within 24 hours of sample collection). Concentrations of dissolved inorganic nitrite (NO_2), dissolved inorganic nitrate (NO_3), and silicate (SiO_4), reported in micromoles/liter, were determined using an AlpKem™ RFA/2 Auto-Analyzer aboard ship.

Nitrates

The automated colorimetric procedures and methodologies used in the analysis of nitrite and nitrate are essentially similar to those described by Armstrong et al. (1967), with modifications described in Atlas et al. (1971). Standardizations were performed prior to each sample run with working solutions prepared aboard ship from pre-weighed "Baker Analyzed" reagent grade standards. Nitrite (NO_2) was determined by diazotizing with sulfanilamide and coupling with N-1 naphthylethelendiamine dihydrochloride to form an azo dye. The color produced is proportional to the nitrite concentration. Samples for nitrate (NO_3) analysis were passed through a copperized cadmium column, which reduces nitrate to nitrite and the resulting nitrite concentration was then determined as described above. The detection limits for nitrite and nitrate were 0.1 $\mu\text{moles/L}$ and 0.4 $\mu\text{moles/L}$, respectively. The precision of duplicate standards measurements was $\pm 0.25\%$ at 8 $\mu\text{moles/L}$ for nitrite and $\pm 0.2\%$ at 40 $\mu\text{moles/L}$ for nitrate. The accuracy for both analytes was assumed to be $\pm 1\%$ since no absolute standards were available. Contoured nitrate values from Leg 1 of this study are presented in Figure 4.

Silicates

The analytical procedures and methodologies used in the analysis of silicate are essentially similar to those described by Armstrong et al. (1967), with modifications described in Atlas et al. (1971). Silicate

SOUTH ATLANTIC 1991 RITS/CO2 LEG 1

Sigma Theta

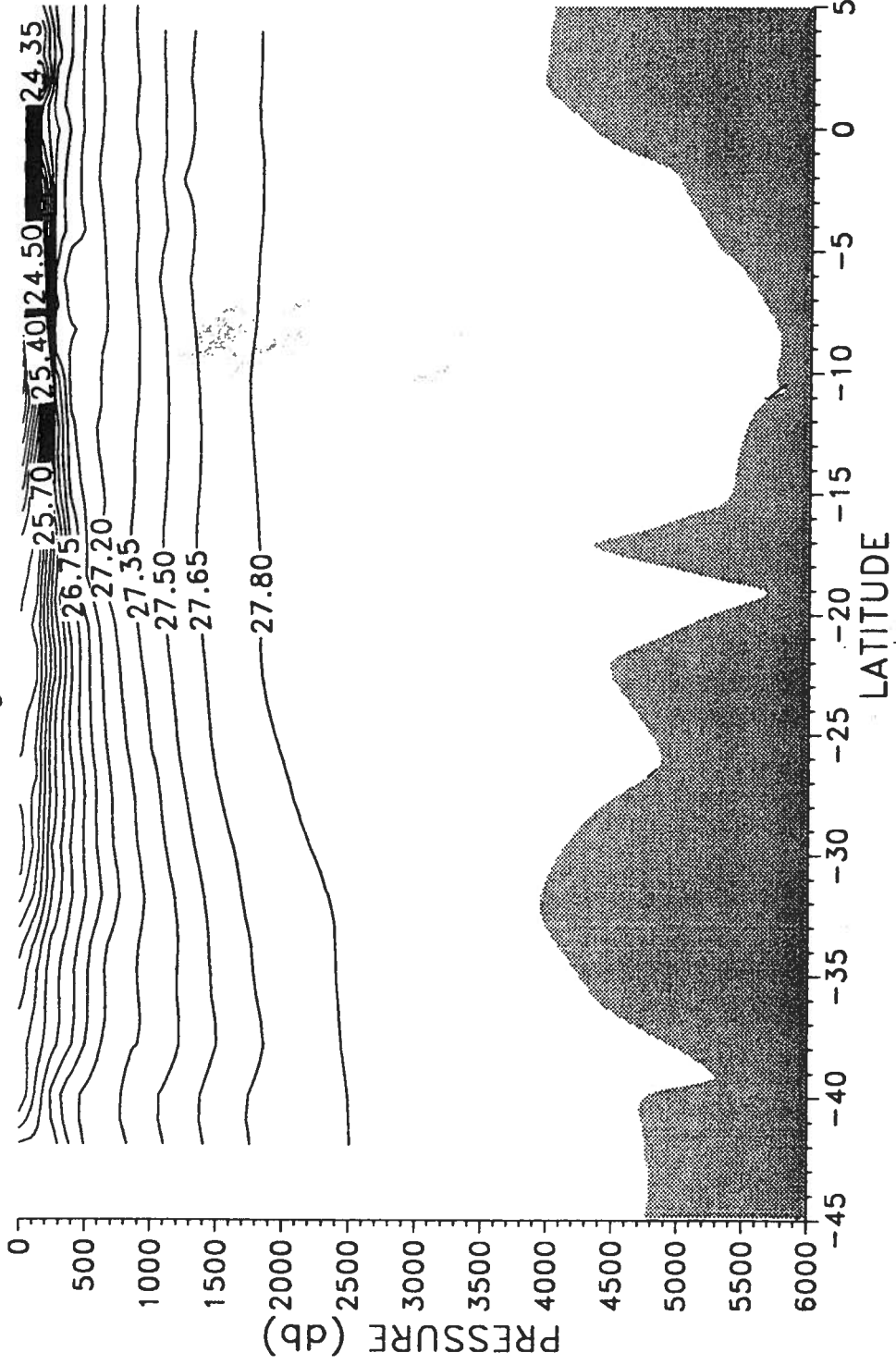


Figure 3: Potential density cross section utilizing 10 decibar averaged sigma-theta data from CTD stations on Leg 1. Contour interval = 0.15. See Figure 2 caption for comment regarding bottom topography.

SOUTH ATLANTIC 1991 RITS/CO2 LEG 1
NO3 ($\mu\text{Mol/L}$)

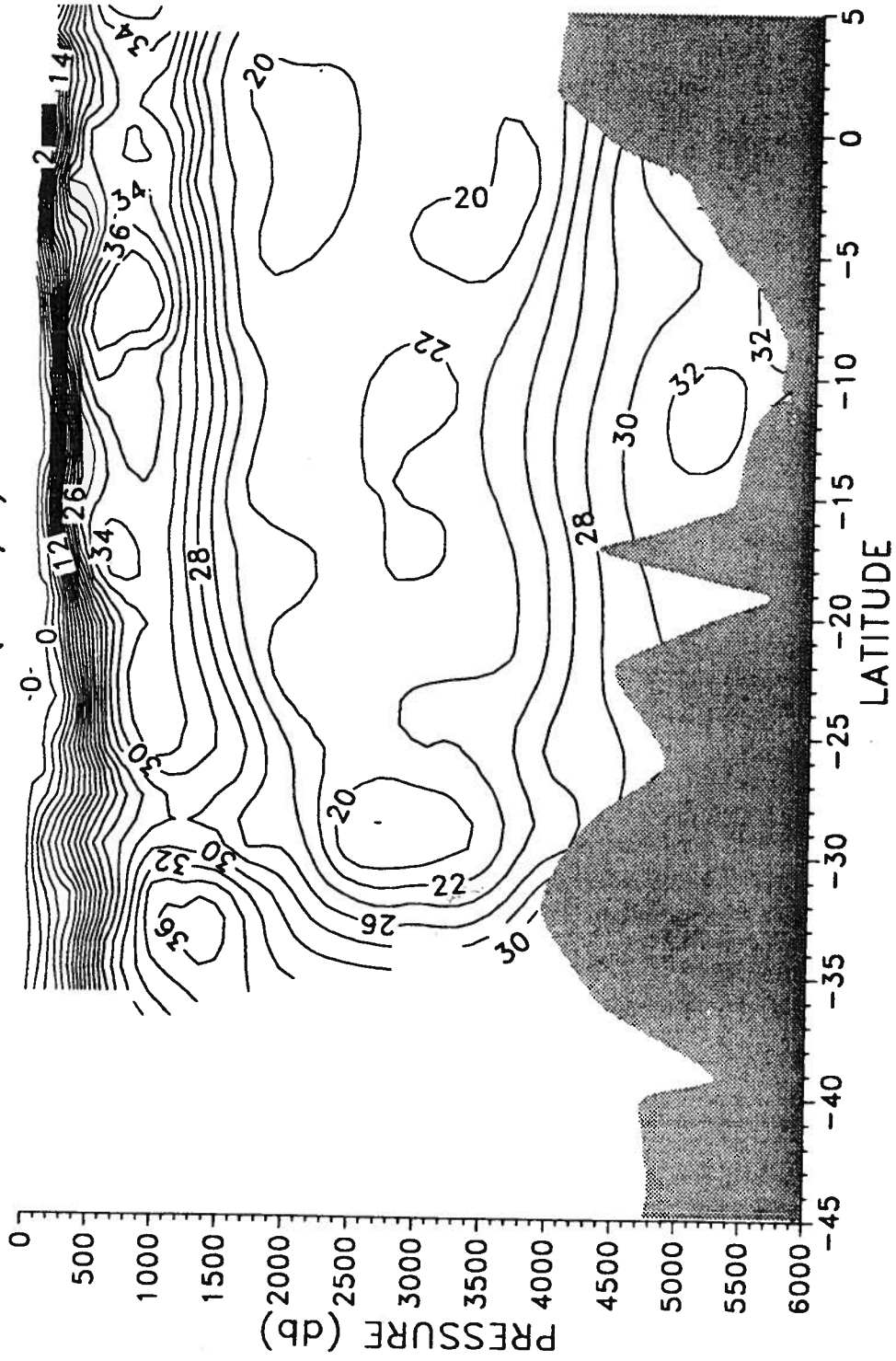


Figure 4: Nitrate data cross section for Leg 1. Contour interval = $2 \mu\text{Mol/L}$. See Figure 2 caption for comment regarding bottom topography.

was determined from the reduction of silicomolybdate in acidic solution to molybdenum blue by ascorbic acid. The color produced is proportional to the concentration of silicate in the sample, with a detection limit of 0.4 μ moles/L. The precision of duplicate measurements was $\pm 0.17\%$, at 120 μ moles/L of silicate, with an assumed accuracy of $\pm 1\%$, since no absolute standards were available. Figure 5 is a contour plot of the silicate values from Leg 1 of this cruise.

2.2 CARBON PARAMETERS

2.2.1 Total Dissolved Inorganic CO₂

Sampling

Samples for dissolved inorganic CO₂ (TCO₂) analysis were drawn from 10-L Niskin™ bottles into 500-mL Pyrex™ bottles using Tygon™ tubing. Bottles were rinsed once, and while being careful to not create bubbles, they were filled from the bottom until half of the bottles' volume had overflowed. The tube was pinched off and withdrawn, creating a 5-mL headspace volume. Each sample had 0.2 mL of a saturated HgCl₂ solution added to act as a sample preservative. The sample bottles were then sealed with glass stoppers lightly covered with Silastic™ grease. The samples were then stored in darkness at ambient (room) temperature for a maximum of two days prior to being analyzed.

Analysis

CO₂ analysis was performed by extracting the inorganic carbon in the sea water samples by acidification and subsequent displacement of the gaseous CO₂ into a coulometer cell. Two coulometers were used on the cruise. One was patterned after that of D. Chipman of Lamont-Doherty Earth Observatory (L.D.E.O.) and shall hereafter be referred to as the "Chipman" system; the other had a Single Operator Multiparameter Metabolic Analyzer (SOMMA) inlet system developed by K. Johnson of Brookhaven National Laboratories (B.N.L.) and shall be called the "Johnson" system.

The samples were introduced into the "Chipman" system by injecting a 23-mL aliquot from a 500-mL bottle with a glass syringe. A metal syringe guide/stopper assured that the injection volume was constant and reproducible. The temperature of the water remaining in the bottle was measured immediately after withdrawing the sample and was used to determine the density of the sample injected into the extraction tube. Subsequently, 1 mL of 10% phosphoric acid was injected into the extraction tube. The acid was purged with N₂ prior to use and stored in a bottle with CO₂-free headspace. The CO₂ was extracted with ultra high purity N₂ which was run through a Malcosorb™ CO₂ scrubber. The evolved CO₂ gas went through a PTFE™ 0.2 micron filter to remove water droplets and aerosols and then titrated coulometrically using an UIC (model 5011) CO₂ coulometer. The gas stream was not dried prior to introduction into the cell. Sample analyses time was set to 20 minutes.

Prior to analysis on the automated "Johnson" system, each 500-mL sample bottle was inserted into a water bath at 20°C. Water from the bottle was displaced into a thermostatted pipette with a (500 ppm CO₂ in air) pressure gas. The water was then injected into an extraction chamber which contained 1 mL of 10% H₃PO₄ solution which had been stripped of CO₂ prior to injection of the sample. The evolved gas was

SOUTH ATLANTIC 1991 RITS/CO2 LEG 1
SiO4 (uMol/L)

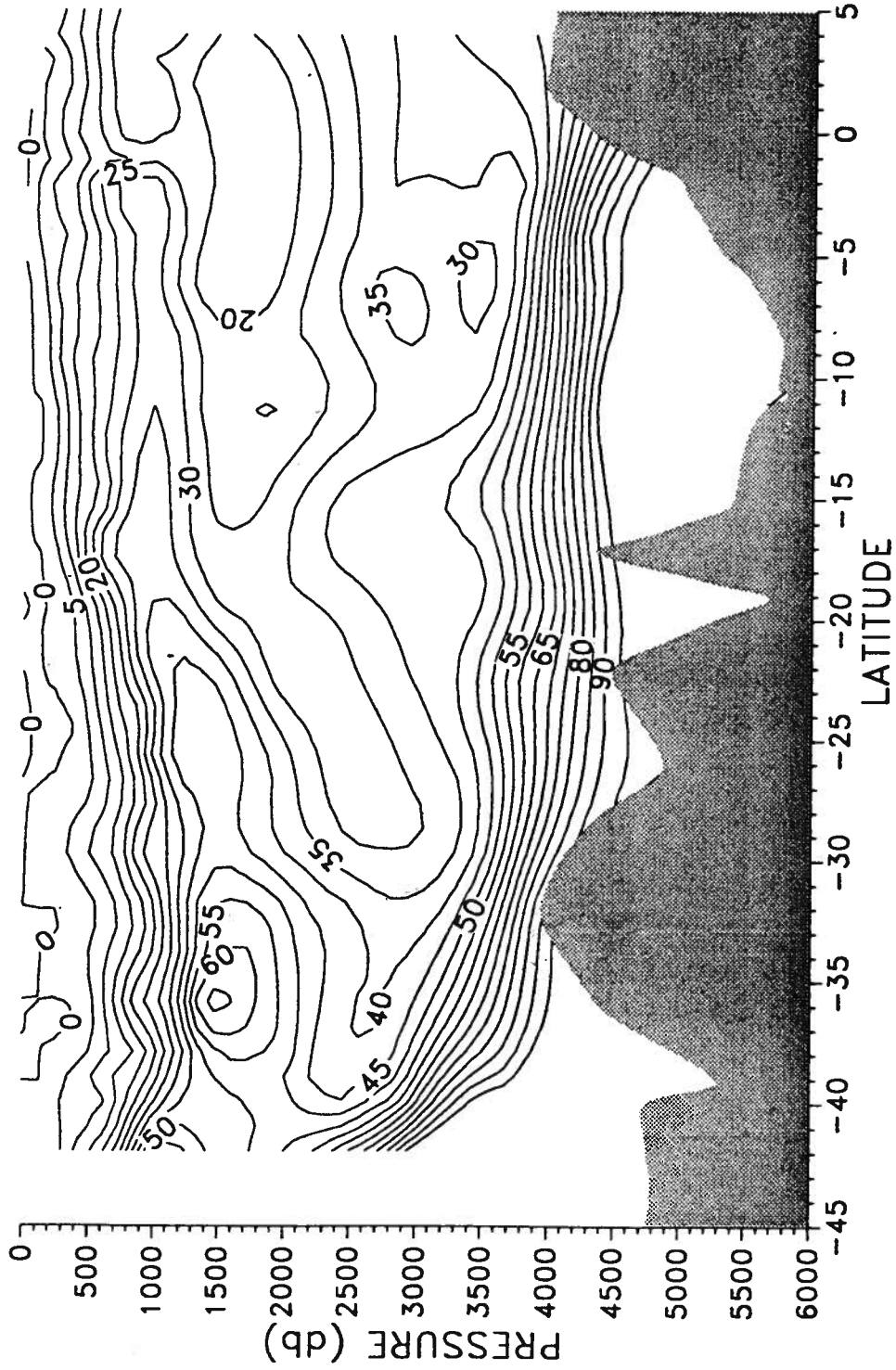


Figure 5: Silicate data cross section for Leg 1. Contour interval = 5 $\mu\text{mol/L}$. See Figure 2 caption for comment regarding bottom topography.

run through a condenser and a MgClO₄ drying column to dry the gas stream, and through an ORBO-53™ tube to remove volatile acids. Additional details concerning this system and procedures are presented in Johnson (1992), and Johnson et al. (1993).

Both the "Johnson" and "Chipman" coulometers were calibrated by injecting aliquots of pure CO₂ using an 8-port or 10-port valve with two sample loops of known volume. The CO₂ gas volumes bracketed the amount of CO₂ extracted from the water samples. The gas loops of the "Johnson" system were calibrated by weight with water at B.N.L. (Wilke et al., 1993). The gas loop volumes on the "Chipman" system were calibrated by alternating gas loop injections from the two gas sampling valves with the same coulometer using the "Johnson" loop volume as a reference. Liquid reference materials (RM's) consisting of bicarbonate in sodium chloride solution were supplied by A. Dickson of Scripps Institute of Oceanography (S.I.O.) and were run on each coulometer cell during the cruise. The results were close to the values determined manometrically by C. D. Keeling at S.I.O.

| | | |
|-------------------------------------|----------------|---------|
| Av. value of RM's run on "Chipman" | 2306.18 ± 1.47 | n = 30 |
| Av. value of RM's run on "Johnson" | 2304.58 ± 1.50 | n = 100 |
| Manometric value [Dickson Batch #6] | 2304.74 ± 0.94 | n = 10 |

Note: All determinations, including replicates from the same bottle are pooled for the averages.

Calculations

The instrument was calibrated three times for each cell solution with a set of gas loop injections. Calculation of the amount of CO₂ injected was determined according to methods described in the Department of Energy (DOE) CO₂ handbook (1991). The gas loops yielded a calibration factor for the instrument defined as:

$$\text{Cal. factor} = \frac{\text{calculated moles of CO}_2 \text{ injected from gas loop}}{\text{measured moles of CO}_2 \text{ injected}}$$

The concentration of CO₂ ([CO₂]) in the samples was determined according to:

$$[\text{CO}_2] =$$

$$\frac{\text{Cal. factor} * (\text{Counts-Blank} * \text{Run Time}) * 2.0728 * 10^{-4} \text{ } \mu\text{mol/count}}{\text{pipette volume} * \text{density of sample}}$$

where Counts is equal to the instrument reading at the end of the analysis; Blank is the counts/minute determined from blank runs performed at least once for each cell solution; Run Time is the minutes the sample is run; 2.0728 * 10⁻⁴ is the conversion factor from counts to μmol. The pipette volume (or syringe volume) was determined by taking aliquots of distilled water at a known temperature from the volumes prior to, during, and after the cruise. No trend was observed in the change in volumes. Standard deviation in the series of measurements over three months was 0.03% of the total weight. The weights with the appropriate densities were used to determine the volume of the syringes

and pipette. Calculations of pipette and syringe volumes, of densities, and of final CO₂ concentrations were all performed according to procedures outlined in the DOE CO₂ handbook (1991). All total CO₂ values are corrected for dilution by 0.2 mL of mercuric chloride solution assuming the solution is saturated with atmospheric CO₂ levels and total water volume is 540 mL yielding a correction factor of 1.00037. Figure 6 shows a contour plot of the coulometer derived TCO₂ values from Leg 1 of this study.

2.2.2 Discrete fugacity of CO₂ (fCO₂)

Sampling

Samples were drawn from 10-L Niskin™ bottles into 500-mL Pyrex™ volumetric flasks using Tygon™ tubing. Bottles were rinsed once and while taking care not to entrain air bubbles, were filled from the bottom until half the bottles' volume overflowed. Five mL of water was then withdrawn with a pipette to create a small expansion volume. A saturated HgCl₂ solution, (0.2 mL), was added to the samples as a preservative. The sample bottles were then sealed with a screw cap containing a polyethylene liner and stored in darkness at room temperature for a maximum of two days prior to analysis.

Discrete fCO₂ analyzer

The AOML discrete fCO₂ system is patterned after the design described in Chipman et al. (1993) and is discussed in detail in Wanninkhof and Thoning (1993). The major difference between the systems is that the AOML system uses a Licor™ (model 6262) non-dispersive infrared analyzer, while the Chipman et al. system utilizes a gas chromatograph with a flame ionization detector and a methanizer, which quantitatively converts CO₂ into CH₄ for analysis.

Samples are collected in 500-mL volumetric flasks and are brought to a temperature of 20.00 ± 0.02°C, using a pre-bath at 19-21°C and a Neslab™ (model RT-220) controlled temperature bath. A 60-mL headspace is created in the flask by replacing the water using a compressed standard gas with a CO₂ mixing ratio close to the fCO₂ of the water. The headspace is circulated in a closed loop through the infrared analyzer (IR), which measures CO₂ and water vapor levels in the sample cell. The headspaces of the two flasks are equilibrated simultaneously in channels A and B. While headspace from the flask in channel A goes through the IR analyzer, the headspace of the flask in channel B is recirculated in a closed loop. The sample in the A channel is equilibrated for 17 minutes while the air from the headspace of the flask flows through the IR analyzer. The sample in the B channel is circulated in a closed loop for 10 minutes and through the IR for 8 minutes. An expandable volume, consisting of a balloon, keeps the contents of the flasks at room pressure.

In order to maintain measurement accuracy and precision, a set of six gas standards is run through the system after every four to ten seawater samples. The standards have mixing ratios of 201.4, 354.1, 517.0, 804.5, 1012.2, and 1529 ppm, which bracket the fCO₂ at 20°C (fCO₂,20) values observed in the water column of the South Atlantic.

The determination of fCO₂ in water from the discrete analyses involves several steps. The mixing ratio and detector response for the

SOUTH ATLANTIC 1991 RITS/CO2 LEG 1

TCO2 ($\mu\text{Mol/Kg}$)

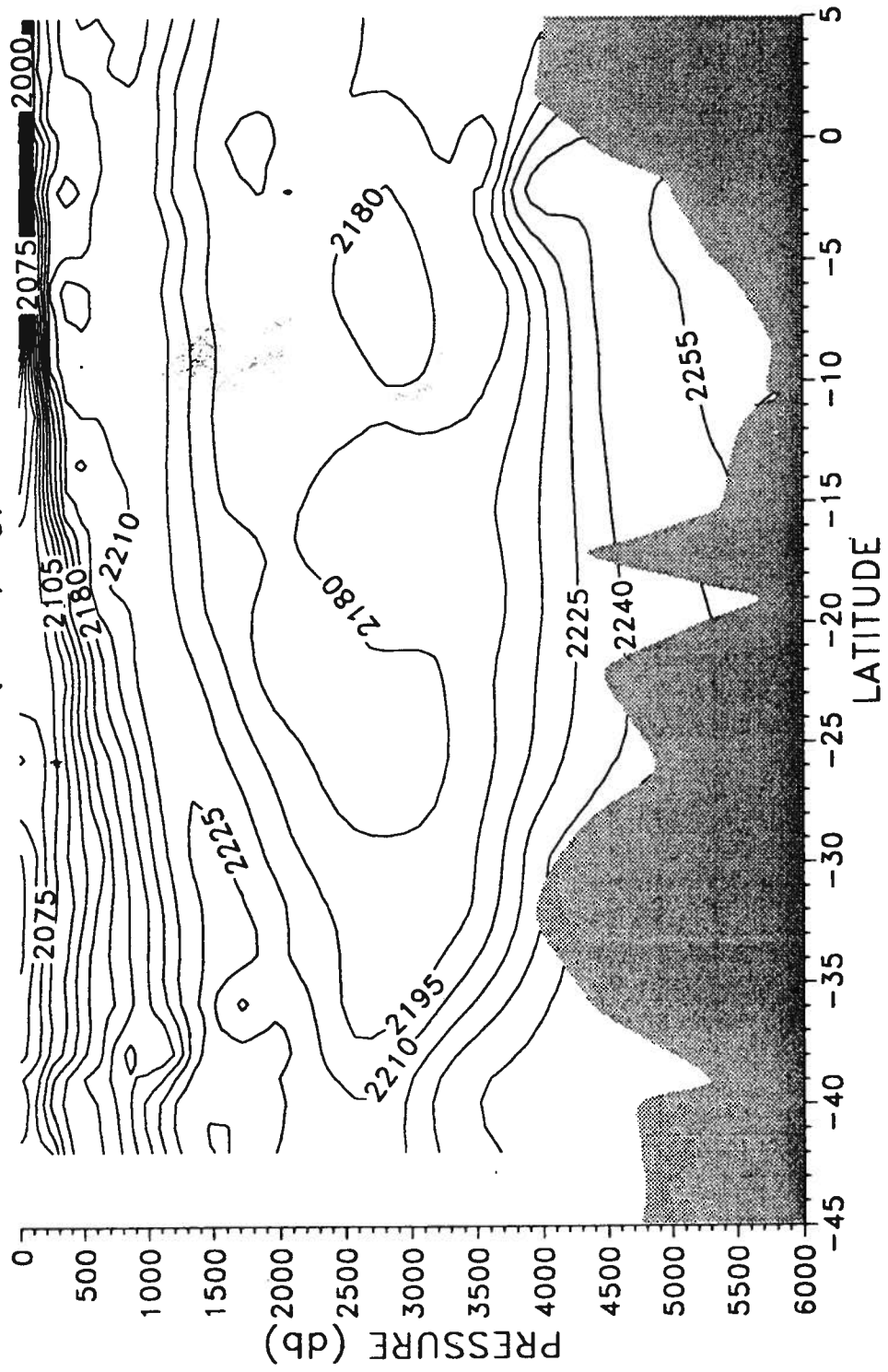


Figure 6: Dissolved inorganic carbon dioxide, TCO₂ (AOML value) cross section for Leg 1. Contour interval = 15 $\mu\text{mol/Kg}$. See Figure 2 caption for comment regarding bottom topography.

standards are normalized for temperature and pressure. The IR voltage output for samples are normalized with regard to pressure and are corrected for the presence of water vapor and converted to a mixing ratio. The mixing ratio in the headspace is converted to fugacity and corrected to fugacity of CO₂ in the water sample prior to equilibration by accounting for change in total CO₂ in water during the equilibration process (for details see, Wanninkhof and Thoning, 1993). The change in the fCO₂ of water, (fCO₂w), caused by the change in TCO₂ is calculated using the constraint that total alkalinity (TAlk), remains constant during exchange of CO₂ gas between the headspace and the water. The calculation is outlined in the appendix of Peng et al. (1987).

2.2.3 Methods for Potentiometric Total Alkalinity, TCO₂ and pH Measurements

The total alkalinity and inorganic carbon (Dickson, 1981) in the water samples was determined during the cruise by making potentiometric titrations. The two systems used consisted of a Metrohm™ 615 titrator and Metrohm™ 605 pH meter that are operated by an Apple™ computer (Thurmond and Millero, 1982). The titration is done by adding HCl to the seawater past the carbonic acid end point. Seawater samples were contained in a water jacketed cell controlled to a constant temperature of 25°C with a Forma™ water bath. Due to the large number of samples to be measured, the titrations were not made over the entire pH range. This allowed a complete titration to be made in about 10 minutes. Unfortunately during the cruise the disk reader of the Apple™ computers failed and the titrations had to be run by hand.

The titrant solution was prepared from standard HCl and reagent grade NaCl. The 0.25 M HCl contained 0.45 M NaCl to yield an ionic strength equivalent to the seawater (0.7 M). The acid was standardized with weighed amounts of Na₂CO₃ dissolved in 0.7 M NaCl solution in the laboratory. A blank titration was made to evaluate the residual alkalinity (14 μM) due to impurities in the NaCl. The normality of the acid was found to be 0.2514 ± 0.0001 M. Measurements made in the laboratory after the cruise yielded the same concentration of the HCl.

The electrode system used to measure the emf of the sample during a titration consisted of a ROSS™ glass pH electrode and an Orion™ double junction reference electrode. The response of the electrodes were determined by HCl titration in 0.7 M NaCl solution. Electrodes with non-Nernstian behavior were discarded (slope larger than ± 0.5 mV of the theoretical slope). Three cells were used during the cruise (Cell 1, 2 and 3). They had volumes (V) and standard emf's, (E*), in seawater of V = 231.10 ± 0.02 cm³, 238.99 ± 0.02 cm³, 239.64 ± 0.02 cm³; E* = 592, 585, 580 mV (± 1 mV), respectively.

The total alkalinity and total CO₂ were calculated from the volumes of acid added and the measured emf's using a least-squares Gran technique. A chemical model (Dickson, 1981) was used to determine the equivalence points on the titration curve.

The initial emf reading of the seawater solution before the titration began was used to determine the pH. The pH at 25°C was determined using the E* calculated for each titration. The concentrations of H⁺ are in mol/kg and are on the seawater scale ([H⁺]_T

= $[H^+]_F + [HSO_4^-] + [HF]$). The electrodes were calibrated before going to sea by making titrations of 0.7 M NaCl with 0.25 M HCl (with 0.45 M NaCl) and TRIS buffer. The TRIS buffer was made up in the laboratory and calibrated with hydrogen electrode system before the cruise (Millero, 1986). The total seawater pH scale (Dickson, 1984) was used for all the measurements.

2.2.4 Dissolved Organic Carbon Methods

A Shimadzu™ DOC-5000 Total Organic Carbon Analyzer with the ASI-5000™ Automated Sample Injector was purchased for use on this cruise. This is an automated DOC instrument utilizing high temperature catalytic combustion (680°C) and non-dispersive infrared detection. It was installed on the ship and operated in NPOC mode (Non-purgable organic carbon) which means the "DOC" reported does not include volatile species. The only modification to the standard operating procedures for this commercial instrument was that "zero" (high-purity) oxygen was used instead of compressed air for the carrier stream.

The water column was sampled using Niskin™ water sampling bottles mounted on the 24 bottle rosette/CTD package that was described in the Hydrographic Methods section of this report. Samples for the DOC analysis were collected on deck in the 40-mL glass vials which fit the autosampler carousel. The samples were free-flowed from the Niskin™ bottle into the vial. Care was taken so that the inner surfaces of the vial and the water stream from the valve did not come into contact with any other surfaces. Each vial was filled and rinsed with sample three times, before being filled for analysis. The sample was immediately acidified to pH of 2 by addition of vacuum-distilled HCl, and sealed with Parafilm™ and a plastic snap ring. Sample levels were kept far enough below the top of the vial to insure that the water did not come into contact with the Parafilm™ during subsequent handling.

The samples were moved to the autosampler for immediate processing, or were stored at 4°C if a delay was necessary. The autosampler was set to purge each sample of inorganic carbon species by bubbling high purity oxygen through the sample for five minutes immediately before the analysis. The gas stream continued to be introduced during the analytical process, except when the water was being transferred to the instrument by the sipper. Samples and standards were run in replicate, (usually six per determination). Peak area for each replicate was recorded for later statistical handling.

Data calibrations on this cruise were produced by the standard addition method; three levels of known concentrations of KHP (Potassium Hydrogen Phthalate) were added to aliquots of a sample and the series run as if they were discrete samples. This procedure insures that matrix effects and artifacts due to handling of the samples are reflected in the calibrations. The single largest problem in calibrating the DOC instrument is evaluating the "instrument blank", the part of the reported signal which is NOT due to organic carbon. Low organic carbon water produced by redistillation of research grade distilled water over potassium permanganate, and batch UV-irradiated Gulf Steam seawater were run daily as samples to monitor this apparent blank (which was usually <4 μmol/L). Data tables with the discrete carbon-related data from this study are in Appendix B.

2.3 PRODUCTIVITY

2.3.1 Methods for Chlorophyll Measurements

Chlorophyll a concentrations were determined from duplicate 250-mL and 300-mL aliquots taken from a flow-through system and Go-Flo™ hydrographic casts respectively. The samples were filtered through Whatman GF/F filters which were then placed in 5 mL of a 40/60 (vol.:vol.) mixture of dimethyl sulfoxide (DMSO):90% Acetone solution and placed in the dark for one hour. This is a modification of the Shoaf and Liem, (1976) and Burnison, (1980) procedure. The fluorescence of the DMSO/Acetone extracts were measured at sea with a Turner Designs™ fluorometer model 111. The fluorometer was calibrated at sea with Sigma™ chlorophyll a, following the method of Parsons et al., (1984).

Water was collected hourly from the seawater flow-through system for chlorophyll a analysis. The intake valve is located in the bow of the ship at about 3 m below the surface. The Go-Flo™ hydrographic casts for both chlorophyll a and production rate measurements were made using 10-L Go-Flo™ bottles mounted on Kevlar hydrowire. Six sampling depths were selected according to light levels. Seawater samples were collected at 100, 50, 30, 15, 6, and 1 % of the incident surface irradiance (I_0). Diffuse vertical attenuation coefficients (K), in reciprocal meters, were estimated at all stations using a Secchi disk and the relation $K = 1.4/\text{Secchi depth}$. Photosynthetically available radiation (PAR) was also measured with depth using a Lambda Instruments™ LI-190S 4π spherical collector. Calculations for this measurement were done after each cast. All Go-Flo™ hydrocasts were performed within a three hour time window (between 7-10 am local), to help ensure uniform sampling conditions throughout the cruise. Contour plots of chlorophyll a values from Leg 1 of this cruise are found in Figure 7.

2.3.2 Methods for Productivity Measurements

Productivity measurements were made using the ^{14}C Carbon method, as originally described by Steemann-Nielsen (1952), with modifications by Fitzwater et al. (1982) to minimize trace metal contamination. All materials were acid-cleaned in dilute (0.1 N) HCl, then rinsed with Milli-Q™ water. Incubation bottles were rinsed with the seawater sample prior to being filled. Samples were collected from the Go-Flo bottles in darkened 2-L acid-cleaned polycarbonate bottles. Approximately 250 mL of sample was transferred to each of three (two light, one dark) acid cleaned polycarbonate bottles and inoculated with 5 μCi of $\text{NaH}^{14}\text{CO}_3$ with acid cleaned Eppendorf™ pipettes. The Amersham-Serle™ isotope (^{14}C -bicarbonate) was prepared in a carrier solution of 0.3 g/L Baker Instra Analyzed™ NaHCO_3 . The three incubation bottles were then placed into small Plexiglas™ tubes that were wrapped with blue film, (#TS-51-xsr from Madico Inc.). The number of wraps were calibrated to simulate the 100, 50, 30, 15, 6, and 1 % of the incident surface I_0 , corresponding to optical depths listed in Appendix C of 0, -0.69, -1.20, -1.90, -2.81, and -4.60. The samples were incubated on deck for 24 hours in clear Plexiglas™ cylinders filled with circulating surface seawater. The samples were then taken to the lab where they were filtered, in

SOUTH ATLANTIC 1991 RITS/CO2 LEG 1
CHLOROPHYL A (mg/m³)

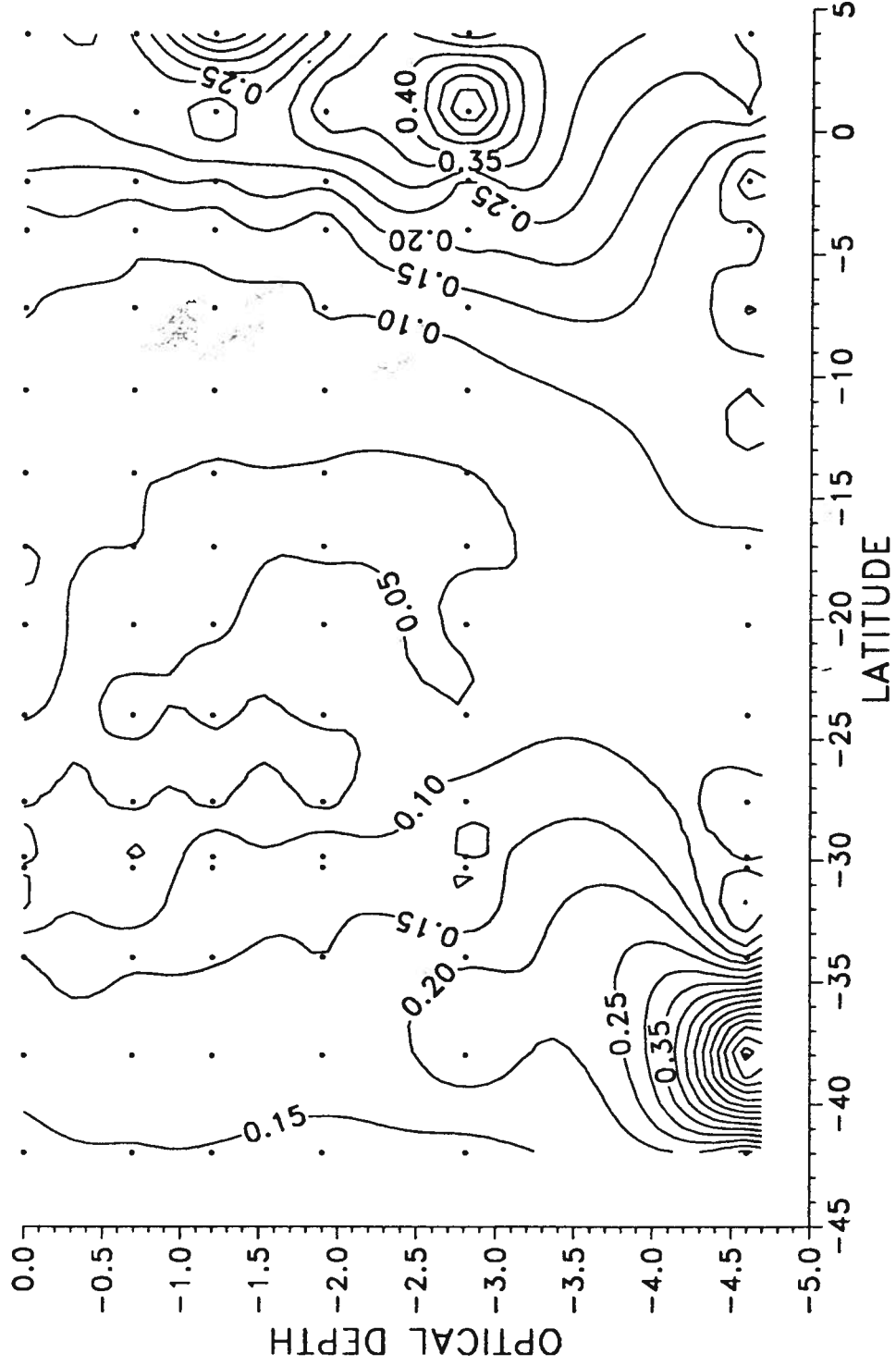


Figure 7: Chlorophyll a cross section from Leg 1. Dots represent sample locations. Contour interval = 0.05 mg/m³.

darkness, through Whatman GF/F filters, and rinsed with filtered seawater without being exposed to air.

Filtrations were performed under a pressure differential of <50 mm Hg to minimize cell breakage (Goldman and Dennett, 1985). The filters were transferred to Nalgene™ scintillation bags, and acidified with 0.5N HCl. After one hour, a 3-mL aliquot of Universol™ (ICN radiochemicals) scintillation cocktail was added to each bag as described in Hitchcock (1986).

Isotope activity of the samples was measured aboard ship with a Tracor model 300 scintillation counter. Production rate ($\text{mg C/m}^3/\text{h}^1$) was calculated from the mean value of the two light bottles minus the dark bottle activity. A contour plot of productivity measurements from Leg 1 of this cruise is presented in Figure 8. Productivity data tables from this study are in Appendix C.

2.4 UNDERWAY MEASUREMENT METHODS

Sampling

During Legs 1 and 2 of the S. ATL-91 cruise, underway measurements of fugacity of CO_2 in surface seawater, ($f\text{CO}_2\text{w}$), and air, ($f\text{CO}_2\text{a}$) were performed with an automated system. The seawater intake was located in the ship's bow bubble, approximately 3 m below the water line. A thermosalinograph, which records temperature and salinity was placed in a shunt off the main seawater intake line, in the bow bubble as well. Since there was evidence of seawater being heated prior to its reaching the thermosalinograph, water temperature was acquired from a hull mounted probe used for acoustic Doppler current profile data reduction. On Leg 2, discrete samples were taken from the underway system at six-hour intervals and analyzed for TCO_2 , $f\text{CO}_2$, and major nutrients in addition to the continuous $f\text{CO}_2$ measurements. Cruise tracks from Legs 1 and 2, with the range of $f\text{CO}_2\text{w}-f\text{CO}_2\text{a}$ values represented by stick diagrams, are presented in Figures 9 and 10. The underway carbon data is presented in tables in Appendix D.

2.4.1 Underway $f\text{CO}_2$ Measurements

The shipboard automated underway $f\text{CO}_2$ system runs on an hourly cycle during which three gas standards, a headspace sample from the equilibrator, and an ambient air sample are analyzed. The equilibrator, which was designed by R. Weiss of S.I.O., is made from a large (58 cm H x 23 cm ID) Plexiglas™ chamber. The equilibrator has a shower head in the top through which surface seawater is forced at a rate of 20-30 L/min. The water spray through the 16-L head space and the turbulence created by the jets impinging on the surface of 8-L of water, cause the gases in water and headspace to equilibrate. A drain 20 cm from the bottom of the equilibrator discharges excess water from the system over the side of the ship. Air in the equilibrator head space is circulated with an Aircadet™ pump (model 7530-40) at 6 L/min in a closed loop through a mass flow meter (MFM) and back pressure regulator. During 23 minutes of each hour, 75 mL/min is teed off upstream of the back pressure regulator through a mass flow controller (MFC) and into the 12-mL sample cell of a Licor™ (model 6251) non-dispersive infrared analyzer. The air removed from the equilibrator through the IR analyzer is replaced with ambient air through an intake/vent line that runs to the outside of the ship. The

SOUTH ATLANTIC 1991 RITS/CO2 LEG 1
 PRODUCTIVITY ($\text{mgC m}^{-3}\text{h}^{-1}$)

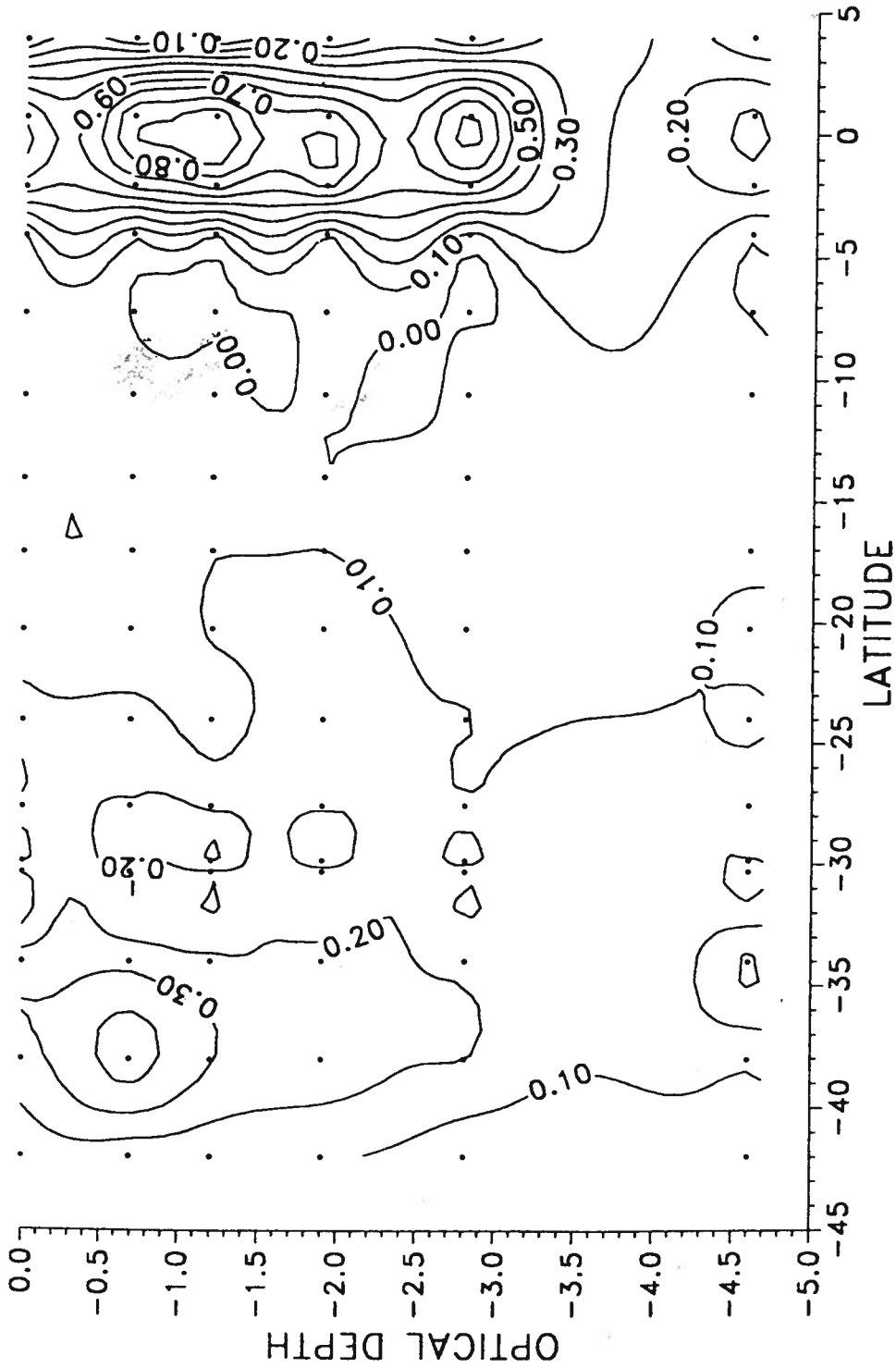


Figure 8: Productivity cross section from Leg 1. Dots represent sample locations. Contour interval = $0.1 \text{ mg C m}^{-3} \text{ h}^{-1}$

SOUTH ATLANTIC 1991 RITS/CO2 LEG 1
 UNDERWAY fCO2 (water - air) [uatm]

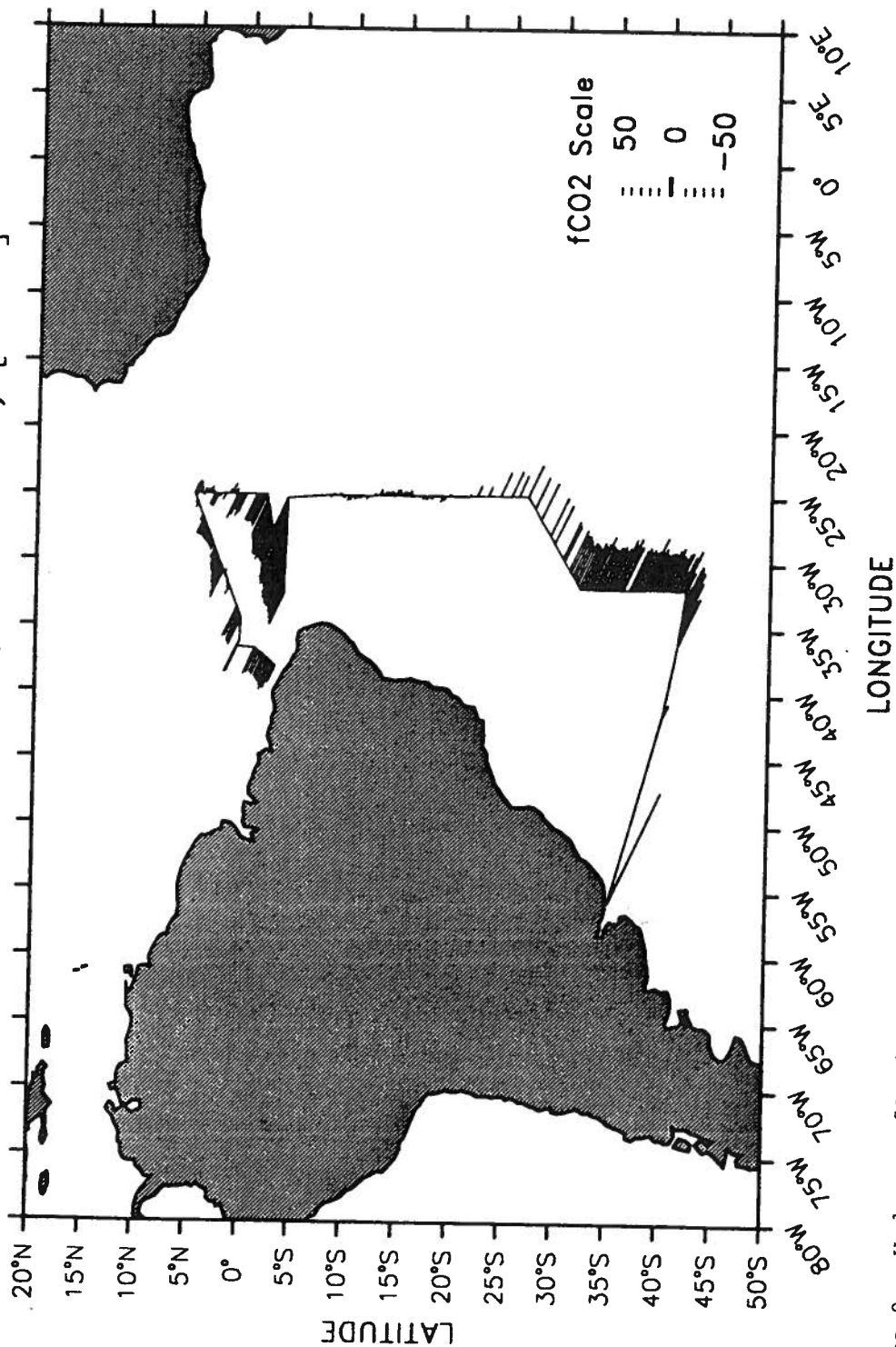


Figure 9: Underway fCO₂(w-a) measurements from Leg 1. Stick height, above, or to the left of track line equals fCO₂(w-a). Negative fCO₂(w-a) values depict sinks and appear below, or to the right of the track line.

SOUTH ATLANTIC 1991 RITS/CO2 LEG 2
 UNDERWAY fCO₂ (water - air) [uatm]

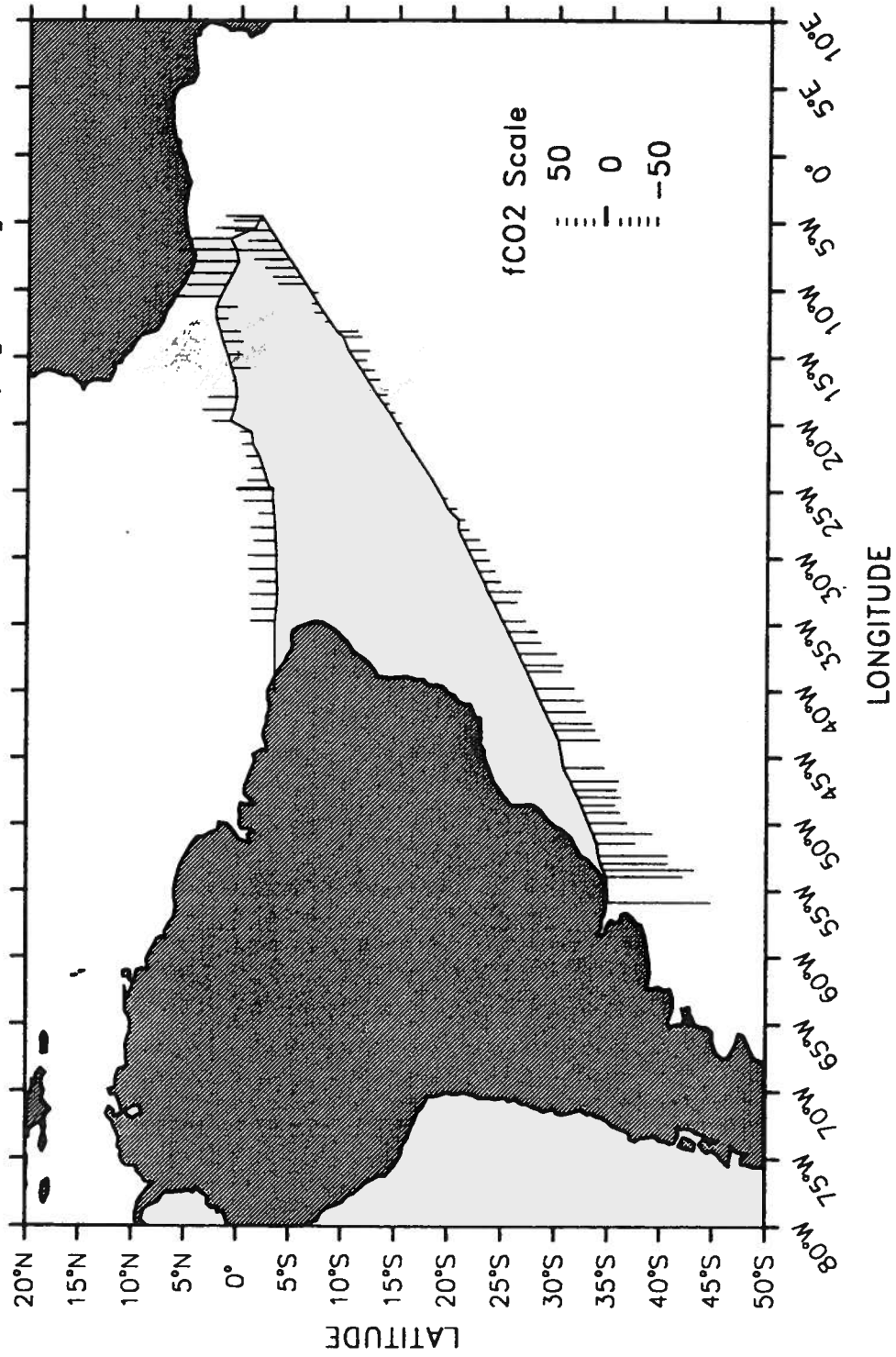


Figure 10: Underway fCO₂(w-a) measurements from Leg 2. Stick height above track line equals fCO₂(w-a). Negative fCO₂(w-a) values appear below the track line.

introduction of the ambient air into the equilibrator chamber during sampling of the headspace results in an error in the determination of the equilibrated head space composition no greater than one micro atmosphere. The total time required to fully replace equilibrator air through the ambient air intake/vent line is 213 minutes. The headspace equilibration time, as determined by return to equilibrium after perturbation by adding nitrogen to the head space, is approximately 2.5 minutes. The intake/vent line also assures that the pressure in the head space of the equilibrator remains at atmospheric value.

During underway sampling operations ambient air is drawn through 100 m of 0.37 cm OD Dekoron™ tubing from the bow mast of the ship at a rate of 6 to 8 L/min. During 22 minutes of each hour, ambient air mixing ratios are measured in the IR analyzer by teeing off the air line at a flow rate of 75 mL/min. Compressed gas standards with nominal mixing ratios of 300, 350, and 400 ppm (parts per million by volume) flow through the IR analyzer for five minutes each hour at 75 mL/min for calibration. The 300 ppm standard flows continuously at 50 mL/min through the reference side of the IR analyzer (detector) as well. All reference tanks undergo a pre- and post-cruise calibration at CMDL against standards certified by the World Meteorological Organization (WMO).

The IR analyzer/detector's voltage output is measured once per second with a Keithley™ (model 195 A) digital multimeter; 1-minute averages are calculated and stored on the hard disk of an MS-DOS computer. The MFC's connected to the reference and sample inlet of the IR, the MFM's measurement of the intake rate of ambient air and recirculation rate of the headspace of the equilibrator, the back pressure in the air and equilibrated air lines, and two thermistors readings of the water temperature in the equilibrator are all logged at 1-minute intervals as well.

fCO₂ Calculations

The mixing ratios of ambient air and equilibrated headspace air are calculated by fitting a second-order polynomial fit through the response of the detector versus mixing ratio of the standards. Due to the need for sufficient time to flush the sample cell and lines leading to the IR from the previous gas, the first three minutes of each analysis run are not used in the calculations. The subsequent one-minute readings for each analysis are averaged, yielding one 19-minute average ambient air mixing ratio and one 20-minute average equilibrated headspace mixing ratio per hour. Typical standard deviations for air values are ± 0.1 ppm and for equilibrated headspace ± 0.3 ppm.

Mixing ratios of dried equilibrated headspace and air must be converted to fugacity of CO₂ in water and water saturated air in order to determine the driving force for the air-sea CO₂ flux. For ambient air, assuming 100% water vapor content, the conversion is:

$$fCO_{2a} = XCO_{2a} (P - p_{H_2O}) \exp(B_{11} + 2 \delta_{12}) P/RT \quad (1)$$

where p_{H_2O} is the water vapor pressure at the sea surface temperature, and P is the atmospheric pressure. The exponential term is the fugacity correction where B_{11} is the second virial coefficient of pure CO₂ ($B_{11} = -1636.75 + 12.0408 T - 0.0327957 T^2 + 3.16528 \times 10^{-5} T^3$) and δ_{12} ($= 57.7 - 0.118 T$) is the correction for an air-CO₂ mixture (Weiss,

1974). The calculation for the fugacity in water includes an empirical temperature correction term for the increase of f_{CO_2} due to heating ($df_{CO_2w}/dT = 4.23\%/^{\circ}C$, D. Chipman and T. Takahashi, personal communication), of the water from passing through the pump and through 5 cm ID PVC tubing within the ship. The water in the equilibrator is typically $0.3^{\circ}C$ warmer than sea surface temperature. The fugacity in water is calculated according to:

$f_{CO_2w} =$

$$X_{CO_2w} (P - p_{H_2Oeq}) (\exp[(T_{sw} - T_{eq}) 0.0428]) \exp(B_{11} + 2 \sigma_{12}) P/RT \quad (2)$$

where p_{H_2Oeq} is the water vapor pressure at the temperature of the water in the equilibrator, T_{sw} is the temperature of the surface seawater, T_{eq} is the temperature of the water in the equilibrator.

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4. REFERENCES

- Armstrong, F.A.J., C.R. Stearns, and J.D.H. Strickland, The measurement of upwelling and subsequent biological processes by means of the Technicon Auto-Analyzer and associated equipment, *Deep-Sea Res.*, 14, 381-389, 1967.
- Atlas, E.L., J.C. Callaway, R.D. Tomlinson, L.I. Gordon, L. Barstow, and P.K.Park, A practical manual for use of the Technicon Autoanalyzer for Nutrient Analysis, revised, Oregon State University Technical Report 215, Reference No. 71-22, 1971.
- Burnison, B.K., Modified dimethylsulfoxide (DMSO) extraction for chlorophyll analysis of phytoplankton, *Can. J. Fish. Aquat. Sci.* 37, 729-733, 1980.
- Carpenter, J.H., The Chesapeake Bay Institute technique for the Winkler Dissolved Oxygen method, *Limnol. Oceanogr.*, 10, 141-143, 1965.
- Chipman, D.W., J. Marra, and T. Takahashi, Primary production at 47° N and 20° W in the North Atlantic Ocean: A comparison between the ¹⁴C incubation method and mixed layer carbon budget observations, *Deep-Sea Res. II*, 40, 151-169, 1993.
- Dickson, A.G., An exact definition of total alkalinity and a procedure for the estimate of alkalinity and total CO₂ from titration data, *Deep-Sea Res.*, 28, 609-623, 1981.
- Dickson, A.G., pH scales and proton-transfer reactions in saline media such as seawater, *Geochim. Cosmochim. Acta*, 48, 2299-2308, 1984.
- DOE, Handbook of methods for the analysis of the various parameters of the carbon dioxide system in sea water, version 1.0, (A. Dickson and C. Goyet ed.), 1991.
- Fitzwater, S.E., G.A. Knauer, and J.B. Martin, Metal contamination and it's effect on primary production measurements, *Limn. Oceanogr.*, 27, 544-551, 1982.
- Friederich, G.E., P. Sherman and L.A. Codispoti, A high precision automated Winkler titration system based on an HP-85 computer, a simple colorimeter and an inexpensive electromechanical buret, Bigelow Lab. for Ocean Sciences, Tech. Report 42, 24 pp, 1984.
- Goldman, J.C. and M.R. Dennet, Susceptibility of some marine phytoplankton species to cell breakage during filtration and post filtration rinsing, *J. Exp. Mar. Biol. Ecol.*, 86, 47-58, 1985.
- Hitchcock, G.L., Methodological aspects of time course measurements of C-14 fixation in marine phytoplankton, *J. Exp. Mar. Biol. Ecol.*, 95, 233-243, 1986.
- Johnson, K.M., Operator's manual; Single operator multiparameter metabolic analyzer (SOMMA) for total carbon dioxide (CT) with Coulometric detection), 70 pp, Brookhaven N.Y., 1992.

- Johnson, K. M., K. D. Wills, D. B. Butler, W. K. Johnson, and C. S. Wong, Coulometric total carbon dioxide analysis for marine studies: maximizing the performance of an automated continuous gas extraction system and coulometric detector, *Mar. Chem.* 44, 167-189, 1993.
- Millero, F.J., The thermodynamics of the carbonic acid system in seawater, *Geochim. Cosmochim. Acta*, 43, 1651-1661, 1979.
- Millero, F. J., and A. Poisson, International one-atmosphere equation of state of seawater, *Deep-Sea Res.*, 28A, 625-629, 1981.
- Millero, F.J., The pH of estuarine waters, *Limnol. Oceanogr.*, 31, 839-847, 1986.
- Parsons, T.R., Y. Maita, and C.M. Lalli, *A Manual of Chemical and Biological Methods for Seawater Analysis*, Pergamon, Elmsford, New York, 1984.
- Peng, T.-H., T. Takahashi, W. S. Broecker, and J. Olafsson, Seasonal variability of carbon dioxide, nutrients and oxygen in the northern North Atlantic surface water: observations and a model, *Tellus*, 39B, 439-458, 1987.
- Shoaf, W.T. and B.W. Lium, Improved extraction of chlorophyll a and b from algae using dimethyl sulfoxide, *Limnol. Oceanogr.* 21, 926-928, 1976.
- Saunders, P. M., and N. P. Fofonoff, Conversion of pressure to depth in the ocean, *Deep-Sea Res.*, 23, 109-111, 1976.
- Steeman-Nielsen, E., The use of radioactive carbon (C^{14}) for measuring organic carbon production in the sea, *J. Cons. Int. Explor. Mer.*, 18, 117-140, 1952.
- Thurmond, V.L., The carbonate system in Ca-Mg-Na-Cl brines up to 6.0 molal NaCl at 25°C. Thesis, 1982.
- Thurmond, V.L., and F.J. Millero, The ionization of carbonic acid in sodium chloride solutions at 25°C, *J. Solution Chem.*, 11, 447-456, 1982.
- Wanninkhof, R., and K. Thoning, Surface water fCO_2 measurements using continuous and discrete sampling methods, *Marine Chem.* 44, 189-204, 1993.
- Weiss, R. F., Carbon dioxide in water and seawater: the solubility of a non-ideal gas, *Mar. Chem.*, 2, 203-215, 1974.
- Wilke, R. J., D. W. R. Wallace and K. M. Johnson, Water-based gravimetric method for the determination of gas loop volume. *Analytical Chem.* 65, 2403-2406, 1993.

APPENDIX A: Index of Measurements and Units

List of measurements

| <u>Column heading or abbreviation</u> | <u>Explanation</u> |
|--|--|
| <i>Hydrography, Appendix B</i> | |
| TCO ₂ (coul.) | dissolved inorganic carbon dioxide (coulometer) |
| TCO ₂ (titr.) | dissolved inorganic carbon dioxide (titrated) |
| fCO ₂ ,20 | fugacity of CO ₂ at 20 degrees |
| TALK | total alkalinity |
| calc. | means the value has been calculated |
| coul. | coulometer. |
| DOC | dissolved organic carbon |
| <i>Productivity measurements, Appendix C</i> | |
| OPT DEPTH | optical depth |
| PROD_RATE | organic carbon production rate |
| CARB_DAY | organic carbon production per day (= PROD_RATE*24) |
| CHLORO_A | chlorophyll <u>a</u> |
| CHLOR_DAY | chlorophyll production per day |
| TOT_PIGS | chlorophyll <u>a</u> + phaeopigments |
| INCUB-TIME | incubation time for productivity measurements |
| <i>Underway measurements, Appendix D</i> | |
| Lat | latitude in decimal degrees |
| Lon | longitude in decimal degrees |
| XCO ₂ ,a | the volume fraction of CO ₂ in air |
| XCO ₂ ,w | the volume fraction of CO ₂ in equilibrator headspace |
| fCO ₂ ,w-a | fugacity of CO ₂ (water value minus the air value) |
| SST | sea surface temperature |
| SST-Eq.T | sea surface Temperature-Equilibrator temperature |
| Sal(CTD) | salinity from CTD measurement at stations |
| Sal(TSG) | salinity measurement from thermosalinograph |

Hydrographic and Carbon System parameters, Appendix B

| <u>Parameter</u> | <u>Units</u> | <u>Unit spelled out</u> |
|----------------------------|--------------|--------------------------------|
| Depth | m | meters |
| Pres. | db | decibars |
| Temp. | °C | degrees centigrade |
| Pot. T. | °C | degrees centigrade |
| Salinity | (none) | salinity |
| Sigma theta | (none) | potential density |
| Oxygen | mL/L | milliliters per liter |
| NO ₂ | umol/L | micro moles per liter |
| NO ₃ | umol/L | micro moles per liter |
| SiO ₄ | umol/L | micro moles per liter |
| TCO ₂ (coul.) | umol/Kg | micro moles per kilogram |
| fCO ₂ (20 deg.) | uatm | micro atmospheres at 20 °C |
| pH | (none) | |
| TALK | uEq/Kg | micro equivalents per kilogram |
| TCO ₂ (titr.) | umol/Kg | micro moles per kilogram |
| DOC | umol/L | micro moles per liter |

Productivity parameters, Appendix C

| <u>Parameter</u> | <u>Units</u> | <u>Unit spelled out</u> |
|------------------|------------------------------------|--|
| SALINITY | (none) | salinity |
| INCUB_TIME | HRS | hours |
| DEPTH | m | meters |
| OPT_DEPTH | (none) | optical depth |
| PROD_RATE | mgC/m ³ /h ¹ | milligrams of carbon per m ³ per hr |
| CARB_DAY | mg/m ³ | milligrams per cubic meter |
| CHLORO_A | mg/m ³ | milligrams per cubic meter |
| CHLORO_DAY | mg/m ³ | milligrams per cubic meter |
| TOT_PIGS | mg/m ³ | milligrams per cubic meter |

Underway parameters, Appendix D

| <u>Parameter</u> | <u>Units</u> | <u>Unit spelled out</u> |
|-----------------------|--------------|-------------------------|
| Lat | Dec. Deg. | decimal degrees |
| Lon | Déc. Deg. | decimal degrees |
| XCO ₂ ,a | ppm | parts per million |
| XCO ₂ ,w | ppm | parts per million |
| SST | deg. C | degrees centigrade |
| SST-Eq.T | deg. C | degrees centigrade |
| Sal (CTD) | none | |
| Pressure | mb | millibars |
| fCO ₂ ,w | uatm | microatmospheres |
| fCO ₂ ,w-a | uatm | microatmospheres |

APPENDIX B: Station Data for Hydrography and Carbon Parameters

Casts are presented by cruise leg and increasing cast number. The cruise leg number, the station number, geographic coordinates, operation number, date and bottom depth are shown at the top of each data table. Data values that are suspect for various reasons are italicized. A blank space is left when either no data was collected, or the value was known to be in error. See Appendix A for explanation of column headings and abbreviations. All coordinates are in fractional degrees with negative values indicating south or west.

NOAA South Atlantic 1991 Long Lines

Leg 1
 Station 1
 Cast 1

Niskin Bottle hydrographic data
 Operation # 0911930001.0
 Date 7/12/1991
 Time (GMT) 630

Latitude -0.66
 Longitude -36.51
 Bottom Depth 4544

| Sample # | Pres. db | Depth m | Temp. deg. C | Pot. T. deg. C | Sigma theta | Salinity | Oxygen mL/L | NO2 umol/L | NO3 umol/L | SiO4 umol/L | TCO2 (cool.) umol/Kg | TCO2 (20 deg.) uatm | TALK uEq/Kg | TCO2 (titr.) umol/Kg | pH | TALK (calc.) uEq/Kg | DOC umol/L |
|----------|----------|---------|--------------|----------------|-------------|----------|-------------|------------|------------|-------------|----------------------|---------------------|-------------|----------------------|-------|---------------------|------------|
| 101 | 4496 | 4416 | 1.030 | 0.670 | 27.865 | 34.749 | | | | | 833.4 | 833.4 | 2363 | 2271 | | | |
| 102 | 4496 | 4416 | 1.030 | 0.670 | 27.865 | 34.748 | 5.60 | | | | 2243.5 | 933.0 | | | | 2370.9 | |
| 103 | 3595 | 3538 | 2.482 | 2.180 | 27.887 | 34.910 | | | | | 2172.7 | 733.5 | 2322 | 2173 | 7.712 | 2335.3 | |
| 104 | 3594 | 3537 | 2.484 | 2.182 | 27.888 | 34.935 | 5.96 | | | | 2171.1 | 726.9 | | | | 2337.1 | |
| 105 | 3596 | 3538 | 2.482 | 2.180 | 27.887 | 34.924 | | | | | 2174.9 | 733.2 | | | | 2335.4 | |
| 106 | 3595 | 3538 | 2.485 | 2.183 | 27.887 | 34.912 | 6.01 | | | | 2175.8 | 721.6 | | | | 2337.9 | |
| 107 | 2995 | 2951 | 2.782 | 2.536 | 27.873 | 34.931 | | | | | 2172.6 | 733.4 | 2310 | 2173 | | 2335.6 | |
| 108 | 2585 | 2550 | 2.962 | 2.754 | 27.860 | 34.940 | 5.88 | | | | 2171.2 | 732.0 | 2331 | 2178 | 7.708 | 2334.5 | |
| 109 | 2385 | 2354 | 3.087 | 2.897 | 27.853 | 34.957 | | | | | 2169.0 | 741.4 | | | | 2325.1 | |
| 110 | 1994 | 1959 | 3.623 | 3.462 | 27.818 | 34.971 | | | | | 2169.9 | 729.6 | | | | 2336.3 | |
| 111 | 1491 | 1474 | | | | | | | | | | | | | | | |
| 112 | 1351 | 1336 | 4.527 | 4.415 | 27.689 | 34.933 | | | | | 2179.2 | 836.4 | 2315 | 2226 | | 2322.2 | |
| 113 | 1351 | 1337 | 4.527 | 4.415 | 27.688 | 34.931 | | | | | 2181.3 | 838.0 | | | | 2321.8 | |
| 114 | 1351 | 1336 | 4.527 | 4.415 | 27.689 | | | | | | | | | | | | |
| 115 | 1352 | 1337 | 4.528 | 4.416 | 27.688 | 34.932 | | | | | 2182.2 | | | | | | |
| 116 | 999 | 989 | 4.521 | 4.441 | 27.467 | 34.657 | 4.01 | | | | 2214.6 | | 2305 | 2223 | | | |
| 117 | 800 | 793 | 4.743 | 4.679 | 27.330 | 34.519 | 3.80 | | | | 2215.7 | 1141.0 | 2307 | 2226 | 7.566 | 2307.9 | |
| 118 | 499 | 495 | 7.029 | 6.981 | 27.116 | 34.612 | | | | | 2200.5 | 1087.0 | | | | 2300.5 | |
| 119 | 401 | 398 | 8.995 | 8.951 | 26.984 | 34.818 | | | | | 2208.2 | 1110.9 | | | | 2302.8 | |
| 120 | 300 | 297 | 10.558 | 10.522 | 26.848 | 34.982 | 3.07 | | | | 2179.8 | 881.9 | 2286 | 2178 | 7.740 | 2313.2 | |
| 121 | 202 | 201 | 11.453 | 11.427 | 26.755 | 35.073 | 3.23 | | | | 2161.6 | 746.1 | 2318 | 2180 | 7.706 | 2322.0 | |
| 122 | 104 | 103 | 17.886 | 17.868 | 26.016 | 35.913 | 3.87 | | | | 2118.7 | 478.8 | 2335 | 2106 | 7.561 | 2369.4 | |
| 123 | 55 | 55 | 26.752 | 26.739 | 23.655 | 36.130 | | | | | 2015.6 | 285.9 | 2358 | 2035 | 8.043 | 2376.8 | |
| 124 | 3 | 2 | 26.851 | 26.850 | 23.620 | 36.131 | 4.59 | | | | 2016.8 | 282.7 | 2368 | 2038 | 8.058 | 2381.6 | |

NOAA South Atlantic 1991 Long Lines

Leg 1
 Station 2
 Cast 2

Niskin Bottle hydrographic data
 Operation # 0911930003.0
 Date 7/12/1991
 Time (GMT) 1841

Latitude -0.46
 Longitude -35.18
 Bottom Depth 4547

| Sample # | Pres. db | Depth m | Temp. deg. C | Pot. T. deg. C | Sigma theta | Salinity | Oxygen mL/L | NO2 umol/L | NO3 umol/L | SiO4 umol/L | TCO2 (coul.) umol/Kg | fCO2 (20 deg.) uatm | TALK uEq/Kg | TCO2 (titr.) umol/Kg | pH | TALK (calc.) uEq/Kg | DOC umol/L |
|----------|----------|---------|--------------|----------------|-------------|----------|-------------|------------|------------|-------------|----------------------|---------------------|-------------|----------------------|----|---------------------|------------|
| | | | | | | | | | | | | | | | | | |
| 201 | 4536 | 4454 | 1.006 | 0.642 | 27.865 | 34.744 | 5.21 | | | | | | | | | | |
| 202 | 4537 | 4455 | 1.006 | 0.642 | 27.864 | 34.745 | 5.21 | | | | | | | | | | |
| 203 | 4536 | 4455 | 1.006 | 0.642 | 27.864 | 34.744 | 5.23 | | | | | | | | | | |
| 204 | 4536 | 4454 | 1.006 | 0.642 | 27.865 | | 5.21 | | | | | | | | | | |
| 205 | 4536 | 4454 | 1.006 | 0.642 | 27.865 | | 5.22 | | | | | | | | | | |
| 206 | 4536 | 4454 | 1.006 | 0.642 | 27.865 | 34.754 | 5.21 | | | | | | | | | | |
| 207 | 4536 | 4454 | 1.006 | 0.642 | 27.865 | 34.747 | 5.23 | | | | | | | | | | |
| 208 | 4535 | 4454 | 1.006 | 0.642 | 27.865 | 34.744 | 5.24 | | | | | | | | | | |
| 209 | 4533 | 4452 | 1.006 | 0.642 | 27.865 | | 5.21 | | | | | | | | | | |
| 210 | 4533 | 4451 | 1.006 | 0.642 | 27.864 | 34.746 | 5.20 | | | | | | | | | | |
| 211 | 4533 | 4452 | 1.006 | 0.642 | 27.866 | | | | | | | | | | | | |
| 212 | 4532 | 4451 | 1.006 | 0.642 | 27.865 | 34.757 | 5.21 | | | | | | | | | | |
| 213 | 717 | 711 | 5.069 | 5.010 | 27.265 | 34.482 | 3.78 | | | | | | | | | | |
| 214 | 719 | 712 | 5.069 | 5.010 | 27.266 | 34.485 | 3.66 | | | | | | | | | | |
| 215 | 720 | 713 | 5.061 | 5.002 | 27.267 | 34.511 | 3.68 | | | | | | | | | | |
| 216 | 719 | 712 | 5.067 | 5.008 | 27.265 | 34.481 | 3.68 | | | | | | | | | | |
| 217 | 720 | 713 | 5.060 | 5.001 | 27.267 | 34.487 | 3.65 | | | | | | | | | | |
| 218 | 720 | 714 | 5.061 | 5.002 | 27.266 | 34.483 | 3.90 | | | | | | | | | | |

NOAA South Atlantic 1991 Long Lines

Leg 1 Station 3 Cast 3
 Niskin Bottle hydrographic data
 Operation # 0911960019.0
 Date 7/15/1991
 Time (GMT) 443
 Latitude 5.00
 Longitude -24.97
 Bottom Depth 4163

| Sample # | Pres. db | Depth m | Temp. deg. C | Pot. T. deg. C | Sigma theta | Salinity | Oxygen mL/L | NO2 umol/L | NO3 umol/L | SiO4 umol/L | TCO2 (coul.) umol/Kg | TCO2 (20 deg.) uatm | TALK uEq/Kg | TCO2 (titr.) umol/Kg | pH | TALK (calc.) uEq/Kg | DOC umol/L | |
|----------|----------|---------|--------------|----------------|-------------|----------|-------------|------------|------------|-------------|----------------------|---------------------|-------------|----------------------|-------|---------------------|------------|--|
| 301 | 1005 | 995 | 4.820 | 4.737 | 27.454 | 34.687 | 3.33 | 0.0 | 34.4 | 29.2 | 2224.3 | 1133.2 | 2300 | 2211 | 7.524 | 2318.3 | 45.2 | |
| 302 | 1005 | 995 | 4.810 | 4.727 | 27.456 | 34.685 | 3.36 | 0.0 | 34.4 | 28.2 | 2226.1 | 1130.4 | | 2211 | 7.524 | 2318.7 | | |
| 303 | 951 | 942 | 4.948 | 4.869 | 27.413 | 34.652 | 3.16 | 0.0 | 35.8 | 28.6 | 2228.5 | 1185.1 | 2299 | 2211 | 7.506 | 2314.8 | | |
| 304 | 901 | 893 | 5.027 | 4.952 | 27.388 | 34.633 | 3.06 | 0.0 | 36.8 | 28.9 | 2230.9 | 1212.4 | 2301 | 2238 | 7.506 | 2313.8 | | |
| 305 | 850 | 842 | 5.231 | 5.159 | 27.353 | 34.637 | 2.93 | 0.0 | 37.3 | 28.5 | 2232.0 | 1239.0 | 2305 | 2238 | | 2311.8 | | |
| 306 | 850 | 842 | 5.224 | 5.152 | 27.355 | 34.618 | 2.92 | 0.0 | 37.2 | 29.7 | 2232.6 | 1239.6 | | 2226 | | 2311.8 | 46.1 | |
| 307 | 800 | 792 | 5.415 | 5.347 | 27.323 | 34.609 | 2.80 | 0.0 | 37.6 | 27.7 | | 1255.6 | 2279 | 2226 | 7.495 | | | |
| 308 | 751 | 744 | 5.622 | 5.557 | 27.290 | 34.600 | 2.76 | 0.0 | 37.6 | 26.1 | 2231.5 | | 2313 | 2256 | | | | |
| 309 | 702 | 695 | 5.690 | 5.629 | 27.261 | | | | | | | | | | | | | |
| 310 | 641 | 635 | 6.107 | 6.050 | 27.230 | 34.600 | 2.80 | 0.0 | 38.0 | 24.4 | 2224.5 | 1217.4 | 2282 | 2212 | 7.508 | 2306.1 | 51.3 | |
| 311 | 580 | 575 | 6.695 | 6.641 | 27.184 | 34.640 | 2.64 | 0.0 | 36.1 | 21.4 | 2225.2 | 1211.5 | 2310 | 2248 | 7.508 | 2307.7 | | |
| 312 | 531 | 526 | 7.182 | 7.131 | 27.153 | 34.684 | 2.47 | 0.0 | 35.5 | 19.4 | 2225.9 | 1217.7 | 2283 | 2214 | | 2307.8 | 54.4 | |
| 313 | 447 | 443 | 8.499 | 8.451 | 27.072 | 34.829 | 1.98 | 0.0 | 35.6 | 17.0 | 2228.2 | 1252.2 | 2309 | 2244 | 7.520 | 2306.5 | | |
| 314 | 401 | 397 | 9.672 | 9.626 | 26.973 | 34.946 | 2.09 | 0.0 | 32.6 | 14.1 | 2220.4 | 1141.9 | 2281 | 2200 | | 2312.6 | | |
| 315 | 352 | 349 | 10.566 | 10.523 | 26.890 | 35.037 | 1.95 | 0.0 | 31.2 | 12.7 | 2217.2 | 1104.7 | 2310 | 2230 | 7.557 | 2314.6 | 42.9 | |
| 316 | 306 | 303 | 11.462 | 11.423 | 26.796 | 35.124 | 2.22 | 0.0 | 27.7 | 10.5 | 2202.5 | 956.0 | | | | 2322.4 | | |
| 317 | 266 | 264 | 11.891 | 11.856 | 26.737 | 35.204 | | | | | | | | | | | | |
| 318 | 221 | 220 | 12.393 | 12.363 | 26.678 | 35.204 | 3.12 | 0.0 | 21.4 | 7.5 | 2168.4 | 747.5 | 2307 | 2263 | | 2328.3 | 55.2 | |
| 319 | 183 | 182 | 12.892 | 12.967 | 26.616 | 35.280 | 3.07 | 0.0 | 19.7 | 7.0 | 2168.0 | 721.7 | 2288 | 2216 | | 2334.9 | | |
| 320 | 135 | 134 | 13.918 | 13.899 | 26.519 | 35.401 | 2.83 | 0.0 | 20.2 | 6.1 | 2171.4 | 718.5 | 2354 | 2258 | | 2340.1 | 55.4 | |
| 321 | 103 | 102 | 15.198 | 15.182 | 26.345 | 35.543 | 2.68 | 0.0 | 18.6 | 5.4 | 2170.0 | 690.5 | | | | 2346.8 | 61.7 | |
| 322 | 79 | 79 | 19.708 | 19.693 | 25.521 | 35.887 | 3.44 | 0.5 | 7.6 | 3.1 | 2120.3 | 475.2 | | | | 2371.1 | 51.6 | |
| 323 | 43 | 43 | 27.670 | 27.660 | 22.867 | 35.478 | 4.72 | 0.6 | 0.0 | 0.0 | 1954.3 | 262.0 | 2314 | 1962 | 8.102 | 2322.1 | 78.4 | |
| 324 | 3 | 3 | 27.793 | 27.792 | 22.656 | 35.236 | 4.62 | 0.0 | 0.0 | 0.0 | 1943.9 | 243.1 | 2303 | 1891 | 8.106 | 2326.2 | 79.0 | |

NOAA South Atlantic 1991 Long Lines

Leg 1
 Station 4
 Cast 4

Niskin Bottle hydrographic data
 Operation # 0911960022.0
 Date 7/15/1991
 Time (GMT) 1253

Latitude 3.99
 Longitude -24.97
 Bottom Depth 4420

| Sample # | Pres. db | Depth m | Temp. deg. C | Pot. T. deg. C | Sigma theta | Salinity | Oxygen mL/L | NO2 umol/L | NO3 umol/L | SiO4 umol/L | TCO2 (cool.) umol/Kg | ICO2 (20 deg.) uatm | TALK uEq/Kg | TCO2 (titr.) umol/Kg | pH | TALK (calc.) uEq/Kg | DOC umol/L |
|----------|----------|---------|--------------|----------------|-------------|----------|-------------|------------|------------|-------------|----------------------|---------------------|-------------|----------------------|-------|---------------------|------------|
| 401 | 4023 | 3955 | 2.342 | 1.996 | 27.883 | 34.889 | 5.58 | 21.9 | 21.8 | 46.4 | 2197.6 | 764.8 | 2317 | 2183 | 7.701 | 2355.7 | 50.8 |
| 402 | 4023 | 3955 | 2.342 | 1.996 | 27.884 | 34.889 | 5.63 | 21.8 | 21.8 | 47.1 | 2196.0 | 768.6 | | | | 2354.8 | |
| 403 | 3689 | 3630 | 2.387 | 2.077 | 27.883 | 34.894 | 5.65 | 21.8 | 21.8 | 43.6 | 2192.5 | 766.3 | | | | 2349.8 | 59.6 |
| 404 | 3190 | 3143 | 2.585 | 2.324 | 27.875 | 34.910 | 5.55 | 21.5 | 21.5 | 39.5 | 2188.3 | | 2335 | 2201 | 7.701 | | 52.9 |
| 405 | 2790 | 2750 | 2.717 | 2.494 | 27.869 | 34.939 | | | | | | | | | | | |
| 406 | 2391 | 2359 | 3.007 | 2.818 | 27.856 | 34.978 | 5.63 | 20.6 | 20.6 | 30.1 | 2175.1 | 759.1 | 2321 | 2229 | 7.410 | 2332.0 | 46.1 |
| 407 | 1990 | 1966 | 3.466 | 3.307 | 27.823 | 34.969 | 5.53 | 21.0 | 21.0 | 24.2 | 2174.0 | 756.0 | 2318 | 2182 | 7.696 | 2331.6 | 46.8 |
| 408 | 1682 | 1662 | 3.982 | 3.845 | 27.779 | 34.970 | 5.40 | 20.9 | 20.9 | 19.9 | 2172.2 | 774.3 | 2310 | 2231 | 7.389 | 2325.1 | |
| 409 | 1591 | 1573 | 4.162 | 4.031 | 27.759 | 34.924 | 5.28 | 21.2 | 21.2 | 19.0 | 2174.2 | 800.8 | 2314 | 2190 | 7.678 | 2321.3 | 50.8 |
| 410 | 1393 | 1377 | 4.396 | 4.281 | 27.699 | | 4.78 | 23.7 | 23.7 | 21.0 | 2188.9 | 857.2 | 2299 | 2229 | 7.369 | 2325.5 | 46.9 |
| 411 | 1193 | 1180 | 4.593 | 4.495 | 27.598 | 34.835 | 4.11 | 28.0 | 28.0 | 25.8 | 2206.4 | 981.1 | 2329 | 2235 | 7.596 | 2321.5 | 46.3 |
| 412 | 994 | 984 | 4.696 | 4.615 | 27.449 | 34.651 | 3.51 | 34.3 | 34.3 | 30.4 | 2224.8 | 1135.8 | 2305 | 2237 | 7.561 | 2317.4 | 49.6 |
| 413 | 846 | 838 | 5.100 | 5.030 | 27.353 | 34.597 | 3.08 | 34.4 | 34.4 | 29.5 | 2229.8 | 1227.6 | 2282 | 2263 | 7.247 | 2310.6 | 48.9 |
| 414 | 744 | 737 | 5.291 | 5.229 | 27.297 | 34.563 | 3.20 | 34.1 | 34.1 | 28.5 | 2222.3 | 1203.7 | | | | 2307.5 | 49.3 |
| 415 | 745 | 738 | 5.293 | 5.231 | 27.297 | 34.551 | 3.17 | 34.3 | 34.3 | 28.4 | 2225.4 | 1205.0 | | | | 2307.4 | 51.0 |
| 416 | 646 | 640 | 5.965 | 5.908 | 27.238 | 34.581 | 2.85 | 34.1 | 34.1 | 25.4 | 2220.9 | 1246.9 | 2273 | 2288 | 7.289 | 2298.4 | |
| 417 | 495 | 491 | 7.607 | 7.558 | 27.115 | 34.726 | 2.39 | 33.2 | 33.2 | 19.6 | 2219.4 | 1229.9 | | | | 2298.2 | 43.3 |
| 418 | 335 | 332 | 10.869 | 10.828 | 26.867 | 35.075 | 1.58 | | | | 2226.5 | 1170.7 | 2302 | 2233 | 7.539 | 2315.9 | |
| 419 | 267 | 264 | 12.677 | 12.641 | 26.661 | 35.246 | 2.47 | 30.5 | 30.5 | 12.8 | 2179.9 | 847.7 | 2328 | 2187 | 7.667 | 2318.5 | 76.7 |
| 420 | 199 | 197 | 13.799 | 13.770 | 26.534 | 35.382 | 2.29 | 22.5 | 22.5 | 8.8 | 2189.4 | 794.6 | 2325 | 2243 | 7.401 | 2341.4 | 55.6 |
| 421 | 90 | 90 | 16.835 | 16.820 | 26.078 | 35.676 | 2.49 | 21.5 | 21.5 | 8.0 | 2164.7 | 673.1 | 2330 | 2185 | 7.724 | 2346.4 | 63.7 |
| 422 | 43 | 42 | 27.832 | 27.822 | 22.964 | 35.675 | 4.56 | 16.5 | 16.5 | 5.0 | 1970.6 | 252.7 | 2331 | 1977 | 8.097 | 2352.2 | 80.9 |
| 423 | 25 | 25 | 27.824 | 27.818 | 22.951 | 35.657 | 4.56 | | | | 1965.8 | 252.0 | 2307 | 2010 | 7.800 | 2347.6 | 80.0 |
| 424 | 3 | 3 | 27.731 | 27.730 | 22.871 | 35.504 | 4.57 | | | | 1860.2 | 248.0 | 2325 | 1980 | 8.114 | 2343.1 | 82.6 |

NOAA South Atlantic 1991 Long Lines

Leg 1 Station 5 Cast 5
 Niskin Bottle hydrographic data
 Operation # 0911960031.0
 Date 7/15/1991 Time (GMT) 1931
 Latitude 3.00
 Longitude -25.00
 Bottom Depth 4361

| Sample # | Pres. db | Depth m | Temp. deg. C | Pot. T. deg. C | Sigma theta | Salinity | Oxygen mL/L | NO2 umol/L | NO3 umol/L | SiO4 umol/L | TCO2 (coul.) umol/Kg | TCO2 (titr.) umol/Kg | TALK uEq/Kg | pH | TALK (calc.) uEq/Kg | DOC umol/L |
|----------|----------|---------|--------------|----------------|-------------|----------|-------------|------------|------------|-------------|----------------------|----------------------|-------------|-------|---------------------|------------|
| 501 | 997 | 987 | 4.540 | 4.460 | 27.451 | 34.643 | 3.54 | | | 21.9 | 2218.2 | 2227 | 2314 | 7.287 | | |
| 502 | 997 | 987 | 4.540 | 4.460 | 27.451 | 34.643 | 3.54 | 0.0 | | | 1124.6 | | | | | |
| 503 | 799 | 792 | 4.932 | 4.867 | 27.323 | 34.538 | 3.34 | 0.0 | | | 2237.3 | 2222 | 2308 | 7.282 | 2323.9 | |
| 504 | 798 | 791 | 4.937 | 4.872 | 27.321 | 34.535 | 3.35 | 0.0 | 34.4 | 29.0 | 1182.2 | | | | | |
| 505 | 500 | 495 | 7.142 | 7.094 | 27.138 | 34.660 | | | | | 2214.1 | 2214 | 2293 | 7.552 | 2300.0 | |
| 506 | 500 | 495 | 7.150 | 7.102 | 27.139 | 34.668 | | 0.0 | 32.1 | 19.3 | 1173.0 | | | | | |
| 507 | 348 | 345 | 10.259 | 10.218 | 26.904 | 35.001 | 1.95 | | | | 2219.6 | 1129.4 | | | | 2313.7 |
| 508 | 348 | 345 | 10.252 | 10.211 | 26.902 | 34.987 | 2.03 | 0.0 | | | 1124.1 | | | | | |
| 509 | 274 | 272 | 12.652 | 12.615 | 26.662 | 35.251 | 2.51 | | | | 2182.9 | 2183 | 2310 | 7.664 | 2323.9 | |
| 510 | 274 | 272 | 12.631 | 12.594 | 26.663 | 35.243 | 2.43 | 0.0 | 23.1 | 7.1 | 850.8 | | | | | |
| 511 | 225 | 223 | 13.387 | 13.355 | 26.582 | 35.336 | 2.18 | 0.0 | | | 2194.0 | 2176 | 2308 | 7.399 | 2332.8 | |
| 512 | 224 | 222 | 13.396 | 13.364 | 26.582 | 35.338 | 2.16 | 0.0 | 18.6 | 5.5 | 858.6 | | | | | |
| 513 | 176 | 175 | 14.529 | 14.503 | 26.449 | 35.478 | 2.75 | 0.0 | | | 2166.8 | 2175 | 2327 | 7.735 | 2338.9 | |
| 514 | 176 | 175 | 14.528 | 14.502 | 26.449 | 35.477 | 2.76 | 0.0 | 19.2 | 5.1 | 703.4 | | | | | |
| 515 | 127 | 126 | 15.690 | 15.670 | 26.294 | 35.611 | 2.22 | 0.0 | | | 2182.0 | 2197 | 2336 | 7.705 | 2345.5 | |
| 516 | 126 | 125 | 15.696 | 15.676 | 26.292 | 35.607 | 2.36 | 0.0 | 18.5 | 4.3 | 748.1 | | | | | |
| 517 | 103 | 102 | 16.389 | 16.372 | 26.173 | 35.664 | 2.17 | 0.2 | | | 2179.2 | 2174 | 2311 | 7.436 | 2345.3 | |
| 518 | 103 | 102 | 16.421 | 16.404 | 26.167 | 35.666 | 2.16 | 0.0 | 2.7 | 0.8 | 736.1 | | | | | |
| 519 | 76 | 75 | 21.762 | 21.747 | 24.988 | 35.919 | 3.56 | 0.0 | | | 2109.4 | 2096 | 2343 | 7.625 | 2379.4 | |
| 520 | 76 | 75 | 21.768 | 21.753 | 24.982 | 35.916 | 3.59 | 0.0 | 0.0 | 0.0 | 2109.4 | 2096 | 2343 | 7.625 | 2379.4 | |
| 521 | 41 | 41 | 27.291 | 27.281 | 23.121 | 35.662 | | 0.0 | 0.0 | 0.0 | 1980.4 | 1988 | 2330 | 8.083 | 2221.3 | |
| 522 | 40 | 40 | 27.288 | 27.279 | 23.121 | 35.651 | | 0.0 | 0.0 | 0.0 | 265.7 | | | | | |
| 523 | 4 | 3 | 27.291 | 27.290 | 23.110 | 35.641 | 4.58 | 0.0 | 0.0 | 0.0 | 266.5 | 1992 | 2320 | 8.077 | 2349.9 | |
| 524 | 3 | 3 | 27.286 | 27.285 | 23.112 | 35.645 | 4.60 | 0.0 | 0.0 | 0.0 | 263.6 | | | | | |

NOAA South Atlantic 1991 Long Lines

Leg 1
Station 6
Cast 6

Niskin Bottle hydrographic data

Operation # 0911970034.0
Date 7/16/1991
Time (GMT) 228

Latitude 2.00
Longitude -25.01
Bottom Depth 3963

| Sample # | Pres. db | Depth m | Temp. deg. C | Pot. T. deg. C | Sigma theta | Salinity | Oxygen mL/L | NO2 umol/L | NO3 umol/L | SiO4 umol/L | TCO2 (cool.) umol/Kg | fCO2 (20 deg.) uatm | TALK | pH | TALK (calc.) uEq/Kg | DOC umol/L | |
|----------|----------|---------|--------------|----------------|-------------|----------|-------------|------------|------------|-------------|----------------------|---------------------|--------|-------|---------------------|------------|------|
| | | | | | | | | | | | | | uEq/Kg | | | | |
| 601 | 3899 | 3835 | 2.360 | 2.027 | 27.881 | 34.897 | 5.60 | 0.0 | 0.0 | 2197.1 | 764.8 | 2338 | 2200 | 7.429 | 2355.3 | | |
| 602 | 3499 | 3444 | 2.477 | 2.185 | 27.877 | 34.900 | 5.66 | 0.0 | 20.3 | 39.0 | 2190.7 | 751.2 | 2336 | 2200 | 7.698 | 2351.5 | |
| 603 | 3099 | 3054 | 2.593 | 2.341 | 27.872 | 34.912 | 0.0 | 0.0 | 20.6 | 36.7 | 2181.8 | 757.1 | 2340 | 2181 | 7.433 | 2340.0 | |
| 604 | 3100 | 3054 | 2.594 | 2.342 | 27.872 | 34.910 | 5.64 | 0.0 | 21.0 | 37.3 | 2187.9 | 750.6 | | | | 2348.5 | |
| 605 | 2598 | 2563 | 2.875 | 2.668 | 27.858 | 34.930 | 0.0 | 0.0 | 0.0 | 0.0 | 2180.6 | 745.2 | 2326 | 2191 | 7.695 | 2341.6 | |
| 606 | 2200 | 2172 | 3.229 | 3.054 | 27.839 | 34.949 | 5.71 | 0.0 | 19.6 | 24.1 | 2173.4 | 739.3 | 2334 | 2163 | 7.437 | 2335.1 | |
| 607 | 1801 | 1779 | 3.769 | 3.624 | 27.800 | 34.973 | 0.0 | 0.0 | 19.6 | 16.5 | 2170.5 | 745.0 | 2316 | 2181 | 7.703 | 2330.4 | |
| 608 | 1598 | 1580 | 4.083 | 3.953 | 27.764 | 34.966 | 5.33 | 0.0 | 20.0 | 16.1 | 2175.2 | 772.6 | 2320 | 2158 | 7.438 | 2328.9 | |
| 609 | 1400 | 1385 | 4.429 | 4.313 | 27.703 | | | | | | | | | | | | |
| 610 | 1202 | 1190 | 4.430 | 4.314 | 27.703 | 34.937 | 4.89 | 0.0 | 21.9 | 17.5 | 2182.7 | 832.8 | | | | 2323.6 | |
| 611 | 1000 | 980 | 4.679 | 4.579 | 27.626 | 34.877 | 4.37 | 0.0 | 24.7 | 20.6 | 2195.5 | 912.2 | 2306 | 2205 | 7.654 | 2321.9 | |
| 612 | 803 | 795 | 4.570 | 4.490 | 27.432 | 34.620 | 3.65 | 0.0 | 31.4 | 28.8 | 2219.0 | 1115.8 | 2303 | 2196 | 7.370 | 2313.7 | 46.5 |
| 613 | 704 | 697 | 4.933 | 4.868 | 27.311 | 34.521 | 3.56 | 0.0 | 32.2 | 28.5 | 2218.2 | 1152.3 | 2304 | 2233 | 7.546 | 2307.5 | |
| 614 | 704 | 697 | 5.274 | 5.215 | 27.271 | 34.521 | 3.45 | 0.0 | 32.4 | 26.7 | 2214.9 | 1143.1 | | | | 2305.2 | 60.3 |
| 615 | 503 | 499 | 7.550 | 7.500 | 27.108 | 34.699 | 2.78 | 0.0 | 31.7 | 17.5 | 2207.8 | 1126.5 | 2292 | 2192 | 7.298 | 2300.2 | |
| 616 | 405 | 401 | 8.944 | 8.900 | 26.997 | 34.823 | 3.00 | 0.0 | 26.8 | 12.7 | 2197.1 | 983.9 | 2303 | 2205 | 7.596 | 2310.7 | 46.0 |
| 617 | 285 | 283 | 11.884 | 11.847 | 26.734 | 35.150 | 2.26 | 0.0 | 23.9 | 8.0 | 2186.3 | 936.3 | 2305 | 2178 | 7.360 | 2319.2 | |
| 618 | 225 | 223 | 13.063 | 13.032 | 26.612 | 35.291 | | 0.0 | 21.9 | 6.4 | 2187.7 | 837.8 | 2310 | 2176 | 7.389 | 2329.3 | 56.7 |
| 619 | 224 | 223 | 13.085 | 13.054 | 26.609 | 35.292 | 2.37 | 0.0 | 20.6 | 7.2 | 2187.3 | 840.9 | | | | 2328.7 | |
| 620 | 166 | 165 | 13.661 | 13.637 | 26.549 | 35.371 | 2.26 | 0.0 | | | 2188.6 | 834.5 | 2324 | 2172 | 7.398 | 2331.6 | |
| 621 | 87 | 86 | 19.810 | 19.794 | 25.403 | 35.767 | 3.20 | 0.3 | | 5.8 | 2129.7 | 531.7 | 2345 | 2135 | 7.831 | 2355.8 | |
| 622 | 47 | 47 | 27.783 | 27.772 | 22.908 | 35.589 | 4.55 | 0.0 | | 0.0 | 1971.3 | 256.0 | 2329 | 2011 | 7.806 | 2348.6 | 81.9 |
| 623 | 29 | 28 | 27.777 | 27.770 | 22.909 | | | 0.0 | 0.0 | 0.0 | | | | | | | |
| 624 | 4 | 4 | 27.769 | 27.768 | 22.909 | 35.580 | 4.67 | 0.0 | 0.0 | 0.0 | 1968.5 | 253.3 | 2329 | 1983 | 8.094 | 2348.1 | 75.7 |

NOAA South Atlantic 1991 Long Lines

Niskin Bottle hydrographic data
 Operation # 0911970036.0
 Date 7/16/1991
 Time (GMT) 905

Latitude 1.00
 Longitude -25.00
 Bottom Depth 3604

Leg 1
 Station 7
 Cast 7

| Sample # | Pres. db | Depth m | Temp. deg. C | Pot. T. deg. C | Sigma theta | Salinity | Oxygen mL/L | NO2 umol/L | NO3 umol/L | SiO4 umol/L | TCO2 (cool.) umol/Kg | fCO2 (20 deg.) uatm | TALK uEq/Kg | TCO2 (titr.) umol/Kg | pH | TALK (calc.) uEq/Kg | DOC umol/L |
|----------|----------|---------|--------------|----------------|-------------|----------|-------------|------------|------------|-------------|----------------------|---------------------|-------------|----------------------|-------|---------------------|------------|
| 701 | 999 | 989 | 4.502 | 4.422 | 27.438 | 34.619 | 3.64 | 0.0 | 29.9 | 29.8 | 2221.5 | 1091.8 | 2315 | 2235 | 7.604 | 2320.0 | |
| 702 | 799 | 792 | 4.908 | 4.843 | 27.318 | 34.535 | 3.08 | 0.0 | 30.9 | 28.7 | 2218.7 | 1141.2 | 2310 | 2240 | 7.514 | 2309.5 | |
| 703 | 500 | 496 | 7.173 | 7.125 | 27.112 | 34.630 | 3.07 | 0.0 | 29.6 | 18.6 | 2209.2 | 1053.0 | 2306 | 2230 | 7.600 | 2308.3 | |
| 704 | 350 | 347 | 9.560 | 9.520 | 26.941 | 34.882 | 2.48 | 0.0 | 26.2 | 12.5 | 2204.9 | 1028.8 | 2302 | 2214 | 7.575 | 2312.1 | |
| 705 | 251 | 249 | 11.585 | 11.553 | 26.770 | 35.131 | 2.07 | 0.0 | 24.4 | 9.8 | 2206.8 | 989.2 | 2306 | 2212 | 7.643 | 2321.6 | |
| 706 | 201 | 200 | 12.712 | 12.685 | 26.646 | 35.244 | 2.90 | 0.0 | 20.3 | 7.6 | 2183.2 | 821.0 | 2315 | 2198 | 7.662 | 2328.0 | |
| 707 | 176 | 174 | 13.463 | 13.438 | 26.564 | 35.334 | 3.44 | 0.0 | 19.1 | 6.4 | 2159.4 | 678.7 | 2319 | 2182 | 7.779 | 2331.7 | |
| 708 | 127 | 126 | 14.283 | 14.264 | 26.478 | 35.447 | 2.57 | 0.0 | 17.0 | 5.6 | 2177.7 | 739.5 | 2323 | 2188 | 7.697 | 2342.0 | |
| 709 | 101 | 101 | 15.698 | 15.682 | 26.301 | 35.627 | 2.84 | 0.0 | 13.9 | 4.3 | 2161.5 | 649.6 | 2342 | 2167 | 7.796 | 2349.6 | |
| 710 | 77 | 77 | 20.874 | 20.859 | 25.252 | 35.945 | 3.61 | 0.3 | 5.5 | 1.1 | 2107.1 | 437.4 | 2353 | 2118 | 7.899 | 2375.5 | |
| 711 | 44 | 43 | 24.197 | 24.188 | 24.241 | 35.851 | 4.42 | 0.0 | 0.8 | 0.0 | 2041.3 | 338.5 | 2346 | 2072 | 8.043 | 2360.4 | |
| 712 | 2 | 2 | 25.966 | 25.966 | 23.325 | 35.367 | 4.62 | 0.0 | 0.0 | 0.0 | 1982.5 | 290.5 | 2318 | 2003 | 8.044 | 2325.4 | |

NOAA South Atlantic 1991 Long Lines

Niskin Bottle hydrographic data

Operation #0911970045.0

Date 7/16/1991

Time (GMT) 1720

Latitude -0.00
 Longitude -24.99
 Bottom Depth 3573

Leg 1
 Station 9
 Cast 8

| Sample # | Pres. db | Depth m | Temp. deg. C | Pot. T. deg. C | Sigma theta | Salinity | Oxygen mL/L | NO2 umol/L | NO3 umol/L | SiO4 umol/L | TCO2 (coul.) umol/Kg | fCO2 (20 deg.) uatm | TALK uEq/Kg | TCO2 (titr.) umol/Kg | pH | TALK (calc.) uEq/Kg | DOC umol/L |
|----------|----------|---------|--------------|----------------|-------------|----------|-------------|------------|------------|-------------|----------------------|---------------------|-------------|----------------------|-------|---------------------|------------|
| 801 | 3311 | 3261 | 2.590 | 2.316 | 27.875 | 34.911 | 5.71 | | | | 2186.1 | 741.0 | 2334 | 2206 | 7.735 | 2348.9 | |
| 802 | 2796 | 2756 | 2.795 | 2.570 | 27.864 | 34.925 | 6.10 | | | | 2176.1 | 743.1 | 2321 | 2189 | 7.686 | 2337.1 | |
| 803 | 2494 | 2450 | 3.005 | 2.806 | 27.854 | 34.938 | 5.93 | | | | 2179.0 | 740.4 | 2317 | 2184 | 7.741 | 2341.3 | |
| 804 | 2194 | 2166 | 3.426 | 3.248 | 27.834 | 34.965 | 5.77 | | | | | 727.2 | 2307 | 2178 | 7.698 | | |
| 805 | 1895 | 1873 | 3.689 | 3.536 | 27.813 | 34.974 | 5.71 | | | | 2159.2 | 734.1 | 2306 | 2186 | 7.725 | 2320.4 | |
| 806 | 1593 | 1575 | 4.177 | 4.046 | 27.765 | 34.979 | 5.42 | 0.0 | 20.8 | 17.0 | 2163.9 | 758.5 | 2305 | 2189 | 7.667 | 2319.6 | |
| 807 | 1490 | 1474 | 4.398 | 4.274 | 27.746 | 34.993 | 5.33 | 0.0 | 20.7 | 16.9 | 2173.8 | 773.4 | 2315 | 2195 | 7.726 | 2327.2 | |
| 808 | 1198 | 1185 | 4.537 | 4.439 | 27.589 | 34.815 | 4.21 | 0.0 | 28.1 | 26.0 | 2197.5 | 953.4 | 2301 | 2212 | 7.596 | 2316.3 | |
| 809 | 751 | 744 | 4.912 | 4.851 | 27.305 | 34.513 | 3.55 | 0.0 | 34.9 | 30.6 | 2219.6 | 1148.1 | 2302 | 2245 | 7.570 | 2309.5 | |
| 810 | 500 | 496 | 7.084 | 7.036 | 27.115 | 34.619 | 3.04 | 0.0 | 32.6 | 20.1 | 2200.3 | 1109.1 | 2286 | 2217 | 7.568 | 2294.2 | |
| 811 | 400 | 397 | 8.953 | 8.909 | 26.987 | 34.814 | 2.50 | 0.0 | 31.7 | 15.6 | 2210.8 | 1110.2 | 2293 | 2219 | 7.594 | 2306.2 | |
| 812 | 375 | 371 | 9.289 | 9.247 | 26.965 | 34.853 | 2.49 | 0.0 | 30.6 | 15.2 | 2200.5 | 1077.6 | 2293 | 2212 | 7.566 | 2299.7 | |
| 813 | 351 | 348 | 9.824 | 9.783 | 26.921 | 34.913 | 2.32 | 0.0 | 31.1 | 14.5 | 2208.1 | 1071.9 | 2298 | 2212 | 7.625 | 2309.0 | |
| 814 | 302 | 300 | 11.353 | 11.315 | 26.785 | 35.086 | 2.01 | 0.0 | 29.8 | 12.3 | 2208.6 | 1038.0 | 2300 | 2210 | 7.585 | 2315.4 | |
| 815 | 260 | 258 | 12.707 | 12.672 | 26.647 | | | | | | | | | | | | |
| 816 | 222 | 220 | 13.006 | 12.975 | 26.610 | 35.273 | 3.18 | 0.0 | 19.2 | 8.5 | 2161.8 | 708.1 | 2319 | 2171 | 7.735 | 2331.5 | |
| 817 | 180 | 178 | 13.407 | 13.382 | 26.571 | 35.326 | 3.37 | 0.0 | 17.8 | 7.3 | 2156.0 | 673.0 | 2332 | 2158 | 7.801 | 2335.2 | |
| 818 | 141 | 140 | 13.944 | 13.924 | 26.513 | 35.400 | 3.60 | 0.0 | 15.4 | 6.7 | 2147.5 | 612.9 | 2357 | 2156 | 7.852 | 2344.3 | |
| 819 | 102 | 101 | 16.248 | 16.232 | 26.258 | 35.732 | 3.84 | 0.7 | 9.8 | 4.7 | 2128.0 | 521.8 | 2348 | 2139 | 7.904 | 2357.8 | |
| 820 | 82 | 82 | 17.508 | 17.494 | 26.102 | 35.929 | 3.92 | 0.1 | 8.8 | 3.7 | 2121.1 | 470.2 | 2374 | 2119 | 7.948 | 2374.4 | |
| 821 | 63 | 63 | 21.054 | 21.042 | 25.396 | 36.209 | 4.10 | 0.3 | 4.9 | 2.4 | 2101.3 | 399.8 | 2359 | 2066 | 8.050 | 2392.5 | |
| 822 | 44 | 43 | 24.250 | 24.241 | 24.392 | 36.081 | 4.61 | 0.2 | 0.6 | 1.1 | 2045.8 | 317.6 | 2348 | 2036 | 8.040 | 2385.7 | |
| 823 | 23 | 23 | 24.846 | 24.841 | 24.029 | 35.844 | 4.74 | 0.0 | 0.0 | 1.0 | 2022.9 | 300.0 | 2341 | 2035 | 8.071 | 2370.3 | |
| 824 | 4 | 4 | 25.025 | 25.024 | 23.969 | 35.848 | 4.75 | 0.0 | 0.0 | 0.0 | 2018.9 | 297.1 | 2341 | 2035 | 8.071 | 2370.3 | 2368.0 |

NOAA South Atlantic 1991 Long Lines

Niskin Bottle hydrographic data

Latitude -1.00
 Longitude -25.00
 Bottom Depth 3278

Operation # 0911980049.0
 Date 7/17/1991
 Time (GMT) 133

Leg 1
 Station 10
 Cast 9

| Sample # | Pres. db | Depth m | Temp. deg. C | Pot. T. deg. C | Sigma theta | Salinity | Oxygen mL/L | NO2 umol/L | NO3 umol/L | SiO4 umol/L | TCO2 (cool.) umol/Kg | fCO2 (20 deg.) uatm | TALK uEq/Kg | TCO2 (titr.) umol/Kg | pH | TALK (calc.) uEq/Kg | DOC umol/L |
|----------|----------|---------|--------------|----------------|-------------|----------|-------------|------------|------------|-------------|----------------------|---------------------|-------------|----------------------|-------|---------------------|------------|
| | | | | | | | | | | | | | | | | | |
| 901 | 1043 | 1032 | 4.466 | 4.383 | 27.455 | 34.634 | 3.91 | 0.0 | 32.5 | 20.0 | 2216.4 | 1079.1 | 2304 | 2233 | 7.547 | 2316.3 | 48.3 |
| 902 | 1043 | 1033 | 4.466 | 4.383 | 27.455 | 34.483 | 3.68 | 0.0 | 33.9 | 19.2 | 2213.3 | 1115.3 | 2295 | 2236 | 7.576 | 2307.1 | 45.0 |
| 903 | 802 | 794 | 4.776 | 4.712 | 27.295 | 34.483 | 3.68 | 0.0 | 34.8 | 17.9 | 2211.4 | 1136.4 | 2291 | 2224 | 7.534 | 2302.1 | 47.3 |
| 904 | 801 | 794 | 4.778 | 4.714 | 27.295 | 34.483 | 4.41 | 0.0 | 34.8 | 17.9 | 2211.4 | 1136.4 | 2291 | 2224 | 7.534 | 2302.1 | 47.3 |
| 905 | 752 | 745 | 5.014 | 4.953 | 27.271 | 34.483 | 4.41 | 0.0 | 34.8 | 17.9 | 2211.4 | 1136.4 | 2291 | 2224 | 7.534 | 2302.1 | 47.3 |
| 906 | 754 | 747 | 5.006 | 4.944 | 27.271 | 34.483 | 4.41 | 0.0 | 34.8 | 17.9 | 2211.4 | 1136.4 | 2291 | 2224 | 7.534 | 2302.1 | 47.3 |
| 907 | 703 | 697 | 5.189 | 5.131 | 27.260 | 34.498 | 3.45 | 0.0 | 33.7 | 18.1 | 2214.5 | 1151.0 | | | | 2303.6 | 43.0 |
| 908 | 704 | 697 | 5.187 | 5.129 | 27.260 | 34.498 | 3.45 | 0.0 | 33.7 | 18.1 | 2214.5 | 1151.0 | | | | 2303.6 | 43.0 |
| 909 | 552 | 547 | 6.036 | 5.987 | 27.182 | 34.532 | 3.91 | 0.0 | 33.6 | 14.7 | 2206.9 | 1104.3 | | | | 2301.8 | 35.0 |
| 910 | 553 | 548 | 6.040 | 5.991 | 27.182 | 34.532 | 3.91 | 0.0 | 33.6 | 14.7 | 2206.9 | 1104.3 | | | | 2301.8 | 35.0 |
| 911 | 402 | 399 | 8.505 | 8.462 | 27.018 | 34.764 | 2.57 | 0.0 | 32.0 | 10.3 | 2209.4 | 1113.7 | | | | 2304.0 | 39.5 |
| 912 | 403 | 399 | 8.532 | 8.489 | 27.017 | 34.764 | 2.57 | 0.0 | 32.0 | 10.3 | 2209.4 | 1113.7 | | | | 2304.0 | 39.5 |
| 913 | 232 | 231 | 12.845 | 12.813 | 26.631 | 35.258 | 2.45 | 0.0 | 24.1 | 5.8 | 2194.6 | 900.3 | | | | 2324.5 | 44.9 |
| 914 | 233 | 231 | 12.841 | 12.809 | 26.634 | 35.258 | 2.45 | 0.0 | 24.1 | 5.8 | 2194.6 | 900.3 | | | | 2324.5 | 44.9 |
| 915 | 183 | 181 | 13.161 | 13.136 | 26.590 | 35.289 | 3.47 | 0.3 | 17.8 | 4.5 | 2151.7 | 667.9 | | | | 2331.3 | 39.5 |
| 916 | 184 | 182 | 13.158 | 13.132 | 26.591 | 35.289 | 3.47 | 0.3 | 17.8 | 4.5 | 2151.7 | 667.9 | | | | 2331.3 | 39.5 |
| 917 | 124 | 123 | 14.730 | 14.711 | 26.427 | 35.511 | 3.35 | 0.0 | 16.2 | 3.9 | 2146.9 | 612.2 | | | | 2344.4 | 74.2 |
| 918 | 124 | 123 | 14.710 | 14.691 | 26.429 | 35.511 | 3.35 | 0.0 | 16.2 | 3.9 | 2146.9 | 612.2 | | | | 2344.4 | 74.2 |
| 919 | 85 | 85 | 17.514 | 17.500 | 26.071 | 35.888 | 3.39 | 0.0 | 11.3 | 2.6 | 2138.5 | 527.2 | 2381 | 2174 | 7.813 | 2368.6 | 53.4 |
| 920 | 86 | 85 | 17.506 | 17.492 | 26.072 | 35.888 | 3.39 | 0.0 | 11.3 | 2.6 | 2138.5 | 527.2 | 2381 | 2174 | 7.813 | 2368.6 | 53.4 |
| 921 | 43 | 43 | 24.430 | 24.421 | 24.405 | 36.168 | 4.84 | 0.0 | 0.0 | 0.7 | 2049.1 | 322.3 | 2374 | 2071 | 8.038 | 2385.4 | 64.5 |
| 922 | 43 | 43 | 24.428 | 24.419 | 24.418 | 36.168 | 4.84 | 0.0 | 0.0 | 0.7 | 2049.1 | 322.3 | 2374 | 2071 | 8.038 | 2385.4 | 64.5 |
| 923 | 3 | 3 | 24.995 | 24.994 | 24.121 | 4.74 | 0.0 | 0.0 | 0.0 | 0.6 | 2032.4 | 307.6 | 2359 | 2052 | 8.021 | 2376.6 | 79.5 |
| 924 | 3 | 3 | 25.023 | 25.022 | 24.107 | 4.74 | 0.0 | 0.0 | 0.0 | 0.6 | 2032.4 | 307.6 | 2359 | 2052 | 8.021 | 2376.6 | 79.5 |

NOAA South Atlantic 1991 Long Lines

Niskin Bottle hydrographic data
 Operation #0911980054.0
 Date 7/17/1991
 Time (GMT) 854

Leg 1
 Station 11
 Cast 10

Latitude -1.99
 Longitude -25.00
 Bottom Depth 4820

| Sample # | Pres. db | Depth m | Temp. deg. C | Pot. T. deg. C | Sigma theta | Salinity | Oxygen mL/L | NO2 umol/L | NO3 umol/L | SiO4 umol/L | TCO2 (cool.) umol/Kg | TCO2 (titr.) umol/Kg | TALK uEq/Kg | pH | TALK (calc.) uEq/Kg | DOC umol/L |
|----------|----------|---------|--------------|----------------|-------------|----------|-------------|------------|------------|-------------|----------------------|----------------------|-------------|-------|---------------------|------------|
| 1001 | 5006 | 4911 | 0.727 | 0.318 | 27.858 | 34.718 | 5.23 | 0.0 | 33.4 | | 2257.1 | 969.7 | 2381 | 7.661 | 2379.3 | |
| 1002 | 4396 | 4318 | 1.052 | 0.702 | 27.868 | 34.755 | 5.45 | 0.0 | 28.2 | | 2245.7 | 922.0 | | | 2375.5 | |
| 1003 | 3844 | 3781 | 2.282 | 1.957 | 27.891 | 34.895 | 6.12 | 0.0 | 20.0 | 36.8 | 2240.9 | 734.6 | | | 2412.7 | |
| 1004 | 3396 | 3344 | 2.532 | 2.250 | 27.880 | 34.911 | 5.77 | 0.0 | 20.4 | 35.9 | 2180.4 | 745.7 | 2334 | 7.749 | 2341.2 | |
| 1005 | 2797 | 2758 | 2.798 | 2.572 | 27.862 | 34.313 | 5.67 | 0.0 | 20.9 | 35.3 | 2181.5 | 755.3 | 2322 | 7.690 | 2340.2 | |
| 1006 | 2095 | 2069 | 3.492 | 3.323 | 27.831 | 34.972 | 6.03 | 0.0 | 19.5 | 20.4 | 2164.0 | 726.7 | 2323 | 7.750 | 2327.7 | |
| 1007 | 1798 | 1777 | 3.903 | 3.756 | 27.796 | 34.980 | 5.66 | 0.0 | 20.0 | 17.6 | 2164.5 | 740.1 | 2310 | 7.695 | 2324.9 | |
| 1008 | 1596 | 1578 | 4.299 | 4.166 | 27.746 | 34.971 | 5.55 | 0.0 | 21.5 | 18.1 | 2173.1 | 779.5 | 2317 | 7.736 | 2325.6 | |
| 1009 | 1397 | 1382 | 4.417 | 4.302 | 27.696 | 34.926 | 4.88 | 0.0 | 23.2 | 20.6 | 2181.6 | 831.6 | 2316 | 7.657 | 2322.6 | |
| 1010 | 1198 | 1185 | 4.503 | 4.405 | 27.653 | 34.887 | 4.75 | 0.0 | 25.4 | 22.7 | 2190.4 | 887.4 | 2322 | 7.687 | 2320.2 | |
| 1011 | 1096 | 1085 | 4.439 | 4.351 | 27.555 | | | | | | | | | | | |
| 1012 | 997 | 987 | 4.342 | 4.264 | 27.429 | 34.587 | 3.81 | 0.0 | 33.0 | 33.3 | 2216.7 | 1103.4 | 2305 | 7.555 | 2312.8 | |
| 1013 | 850 | 841 | 4.542 | 4.475 | 27.352 | 34.517 | 3.87 | 0.0 | 33.8 | 32.5 | 2216.1 | 1144.8 | 2306 | 7.598 | 2306.2 | |
| 1014 | 750 | 743 | 4.600 | 4.541 | 27.319 | 34.494 | 3.74 | 0.0 | 33.0 | 32.6 | 2214.4 | 1160.9 | 2303 | 7.526 | 2302.1 | |
| 1015 | 600 | 595 | 5.410 | 5.360 | 27.227 | 34.492 | 3.57 | 0.0 | 33.7 | 27.8 | 2209.2 | 1133.5 | 2297 | 7.579 | 2300.2 | |
| 1016 | 554 | 549 | 5.778 | 5.730 | 27.196 | 34.507 | 3.41 | 0.0 | 33.7 | 25.6 | 2210.3 | 1139.2 | 2292 | 7.553 | 2298.3 | |
| 1017 | 502 | 497 | 6.632 | 6.586 | 27.133 | 34.566 | 3.44 | 0.0 | 32.6 | 22.5 | 2204.9 | 1110.7 | 2290 | 7.608 | 2297.7 | |
| 1018 | 402 | 399 | 8.985 | 8.841 | 26.988 | 34.801 | 2.18 | 0.6 | 30.3 | 16.4 | 2218.9 | 1207.4 | 2295 | 7.544 | 2302.8 | |
| 1019 | 303 | 301 | 10.967 | 10.930 | 26.813 | 35.031 | 2.45 | 0.0 | 29.3 | 12.4 | 2206.2 | 1047.5 | 2308 | 7.628 | 2311.1 | |
| 1020 | 204 | 203 | 12.942 | 12.914 | 26.622 | 35.272 | 2.21 | 0.0 | 29.3 | 12.7 | 2191.9 | 885.1 | 2312 | 7.643 | 2324.4 | |
| 1021 | 105 | 104 | 14.281 | 14.266 | 26.475 | 35.447 | 2.42 | 0.0 | 22.1 | 7.7 | 2180.1 | 796.4 | 2325 | 7.721 | 2330.8 | |
| 1022 | 64 | 64 | 24.946 | 24.932 | 24.198 | 36.094 | 4.64 | 0.0 | 0.0 | 1.4 | 2040.3 | 319.0 | 2373 | 8.048 | 2377.5 | |
| 1023 | 44 | 43 | 25.214 | 25.204 | 24.104 | 36.088 | 4.75 | 0.0 | 0.0 | 1.2 | 2035.3 | 322.1 | 2367 | 8.018 | 2368.9 | |
| 1024 | 3 | 3 | 25.326 | 25.325 | 24.066 | 36.088 | 4.71 | 0.0 | 0.0 | 1.1 | 2034.5 | 313.8 | 2358 | 8.020 | 2368.2 | |

NOAA South Atlantic 1991 Long Lines

Niskin Bottle hydrographic data

Latitude -4.00

Operation # 0912010096.0

Longitude -25.00

Date 7/20/1991

Bottom Depth 5643

Time (GMT) 1146

Leg 1

Station 12

Cast 11

| Sample # | Pres. db | Depth m | Temp. deg. C | Pot. T. deg. C | Sigma theta | Salinity | Oxygen mL/L | NO2 umol/L | NO3 umol/L | SiO4 umol/L | TCO2 (couli.) umol/Kg | CO2 (20 deg.) uatm | TALK uEq/Kg | TCO2 (titr.) umol/Kg | pH | TALK (calc.) uEq/Kg | DOC umol/L |
|----------|----------|---------|--------------|----------------|-------------|----------|-------------|------------|------------|-------------|-----------------------|--------------------|-------------|----------------------|-------|---------------------|------------|
| 1101 | 5245 | 5142 | 0.727 | 0.290 | 27.858 | 34.710 | 5.09 | 0.0 | 30.8 | 108.7 | 2259.0 | 983.0 | 2361 | 2288 | 7.557 | 2379.0 | |
| 1102 | 4743 | 4655 | 0.821 | 0.439 | 27.862 | 34.729 | 5.25 | 0.0 | 29.2 | 101.6 | 2252.7 | 960.7 | 2335 | 2257 | | 2376.1 | |
| 1103 | 4247 | 4173 | 1.294 | 0.953 | 27.874 | 34.783 | 5.36 | 0.0 | 26.7 | 82.6 | 2234.7 | 878.6 | 2369 | 2248 | 7.686 | 2371.9 | |
| 1104 | 3796 | 3734 | 2.377 | 2.055 | 27.890 | | | | | | | | | | | | |
| 1105 | 3496 | 3441 | 2.545 | 2.252 | 27.884 | 34.914 | | 0.0 | 19.1 | 30.6 | 2175.2 | 729.8 | 2296 | 2183 | | 2339.4 | |
| 1106 | 2974 | 2930 | 2.689 | 2.448 | 27.871 | 34.922 | 5.85 | 0.0 | 19.6 | 31.4 | 2182.0 | 742.2 | 2300 | 2202 | 7.688 | 2344.0 | |
| 1107 | 2487 | 2454 | 2.954 | 2.756 | 27.853 | 34.930 | 6.11 | 0.0 | 20.4 | 28.8 | 2180.0 | 742.7 | 2285 | 2176 | | 2341.7 | |
| 1108 | 1999 | 1975 | 3.508 | 3.348 | 27.824 | 34.963 | 5.77 | 0.0 | 19.3 | 19.2 | 2169.8 | 728.3 | 2271 | 2171 | 7.695 | 2333.9 | |
| 1109 | 1497 | 1481 | 4.249 | 4.126 | 27.735 | 34.950 | 5.19 | 0.0 | 21.8 | 17.4 | 2179.2 | 794.3 | 2278 | 2174 | | 2328.4 | |
| 1110 | 1200 | 1187 | 4.320 | 4.224 | 27.584 | 34.774 | 4.22 | 0.0 | 28.9 | 25.7 | 2207.2 | 950.5 | 2278 | 2218 | 7.580 | 2327.5 | |
| 1111 | 1097 | 1086 | 4.239 | 4.153 | 27.503 | 34.661 | 3.88 | 0.0 | 31.3 | 29.6 | 2221.9 | 1072.8 | 2276 | 2243 | | 2319.0 | |
| 1112 | 1002 | 992 | 4.196 | 4.119 | 27.424 | 34.558 | 3.90 | 0.0 | 33.2 | 31.8 | 2221.4 | 1110.8 | 2266 | 2239 | 7.503 | 2316.9 | |
| 1113 | 898 | 889 | 4.329 | 4.259 | 27.367 | 34.506 | | 0.0 | 34.2 | 31.2 | 2221.7 | 1142.4 | 2275 | 2225 | | 2312.6 | |
| 1114 | 797 | 789 | 4.668 | 4.605 | 27.308 | 34.477 | 3.53 | 0.0 | 35.8 | 29.4 | 2224.0 | 1181.1 | 2261 | 2229 | 7.516 | 2309.8 | |
| 1115 | 700 | 694 | 5.149 | 5.091 | 27.257 | 34.485 | 3.43 | 0.0 | 35.6 | 26.7 | 2222.2 | 1210.6 | 2257 | 2220 | | 2304.1 | |
| 1116 | 600 | 595 | 5.978 | 5.926 | 27.195 | 34.534 | 3.00 | 0.0 | 34.9 | 22.8 | 2223.4 | 1231.9 | 2253 | 2236 | 7.483 | 2304.5 | |
| 1117 | 502 | 498 | 7.430 | 7.381 | 27.101 | | | | | | | | | | | | |
| 1118 | 401 | 397 | 9.637 | 9.591 | 26.917 | 34.863 | | 0.0 | 26.8 | 12.4 | 2193.9 | 986.0 | 2271 | 2199 | | 2297.6 | |
| 1119 | 302 | 299 | 11.446 | 11.408 | 26.763 | 35.076 | 2.89 | 0.0 | 23.2 | 9.3 | 2180.6 | 882.9 | 2273 | 2198 | 7.626 | 2311.6 | |
| 1120 | 203 | 201 | 12.834 | 12.806 | 26.633 | 35.262 | 2.13 | 0.0 | 23.9 | 8.6 | 2197.3 | 912.8 | | | | 2325.1 | |
| 1121 | 125 | 124 | 14.363 | 14.345 | 26.462 | 35.448 | | 0.0 | 20.5 | 6.7 | | 807.5 | | | 7.626 | 2390.4 | |
| 1122 | 84 | 84 | 21.594 | 21.577 | 25.257 | 36.210 | | | | | 2101.9 | 403.6 | 2361 | 2104 | 7.965 | 2350.7 | |
| 1123 | 45 | 45 | 26.088 | 26.078 | 23.700 | 35.911 | 4.86 | | | | 2012.8 | 308.2 | 2321 | 2040 | 7.981 | | |
| 1124 | 3 | 3 | 26.169 | 26.168 | 23.672 | 35.912 | 4.66 | 0.4 | 3.3 | 1.5 | 2020.3 | 292.7 | | | | 2375.2 | |

NOAA South Atlantic 1991 Long Lines

Leg 1
 Station 13
 Cast 12

Latitude -6.00
 Longitude -25.00
 Bottom Depth 5643

Niskin Bottle hydrographic data
 Operation # 0912020109.0
 Date 7/21/1991
 Time (GMT) 353

| Sample # | Pres. db | Depth m | Temp. deg. C | Pot. T. deg. C | Sigma theta | Salinity | Oxygen mL/L | NO2 umol/L | NO3 umol/L | SiO4 umol/L | TCO2 (cool.) umol/Kg | tCO2 (20 deg.) uatm | TALK uEq/Kg | TCO2 (titr.) umol/Kg | pH | TALK (calc.) uEq/Kg | DOC umol/L |
|----------|----------|---------|--------------|----------------|-------------|----------|-------------|------------|------------|-------------|----------------------|---------------------|-------------|----------------------|-------|---------------------|------------|
| 1201 | 559 | 5447 | 0.690 | 0.216 | 27.856 | 34.706 | 5.09 | | | 109.0 | 2257.0 | 1004.9 | 2363 | 2272 | 7.610 | 2373.8 | |
| 1202 | 4894 | 4899 | 0.771 | 0.362 | 27.859 | 34.719 | 5.14 | | | 106.2 | 2256.0 | 978.3 | 2367 | 2266 | 7.614 | 2374.6 | |
| 1203 | 4993 | 4898 | 0.770 | 0.361 | 27.860 | 34.732 | 5.15 | | | 103.1 | 2252.3 | 984.3 | | | | 2379.0 | |
| 1204 | 4493 | 4413 | 0.986 | 0.627 | 27.867 | 34.748 | 5.40 | | | 93.4 | 2245.7 | 940.5 | 2366 | 2247 | 7.661 | 2372.0 | |
| 1205 | 3695 | 3635 | 2.441 | 2.129 | 27.888 | 34.913 | 5.91 | | | 33.4 | 2175.4 | 731.5 | 2326 | 2191 | 7.697 | 2339.2 | |
| 1206 | 2996 | 2953 | 2.681 | 2.438 | 27.866 | 34.909 | | | | 35.2 | 2185.7 | 760.3 | 2336 | 2187 | 7.739 | 2343.6 | |
| 1207 | 2617 | 2581 | 2.811 | 2.603 | 27.852 | 34.909 | 5.57 | | | 34.9 | 2184.0 | 772.6 | 2331 | 2204 | 7.694 | 2338.6 | |
| 1208 | 1996 | 1971 | 3.464 | 3.305 | 27.823 | 34.951 | 6.11 | | | 21.8 | 2169.3 | 744.5 | 2304 | 2166 | 7.683 | 2329.1 | |
| 1209 | 1886 | 1863 | 3.630 | 3.479 | 27.812 | 34.957 | 5.70 | | | 17.5 | 2166.0 | 742.4 | 2289 | 2173 | 7.640 | 2326.0 | |
| 1210 | 1797 | 1778 | 3.797 | 3.652 | 27.800 | 34.966 | 6.13 | | | 17.5 | 2168.6 | 747.1 | 2315 | 2180 | 7.726 | 2327.7 | |
| 1211 | 1700 | 1680 | 3.959 | 3.821 | 27.787 | 34.985 | 5.57 | | | 16.2 | 2165.9 | 748.6 | 2303 | 2175 | 7.690 | 2324.3 | |
| 1212 | 1498 | 1481 | 4.264 | 4.141 | 27.781 | 34.939 | 5.55 | | | 17.6 | 2178.4 | 802.6 | 2315 | 2184 | 7.713 | 2325.6 | |
| 1213 | 1299 | 1285 | 4.402 | 4.296 | 27.667 | 34.877 | | | | 18.4 | 2189.1 | 870.9 | 2312 | 2202 | 7.649 | 2322.7 | |
| 1214 | 1100 | 1088 | 4.274 | 4.187 | 27.564 | 34.734 | 4.12 | | | 26.6 | 2211.8 | 1001.7 | 2301 | 2209 | 7.567 | 2323.7 | |
| 1215 | 898 | 889 | 4.096 | 4.028 | 27.389 | 34.491 | | | | 33.4 | 2216.8 | 1119.6 | 2276 | 2223 | 7.492 | 2310.4 | |
| 1216 | 800 | 793 | 4.580 | 4.517 | 27.306 | 34.453 | | | | 29.6 | 2221.4 | 1165.1 | 2302 | 2219 | 7.576 | 2309.1 | |
| 1217 | 700 | 694 | 5.213 | 5.155 | 27.250 | 34.469 | | | | 25.3 | 2218.5 | 1213.3 | 2291 | 2218 | 7.544 | 2299.7 | |
| 1218 | 602 | 596 | 6.078 | 6.025 | 27.187 | 34.528 | | | | 22.8 | 2238.5 | 1238.5 | 2299 | 2223 | 7.546 | | |
| 1219 | 403 | 399 | 8.495 | 8.452 | 27.021 | 34.773 | 2.79 | | | 15.9 | 2227.8 | 1281.8 | 2294 | 2236 | 7.508 | 2302.3 | |
| 1220 | 205 | 204 | 11.548 | 11.522 | 26.774 | 35.107 | | | | 9.7 | 2199.6 | 973.9 | 2311 | 2202 | 7.644 | 2316.1 | 49.8 |
| 1221 | 125 | 124 | 19.454 | 19.431 | 25.747 | 36.082 | | | | 2.9 | 2134.3 | 496.8 | 2362 | 2150 | 7.847 | 2379.3 | 69.5 |
| 1222 | 85 | 84 | 26.073 | 26.054 | 24.117 | 36.504 | | | | | | | 2397 | 2051 | 8.089 | | 102.9 |
| 1223 | 47 | 46 | 26.248 | 26.238 | 23.899 | 36.219 | 4.64 | | | | 2031.5 | 293.3 | 2369 | 2052 | 8.035 | 2390.3 | 95.8 |
| 1224 | 3 | 3 | 26.254 | 26.253 | 23.891 | 36.222 | 4.65 | | | | 2033.8 | 291.8 | 2369 | 2037 | 8.055 | 2394.8 | 78.7 |

NOAA South Atlantic 1991 Long Lines

Niskin Bottle hydrographic data

Latitude -8.00
 Longitude -25.00
 Bottom Depth 5653

Leg 1
 Station 15
 Cast 13

Operation # 0912020122.0
 Date 7/21/1991
 Time (GMT) 1931

| Sample # | Pres. db | Depth m | Temp. deg. C | Pot. T. deg. C | Sigma theta | Salinity | Oxygen mL/L | NO2 umol/L | NO3 umol/L | SiO4 umol/L | TCO2 (cool.) umol/Kg | TCO2 (titr.) umol/Kg | TALK uEq/Kg | pH | TALK (calc.) uEq/Kg | DOC umol/L |
|----------|----------|---------|--------------|----------------|-------------|----------|-------------|------------|------------|-------------|----------------------|----------------------|-------------|-------|---------------------|------------|
| 1301 | 5780 | 5660 | 0.690 | 0.188 | 27.855 | 34.701 | 5.15 | 0.0 | 32.7 | 115.5 | 2257.7 | 999.7 | 2387 | 7.647 | 2374.7 | |
| 1302 | 3997 | 3929 | 1.933 | 1.601 | 27.882 | 34.853 | 5.61 | 0.0 | 24.8 | 59.4 | 2204.7 | 800.0 | 2355 | 7.649 | 2354.8 | |
| 1303 | 2996 | 2953 | 2.685 | 2.441 | 27.865 | 34.913 | | 0.0 | 21.7 | 36.0 | 2185.8 | 758.3 | 2336 | 7.741 | 2344.4 | |
| 1304 | 1994 | 1969 | 3.331 | 3.174 | 27.823 | 34.943 | 5.60 | 0.0 | 21.6 | 24.4 | 2173.7 | 753.6 | 2323 | 7.697 | 2331.8 | |
| 1305 | 1596 | 1578 | 3.905 | 3.777 | 27.761 | 34.939 | 5.51 | 0.0 | 21.8 | 21.4 | 2176.0 | 799.0 | 2318 | 7.721 | 2323.6 | |
| 1306 | 1395 | 1380 | 4.117 | 4.005 | 27.701 | 34.893 | 4.88 | 0.0 | 25.6 | 21.1 | 2188.3 | 852.6 | 2310 | 7.643 | 2325.6 | |
| 1307 | 1197 | 1185 | 4.102 | 4.008 | 27.581 | 34.743 | | 0.0 | 31.2 | 29.2 | 2207.5 | 1007.7 | 2317 | 7.611 | 2317.9 | |
| 1308 | 997 | 987 | 4.172 | 4.095 | 27.429 | 34.567 | 3.87 | 0.0 | 38.0 | 32.5 | 2223.3 | 1148.7 | 2302 | 7.526 | 2313.7 | |
| 1309 | 800 | 792 | 4.802 | 4.738 | 27.291 | 34.493 | 3.37 | 0.0 | 39.0 | 28.7 | 2223.0 | 1207.0 | 2283 | 7.490 | 2305.4 | |
| 1310 | 753 | 746 | 5.046 | 4.984 | 27.265 | 34.482 | 4.57 | 0.0 | 39.1 | 27.2 | 2222.2 | 1214.0 | 2283 | 7.490 | 2303.7 | |
| 1311 | 703 | 696 | 5.468 | 5.408 | 27.232 | 34.510 | | 0.0 | 38.8 | 24.4 | 2223.5 | 1240.3 | 2291 | 7.523 | 2301.8 | |
| 1312 | 600 | 595 | 6.253 | 6.199 | 27.174 | 34.552 | 2.86 | 0.0 | 39.9 | 21.2 | 2220.8 | 1247.1 | 2303 | 7.545 | 2298.3 | |
| 1313 | 503 | 498 | 7.260 | 7.211 | 27.111 | 34.647 | | 0.0 | 39.9 | 18.3 | 2222.3 | 1328.4 | 2287 | 7.473 | 2290.6 | |
| 1314 | 401 | 397 | 8.331 | 8.289 | 27.029 | 34.743 | 2.37 | 0.0 | 37.3 | 14.8 | 2222.3 | 1237.2 | 2297 | 7.546 | 2301.7 | |
| 1315 | 353 | 350 | 8.944 | 8.906 | 26.985 | 34.817 | | 0.0 | 35.2 | 13.4 | 2217.8 | 1211.7 | 2295 | 7.523 | 2300.1 | |
| 1316 | 302 | 299 | 9.609 | 9.575 | 26.920 | 34.866 | 2.82 | 0.0 | 30.5 | 11.4 | 2196.0 | 1009.8 | 2305 | 7.629 | 2305.3 | |
| 1317 | 254 | 252 | 10.147 | 10.117 | 26.881 | 34.935 | | 0.0 | 26.6 | 9.5 | 2194.5 | 958.9 | 2299 | 7.596 | 2312.5 | |
| 1318 | 205 | 203 | 11.478 | 11.452 | 26.776 | 35.111 | 2.74 | 0.0 | 20.3 | 7.0 | 2187.9 | 875.0 | 2316 | 7.677 | 2321.4 | |
| 1319 | 153 | 152 | 14.490 | 14.467 | 26.474 | 35.499 | | 0.0 | 20.3 | 3.3 | 2172.2 | 723.9 | 2326 | 7.703 | 2340.0 | |
| 1320 | 104 | 104 | 22.880 | 22.859 | 25.268 | 36.732 | 4.78 | 0.0 | 0.0 | 0.0 | 2084.6 | 346.6 | 2410 | 8.003 | 2412.7 | |
| 1321 | 78 | 77 | 26.163 | 26.146 | 24.070 | 36.432 | | 0.0 | 0.0 | 0.0 | 2022.2 | 276.0 | 2397.6 | | 2397.6 | |
| 1322 | 46 | 46 | 26.271 | 26.261 | 23.974 | 36.350 | | 0.0 | 0.0 | 0.0 | 2017.4 | 271.8 | 2403 | 8.070 | 2395.5 | |
| 1323 | 29 | 29 | 26.266 | 26.259 | 23.973 | 36.350 | 4.64 | 0.0 | 0.0 | 0.0 | 2015.9 | 239.6 | 2396 | 8.016 | 2395.5 | |
| 1324 | 3 | 3 | 26.253 | 26.252 | 23.975 | 36.366 | | 0.0 | 0.0 | 0.0 | 2016.1 | 269.8 | 2384 | 8.099 | 2395.8 | |

NOAA South Atlantic 1991 Long Lines

Leg 1
 Station 16
 Cast 14

Latitude -9.00
 Longitude -25.00
 Bottom Depth 5638

Niskin Bottle hydrographic data
 Operation # 0912030131.0
 Date 7/22/1991
 Time (GMT) 417

| Sample # | Pres. db | Depth m | Temp. deg. C | Pot. T. deg. C | Sigma theta | Salinity | Oxygen mL/L | NO2 umol/L | NO3 umol/L | SiO4 umol/L | TCO2 (coul.) umol/Kg | TCO2 (titr.) umol/Kg | TALK uEq/Kg | pH | TALK (calc.) uEq/Kg | DOC umol/L |
|----------|----------|---------|--------------|----------------|-------------|----------|-------------|------------|------------|-------------|----------------------|----------------------|-------------|------|---------------------|------------|
| 1401 | 1014 | 1004 | 4.094 | 4.016 | 27.445 | 34.587 | 3.79 | 0.0 | 33.3 | 32.2 | 2217.8 | 1110.5 | 2299 | 2226 | 7.593 | 2313.0 |
| 1402 | 1014 | 1004 | 4.094 | 4.016 | 27.445 | | | | | | | | | | | |
| 1403 | 871 | 862 | 4.421 | 4.353 | 27.341 | 34.488 | 4.53 | 0.0 | 36.2 | 31.0 | 2219.7 | 1204.0 | 2296 | 2227 | 7.542 | 2302.2 |
| 1404 | 871 | 863 | 4.421 | 4.353 | 27.342 | | | | | | | | | | | |
| 1405 | 754 | 747 | 4.963 | 4.902 | 27.267 | 34.473 | 3.33 | 0.0 | 35.3 | 26.9 | 2218.4 | 1190.2 | 2292 | 2226 | 7.564 | 2302.5 |
| 1406 | 754 | 747 | 4.967 | 4.906 | 27.268 | | | | | | | | | | | |
| 1407 | 630 | 624 | 5.715 | 5.661 | 27.211 | 34.514 | 3.90 | 0.0 | 37.1 | 23.5 | 2222.9 | 1234.2 | 2295 | 2232 | 7.519 | 2302.1 |
| 1408 | 628 | 623 | 5.717 | 5.663 | 27.211 | | | | | | | | | | | |
| 1409 | 502 | 497 | 6.788 | 6.741 | 27.198 | 34.599 | 2.52 | 0.0 | | 20.1 | 2224.8 | 1263.9 | 2334 | 2278 | 7.497 | 2300.7 |
| 1410 | 503 | 499 | 6.803 | 6.756 | 27.196 | | | | | | | | | | | |
| 1411 | 354 | 351 | 8.572 | 8.534 | 27.013 | 34.772 | 0.0 | 0.0 | 33.0 | 15.0 | 2216.9 | 1188.1 | 2290 | 2235 | 7.546 | 2302.1 |
| 1412 | 352 | 349 | 8.567 | 8.530 | 27.015 | | | | | | | | | | | |
| 1413 | 255 | 253 | 10.486 | 10.455 | 26.868 | 34.997 | 2.61 | 0.0 | 28.6 | 11.2 | 2203.2 | 1026.2 | 2302 | 2225 | 7.554 | 2311.1 |
| 1414 | 253 | 251 | 10.513 | 10.483 | 26.869 | | | | | | | | | | | |
| 1415 | 184 | 182 | 13.627 | 13.601 | 26.565 | 34.378 | 0.0 | 0.0 | 22.6 | 5.6 | 2182.5 | 790.4 | 2323 | 2197 | 7.668 | 2334.6 |
| 1416 | 183 | 182 | 13.648 | 13.622 | 26.564 | | | | | | | | | | | |
| 1417 | 124 | 123 | 20.859 | 20.835 | 25.923 | 36.430 | 0.5 | 0.0 | 2.0 | 0.0 | 2105.1 | 401.7 | 2389 | 2129 | 7.927 | 2397.0 |
| 1418 | 123 | 122 | 20.915 | 20.891 | 25.919 | | | | | | | | | | | |
| 1419 | 102 | 101 | 23.156 | 23.135 | 25.198 | 36.716 | 0.0 | 0.0 | 0.0 | 0.0 | 2078.6 | 323.2 | 2404 | 2101 | 8.030 | 2425.1 |
| 1420 | 100 | 100 | 23.260 | 23.239 | 25.177 | | | | | | | | | | | |
| 1421 | 44 | 43 | 25.840 | 25.830 | 24.249 | 36.535 | 4.66 | 0.0 | 0.0 | 0.0 | 2032.0 | 281.1 | 2385 | 2057 | 8.085 | 2405.2 |
| 1422 | 44 | 44 | 25.836 | 25.826 | 24.250 | | | | | | | | | | | |
| 1423 | 2 | 2 | 25.836 | 25.835 | 24.247 | 36.537 | 4.67 | 0.0 | 0.0 | 0.0 | 2031.8 | 279.9 | 2383 | 2059 | 8.038 | 2406.4 |
| 1424 | 3 | 3 | 25.833 | 25.832 | 24.249 | | | | | | | | | | | |

NOAA South Atlantic 1991 Long Lines

Leg 1
 Station 18
 Cast 15

Niskin Bottle hydrographic data
 Operation # 0912030141.0
 Date 7/22/1991
 Time (GMT) 1752

Latitude -10.99
 Longitude -25.00
 Bottom Depth 5642

| Sample # | Pres. db | Depth m | Temp. deg. C | Pot. T. deg. C | Sigma theta | Salinity | Oxygen mL/L | NO2 umol/L | NO3 umol/L | SiO4 umol/L | TCO2 (cool.) umol/Kg | TCO2 (20 deg.) uatm | TALK uEq/Kg | TCO2 (titr.) umol/Kg | pH | TALK (calc.) uEq/Kg | DOC umol/L |
|----------|----------|---------|--------------|----------------|-------------|----------|-------------|------------|------------|-------------|----------------------|---------------------|-------------|----------------------|-------|---------------------|------------|
| 1501 | 5654 | 5538 | 0.727 | 0.239 | 27.857 | 34.719 | 5.32 | 0.0 | 31.7 | 115.3 | 2259.7 | 997.3 | 2367 | 2252 | 7.655 | 2381.3 | |
| 1502 | 4994 | 4899 | 0.769 | 0.360 | 27.861 | 34.724 | 5.17 | 0.0 | 32.6 | 114.0 | 2252.2 | 966.2 | | 2260 | 7.614 | 2374.2 | |
| 1503 | 4480 | 4400 | 1.010 | 0.652 | 27.867 | 34.756 | | 0.0 | | 104.5 | 2241.6 | 930.0 | | 2230 | 7.708 | 2355.3 | |
| 1504 | 3993 | 3926 | 1.898 | 1.568 | 27.879 | 34.845 | 5.83 | 0.0 | 25.9 | 63.6 | 2206.7 | 810.1 | | 2194 | 7.697 | 2341.3 | |
| 1505 | 3497 | 3442 | 2.544 | 2.251 | 27.880 | 34.910 | | 0.0 | 22.1 | 35.2 | 2179.7 | 742.1 | | 2179 | 7.743 | 2339.7 | |
| 1506 | 2993 | 2950 | 2.737 | 2.493 | 27.868 | 34.928 | 5.74 | 0.0 | 22.5 | 31.7 | 2178.5 | 743.0 | | 2182 | 7.702 | 2337.8 | |
| 1507 | 2496 | 2462 | 2.998 | 2.799 | 27.853 | 34.938 | | 0.0 | 21.9 | 27.1 | 2175.2 | 736.4 | | 2169 | 7.754 | 2328.9 | |
| 1508 | 1996 | 1972 | 3.439 | 3.280 | 27.828 | 34.968 | 6.04 | 0.0 | 21.1 | 20.2 | 2166.4 | 732.0 | | 2191 | 7.681 | 2328.8 | |
| 1509 | 1600 | 1581 | 3.922 | 3.794 | 27.768 | 34.953 | | 0.0 | 28.4 | 23.9 | 2173.3 | 763.7 | | 2187 | 7.677 | 2320.6 | |
| 1510 | 1357 | 1342 | 4.204 | 4.095 | 27.657 | 34.851 | | 0.0 | 34.2 | 35.1 | 2221.1 | 1069.1 | | 2230 | 7.653 | 2322.6 | |
| 1511 | 999 | 989 | 3.932 | 3.857 | 27.426 | 34.533 | 3.96 | 0.0 | | | 2217.6 | 1128.7 | | 2220 | 7.574 | 2309.8 | |
| 1512 | 802 | 794 | 4.523 | 4.460 | 27.301 | 34.451 | 3.91 | 0.0 | 34.7 | 22.7 | 2210.9 | 1136.2 | | 2221 | 7.536 | 2301.7 | |
| 1513 | 601 | 596 | 5.742 | 5.690 | 27.195 | 34.500 | | 0.0 | 35.0 | 19.0 | 2213.9 | 1153.2 | | 2223 | 7.559 | 2302.9 | |
| 1514 | 502 | 497 | 6.759 | 6.712 | 27.129 | 34.584 | 3.01 | 0.0 | 32.1 | 15.1 | 2206.2 | 1103.5 | | 2221 | 7.541 | 2301.8 | |
| 1515 | 403 | 400 | 8.006 | 7.965 | 27.047 | 34.742 | | 0.0 | 27.8 | 10.3 | 2192.7 | 953.3 | | 2194 | 7.646 | 2311.4 | |
| 1516 | 301 | 299 | 10.380 | 10.344 | 26.852 | 34.949 | | 0.0 | 21.1 | 5.9 | 2164.7 | 755.6 | | 2181 | 7.691 | 2322.0 | |
| 1517 | 252 | 250 | 12.335 | 12.301 | 26.658 | 35.292 | 3.18 | 0.0 | 14.7 | 2.8 | 2137.0 | 573.0 | | 2130 | 7.812 | 2346.8 | 66.5 |
| 1518 | 202 | 200 | 15.102 | 15.071 | 26.354 | 35.521 | | 0.4 | 3.4 | 0.0 | 2109.5 | 409.6 | | 2056 | 7.908 | 2396.7 | |
| 1519 | 153 | 152 | 20.306 | 20.277 | 25.706 | 36.348 | 4.29 | 0.0 | 0.0 | 0.0 | 2051.4 | 331.8 | | 2060 | 8.091 | 2384.6 | 85.1 |
| 1520 | 103 | 102 | 25.451 | 25.428 | 24.604 | 36.841 | | 0.0 | 0.0 | 0.0 | 2053.7 | 283.6 | | 2412 | 8.089 | 2429.1 | 91.9 |
| 1521 | 76 | 75 | 25.464 | 25.447 | 24.596 | 36.840 | | 0.0 | 0.0 | 0.0 | 2051.0 | 283.6 | | 2409 | 8.047 | 2432.7 | 86.6 |
| 1522 | 44 | 44 | 25.459 | 25.449 | 24.595 | 36.840 | 4.78 | 0.0 | 0.0 | 0.0 | 2052.8 | 282.4 | | 2415 | 8.098 | 2444.9 | 89.1 |
| 1523 | 29 | 29 | 25.452 | 25.446 | 24.596 | 36.841 | | 0.0 | 0.0 | 0.0 | 2064.1 | 284.4 | | | | | |
| 1524 | 3 | 3 | 25.443 | 25.442 | 24.597 | 36.838 | 4.70 | 0.0 | 0.0 | 0.0 | | | | | | | |

NOAA South Atlantic 1991 Long Lines

Leg 1
 Station 19
 Cast 16

Niskin Bottle hydrographic data
 Operation # 0912040148.0
 Date 7/23/1991
 Time (GMT) 6 51

Latitude -13.00
 Longitude -25.00
 Bottom Depth 4648

| Sample # | Pres. db | Depth m | Temp. deg. C | Pot. T. deg. C | Sigma theta | Salinity | Oxygen mL/L | NO2 umol/L | NO3 umol/L | SiO4 umol/L | TCO2 (coul.) umol/Kg | TCO2 (titr.) umol/Kg | TALK uEq/Kg | pH | TALK (calc.) uEq/Kg | DOC umol/L |
|----------|----------|---------|--------------|----------------|-------------|----------|-------------|------------|------------|-------------|----------------------|----------------------|-------------|-------|---------------------|------------|
| 1601 | 1020 | 1010 | 3.858 | 3.782 | 27.446 | 34.446 | 4.01 | 0.0 | 32.9 | 36.0 | 2217.6 | 2222 | 2307 | 7.572 | 2317.3 | |
| 1602 | 1020 | 1010 | 3.858 | 3.782 | 27.446 | 34.486 | 3.88 | 0.0 | 34.7 | 36.1 | 2216.3 | 2231 | 2297 | 7.521 | 2316.9 | |
| 1603 | 901 | 892 | 4.046 | 3.978 | 27.377 | 34.447 | 4.12 | 0.0 | 35.7 | 32.1 | 2218.9 | 2221 | 2282 | 7.512 | 2307.0 | |
| 1604 | 800 | 792 | 4.314 | 4.253 | 27.319 | 34.445 | 3.90 | 0.0 | 33.9 | 29.5 | 2213.9 | 2215 | 2277 | 7.498 | 2306.7 | |
| 1605 | 703 | 696 | 4.575 | 4.520 | 27.277 | 34.481 | | 0.0 | 33.3 | 25.2 | 2210.1 | 2208 | 2312 | 7.607 | 2299.8 | |
| 1606 | 601 | 596 | 5.233 | 5.184 | 27.214 | 34.450 | | 0.0 | 33.1 | 21.9 | 2202.8 | 2191 | 2302 | 7.607 | 2297.2 | |
| 1607 | 545 | 540 | 5.545 | 5.499 | 27.176 | 34.486 | 4.07 | 0.0 | 29.1 | 19.0 | 2189.2 | 2204 | 2287 | 7.618 | 2301.0 | |
| 1608 | 502 | 498 | 6.088 | 6.044 | 27.139 | 34.596 | | 0.0 | 29.7 | 17.7 | 2194.5 | 2211 | 2293 | 7.572 | 2303.4 | |
| 1609 | 451 | 447 | 7.174 | 7.131 | 27.083 | 34.705 | | 0.0 | 28.8 | 14.4 | 2183.3 | 2208 | 2294 | 7.626 | 2306.8 | |
| 1610 | 401 | 398 | 8.255 | 8.213 | 27.010 | 34.827 | | 0.0 | 27.7 | 12.4 | 2196.0 | 2207 | 2296 | 7.590 | 2306.9 | |
| 1611 | 350 | 347 | 9.423 | 9.384 | 26.920 | 35.006 | | 0.0 | 24.1 | 9.4 | 2195.4 | 2193 | 2304 | 7.676 | 2308.6 | |
| 1612 | 302 | 300 | 11.002 | 10.965 | 26.782 | 35.212 | | 0.0 | 17.5 | 5.3 | 2183.1 | 2165 | 2314 | 7.724 | 2324.9 | |
| 1613 | 251 | 249 | 12.917 | 12.882 | 26.581 | 35.604 | | 0.0 | 8.9 | 2.0 | 2154.8 | 2137 | 2338 | 7.883 | 2348.8 | |
| 1614 | 202 | 200 | 15.757 | 15.725 | 26.265 | 36.375 | | 0.3 | 0.7 | 0.0 | 2117.2 | 2114 | 2385 | 7.961 | 2398.1 | |
| 1615 | 152 | 151 | 20.495 | 20.466 | 25.882 | 36.900 | | 0.0 | 0.0 | 0.0 | 2097.0 | 2095 | 2415 | 8.071 | 2434.4 | |
| 1616 | 112 | 111 | 23.826 | 23.802 | 25.141 | 37.011 | | 0.0 | 0.0 | 0.0 | 2075.9 | 2086 | 2426 | 8.058 | 2440.4 | |
| 1617 | 63 | 62 | 24.957 | 24.943 | 24.882 | 37.012 | 4.69 | 0.0 | 0.0 | 0.0 | 2082.4 | 2081 | 2427 | 8.062 | 2436.9 | |
| 1618 | 64 | 63 | 24.958 | 24.944 | 24.881 | 37.012 | 4.81 | 0.0 | 0.0 | 0.0 | 286.5 | 2086 | 2427 | 8.062 | 2436.9 | |
| 1619 | 3 | 3 | 24.936 | 24.935 | 24.884 | 37.012 | 4.81 | 0.0 | 0.0 | 0.0 | 285.0 | 2081 | 2427 | 8.062 | 2436.9 | |

NOAA South Atlantic 1991 Long Lines

Leg 1
 Station 21
 Cast 17

Niskin Bottle hydrographic data
 Operation # 0912040159.0
 Date 7/23/1991
 Time (GMT) 2031

Latitude -15.00
 Longitude -25.00
 Bottom Depth 5648

| Sample # | Pres. db | Depth m | Temp. deg. C | Pot. T. deg. C | Sigma theta | Salinity | Oxygen mL/L | NO2 umol/L | NO3 umol/L | SiO4 umol/L | TCO2 (coul.) umol/Kg | TCO2 (20' deg.) uatm | TALK uEq/Kg | TCO2 (titr.) umol/Kg | pH | TALK (calc.) uEq/Kg | DOC umol/L |
|----------|----------|---------|--------------|----------------|-------------|----------|-------------|------------|------------|-------------|----------------------|----------------------|-------------|----------------------|-------|---------------------|------------|
| 1701 | 5450 | 5341 | 0.718 | 0.256 | 27.858 | 34.733 | 5.13 | 0.0 | 31.6 | 120.9 | 2254.4 | 985.3 | 2365 | 2283 | 7.611 | 2373.2 | |
| 1702 | 4743 | 4656 | 0.876 | 0.492 | 27.864 | 34.739 | | 0.0 | 31.1 | 105.1 | 2248.7 | 939.8 | 2360 | 2234 | 7.583 | 2375.3 | |
| 1703 | 3994 | 3927 | 1.765 | 1.438 | 27.877 | 34.837 | 5.68 | 0.0 | 25.9 | 68.3 | 2210.6 | 830.5 | | | | 2355.1 | |
| 1704 | 3495 | 3441 | 2.451 | 2.160 | 27.871 | 34.894 | | 0.0 | 21.9 | 46.0 | 2190.8 | 780.9 | | | | 2344.3 | |
| 1705 | 2995 | 2951 | 2.663 | 2.420 | 27.859 | 34.904 | 5.54 | 0.0 | 21.6 | 39.7 | 2187.9 | 767.3 | 2335 | 2207 | 7.689 | 2344.3 | |
| 1706 | 2495 | 2461 | 2.801 | 2.605 | 27.847 | 34.909 | | 0.0 | 21.9 | 36.8 | 2188.8 | 770.7 | 2329 | 2201 | 7.683 | 2344.6 | |
| 1707 | 1994 | 1970 | 3.192 | 3.037 | 27.823 | 34.926 | 5.74 | 0.0 | 20.9 | 28.4 | 2176.3 | 770.9 | 2327 | 2202 | 7.734 | 2330.4 | |
| 1708 | 1587 | 1569 | 3.890 | 3.763 | 27.753 | 34.929 | | 0.0 | 22.2 | 21.4 | 2178.9 | 804.1 | 2313 | 2194 | 7.669 | 2325.6 | |
| 1709 | 1237 | 1224 | 4.001 | 3.905 | 27.588 | 34.738 | | 29.3 | 30.5 | 30.5 | 2204.3 | 948.6 | 2335 | 2229 | 7.669 | 2324.5 | |
| 1710 | 998 | 989 | 3.796 | 3.722 | 27.431 | 34.533 | 4.14 | 0.0 | 33.6 | 37.1 | 2216.3 | 1074.5 | 2304 | 2224 | 7.561 | 2316.5 | |
| 1711 | 800 | 793 | 4.180 | 4.120 | 27.317 | 34.427 | 4.20 | 0.0 | 33.3 | 35.0 | 2205.4 | 1073.0 | 2326 | 2231 | 7.635 | 2304.5 | |
| 1712 | 620 | 614 | 5.523 | 5.471 | 27.184 | 34.457 | | 0.0 | 32.7 | 22.4 | 2192.9 | 1026.4 | 2287 | 2204 | 7.568 | 2297.9 | |
| 1713 | 500 | 495 | 7.150 | 7.102 | 27.090 | 34.605 | 3.77 | 0.0 | 30.8 | 17.5 | 2195.2 | 1031.4 | 2292 | 2209 | 7.619 | 2300.1 | |
| 1714 | 401 | 397 | 9.111 | 9.067 | 26.951 | | | 0.0 | | 16.2 | 2201.6 | 1042.8 | 2297 | 2213 | 7.562 | 2306.0 | |
| 1715 | 350 | 347 | 10.194 | 10.153 | 26.846 | | | | | | 2183.2 | 914.2 | 2304 | 2182 | 7.652 | 2307.8 | |
| 1716 | 302 | 299 | 11.818 | 11.779 | 26.692 | 35.078 | 3.06 | 0.0 | 24.6 | 10.1 | 2171.6 | 818.3 | 2312 | 2182 | 7.694 | 2314.9 | |
| 1717 | 251 | 248 | 13.672 | 13.636 | 26.500 | | | 0.0 | 21.3 | 7.3 | 2146.4 | 654.6 | 2318 | 2163 | 7.794 | 2329.3 | |
| 1718 | 200 | 199 | 16.398 | 16.306 | 26.193 | 35.671 | 4.17 | 0.0 | 15.7 | 4.7 | 2111.5 | 487.3 | 2351 | 2130 | 7.867 | 2354.7 | |
| 1719 | 143 | 142 | 20.398 | 20.371 | 25.681 | | | 0.0 | 7.6 | 1.8 | 2093.4 | 375.5 | 2385 | 2125 | 7.977 | 2399.9 | |
| 1720 | 103 | 102 | 23.141 | 23.120 | 25.316 | 36.870 | 4.89 | 0.3 | 1.0 | 0.0 | 2082.9 | 319.6 | 2416 | 2106 | 8.002 | 2434.5 | |
| 1721 | 78 | 77 | 24.219 | 24.202 | 25.162 | | | 0.0 | 0.0 | 0.0 | 2075.4 | 298.9 | 2430 | 2094 | 8.086 | 2446.1 | |
| 1722 | 44 | 44 | 24.372 | 24.363 | 25.112 | 37.090 | 4.76 | 0.0 | 0.0 | 0.0 | 2070.8 | 292.5 | 2433 | 2097 | 8.042 | 2446.7 | |
| 1723 | 30 | 30 | 24.377 | 24.371 | 25.108 | 37.082 | | 0.0 | 0.0 | 0.0 | 2070.1 | 292.4 | 2423 | 2098 | 8.012 | 2446.0 | |
| 1724 | 2 | 2 | 24.370 | 24.370 | 25.109 | 37.088 | 4.95 | 0.0 | 0.0 | 0.0 | 2070.9 | 291.5 | 2424 | 2095 | 8.020 | 2447.9 | |

NOAA South Atlantic 1991 Long Lines

Niskin Bottle hydrographic data
 Operation # 0912050169.0
 Date 7/24/1991
 Time (GMT) 1017

Leg 1
 Station 22
 Cast 18

Latitude -17.00
 Longitude -25.00
 Bottom Depth 5343

| Sample # | Pres. db | Depth m | Temp. deg. C | Pot. T. deg. C | Sigma theta | Salinity | Oxygen mL/L | NO2 umol/L | NO3 umol/L | SiO4 umol/L | TCO2 (cool.) umol/Kg | fCO2 (20 deg.) uatm | TALK uEq/Kg | TCO2 (titr.) umol/Kg | pH | TALK (calc.) uEq/Kg | DOC umol/L |
|----------|----------|---------|--------------|----------------|-------------|----------|-------------|------------|------------|-------------|----------------------|---------------------|-------------|----------------------|-------|---------------------|------------|
| 1801 | 5229 | 5127 | 0.718 | 0.284 | 27.858 | 34.711 | 5.16 | 0.0 | 31.0 | 110.9 | 2255.4 | | 2357 | 2260 | 7.594 | | |
| 1802 | 4794 | 4705 | 0.830 | 0.442 | 27.862 | 34.727 | 5.21 | 0.0 | 30.6 | 106.0 | 2248.8 | | 2359 | 2259 | 7.608 | | |
| 1803 | 4395 | 4317 | 1.177 | 0.823 | 27.869 | 34.766 | | 0.0 | 28.6 | 92.1 | 2231.7 | 903.5 | 2353 | 2244 | 7.656 | 2363.4 | |
| 1804 | 3995 | 3830 | 1.935 | 1.614 | 27.876 | 34.841 | | 0.0 | 23.6 | 60.7 | 2205.1 | 812.8 | 2329 | 2210 | 7.661 | 2352.9 | |
| 1805 | 3495 | 3440 | 2.489 | 2.197 | 27.871 | 34.892 | 5.66 | 0.0 | 21.4 | 41.2 | 2188.6 | 767.0 | 2319 | 2215 | 7.598 | 2345.2 | |
| 1806 | 2995 | 2951 | 2.673 | 2.430 | 27.859 | 34.909 | 5.67 | 0.0 | 22.9 | 38.3 | 2188.2 | 765.5 | 2312 | 2197 | 7.621 | 2345.1 | |
| 1807 | 2494 | 2461 | 2.803 | 2.607 | 27.845 | 34.902 | | 0.0 | 21.4 | 37.8 | 2188.0 | 766.5 | 2337 | 2186 | 7.725 | 2344.7 | |
| 1808 | 1995 | 1971 | 3.078 | 2.925 | 27.823 | 34.910 | 5.73 | 0.0 | 22.2 | 29.5 | 2179.0 | 765.4 | 2316 | 2189 | 7.684 | 2334.8 | |
| 1809 | 1645 | 1626 | 3.457 | 3.330 | 27.764 | 34.887 | | 0.0 | 23.5 | 27.3 | 2187.2 | 803.6 | 2316 | 2190 | 7.702 | 2334.9 | |
| 1810 | 1397 | 1382 | 3.773 | 3.665 | 27.681 | 34.827 | | 0.0 | 25.9 | 27.6 | 2195.0 | 880.4 | 2313 | 2203 | 7.638 | 2327.2 | |
| 1811 | 1197 | 1185 | 3.841 | 3.750 | 27.581 | 34.708 | 5.22 | 0.0 | 29.7 | 32.5 | 2210.0 | 963.8 | 2308 | 2207 | 7.634 | 2328.0 | |
| 1812 | 998 | 988 | 3.720 | 3.647 | 27.445 | 34.522 | 4.19 | 0.0 | 32.9 | 39.0 | 2215.0 | 1054.8 | 2307 | 2223 | 7.570 | 2318.0 | |
| 1813 | 898 | 890 | 3.804 | 3.738 | 27.398 | 34.474 | | 0.0 | | | 2216.3 | 1065.8 | 2306 | 2223 | 7.595 | 2317.6 | |
| 1814 | 798 | 792 | 4.141 | 4.081 | 27.328 | 34.430 | 4.11 | 0.0 | 33.5 | 37.8 | 2211.0 | 1069.2 | 2298 | 2221 | 7.555 | 2311.2 | |
| 1815 | 699 | 693 | 4.636 | 4.581 | 27.267 | | | | | | | | | | | | |
| 1816 | 600 | 595 | 5.650 | 5.599 | 27.185 | 34.469 | | 0.0 | 34.7 | 33.7 | 2198.0 | 1046.9 | 2298 | 2203 | 7.603 | 2300.4 | |
| 1817 | 480 | 476 | 8.108 | 8.058 | 27.001 | 34.660 | | 0.0 | 33.5 | 22.7 | 2186.0 | 936.5 | 2294 | 2196 | 7.611 | 2306.1 | |
| 1818 | 399 | 396 | 10.036 | 9.989 | 26.833 | 34.843 | 3.56 | 0.0 | 27.9 | 14.4 | 2165.0 | 820.7 | 2295 | 2172 | 7.703 | 2306.0 | |
| 1819 | 301 | 298 | 12.953 | 12.911 | 26.527 | 35.145 | | 0.0 | 26.8 | 8.9 | 2123.5 | 578.3 | 2307 | 2136 | 7.786 | 2327.4 | |
| 1820 | 201 | 200 | 17.845 | 17.910 | 25.988 | 35.903 | 4.55 | 0.0 | 13.1 | 3.2 | 2095.3 | 435.9 | 2355 | 2111 | 7.945 | 2361.8 | |
| 1821 | 141 | 140 | 23.683 | 23.653 | 25.377 | 37.151 | | 0.0 | 3.6 | 0.0 | 2088.7 | 306.2 | 2429 | 2102 | 8.026 | 2456.3 | |
| 1822 | 102 | 102 | 23.733 | 23.711 | 25.374 | 37.166 | | 0.0 | 0.0 | 0.0 | 2085.9 | 305.6 | 2434 | 2112 | 8.053 | 2453.6 | |
| 1823 | 55 | 54 | 23.726 | 23.714 | 25.372 | 37.167 | 5.63 | 0.0 | 0.0 | 0.0 | 2087.8 | 305.8 | 2431 | 2105 | 8.027 | 2454.3 | |
| 1824 | 3 | 2 | 23.751 | 23.750 | 25.362 | 37.169 | 4.81 | 0.0 | 0.0 | 0.0 | 2087.0 | 306.0 | 2454 | 2111 | 8.006 | 2454.6 | |

NOAA South Atlantic 1991 Long Lines

Leg 1
 Station 23
 Cast 19

Latitude -19.00
 Longitude -25.00
 Bottom Depth 5652

Niskin Bottle hydrographic data
 Operation # 0912060180.0
 Date 7/25/1991
 Time (GMT) 145

| Sample # | Pres. db | Depth m | Temp. deg. C | Pot. T. deg. C | Sigma theta | Salinity | Oxygen mL/L | NO2 umol/L | NO3 umol/L | SO4 umol/L | TCO2 (cool.) umol/Kg | TCO2 (titr.) umol/Kg | pH | TALK uEq/Kg | DOC umol/L |
|----------|----------|---------|--------------|----------------|-------------|----------|-------------|------------|------------|------------|----------------------|----------------------|-------|-------------|------------|
| | | | | | | | | | | | | | | | |
| 1901 | 5776 | 5656 | 0.547 | 0.051 | 27.852 | 34.892 | 5.09 | 0.0 | 33.4 | 119.6 | 2261.7 | 1020.0 | 7.626 | 2370 | 38.3 |
| 1902 | 4743 | 4655 | 0.962 | 0.576 | 27.864 | 34.740 | 5.54 | 0.0 | 30.0 | 100.9 | 2244.1 | 941.0 | 7.609 | 2360 | 29.2 |
| 1903 | 3985 | 3927 | 1.856 | 1.527 | 27.877 | 34.836 | 5.74 | 0.0 | 24.4 | 61.5 | 2209.3 | 817.5 | 7.713 | 2348 | 38.6 |
| 1904 | 3494 | 3439 | 2.473 | 2.182 | 27.875 | 34.897 | 5.74 | 0.0 | 21.2 | 39.1 | 2184.1 | 759.1 | 7.701 | 2331 | 32.4 |
| 1905 | 2995 | 2951 | 2.679 | 2.436 | 27.862 | 34.905 | 5.62 | 0.0 | 21.6 | 36.9 | 2186.3 | 755.6 | 7.660 | 2306 | 32.4 |
| 1906 | 2495 | 2461 | 2.872 | 2.675 | 27.849 | 34.917 | 5.64 | 0.0 | 22.0 | 32.9 | 2179.1 | 751.6 | 7.727 | 2327 | 32.4 |
| 1907 | 1993 | 1969 | 3.233 | 3.078 | 27.820 | 34.928 | 5.59 | 0.0 | 22.7 | 29.5 | 2176.6 | 751.9 | 7.634 | 2305 | 27.9 |
| 1908 | 1498 | 1481 | 3.668 | 3.552 | 27.715 | 34.852 | 4.94 | 0.0 | 24.9 | 28.3 | 2190.4 | 841.2 | 7.698 | 2317 | 38.7 |
| 1909 | 997 | 987 | 3.738 | 3.665 | 27.431 | 34.512 | 4.12 | 0.0 | 33.4 | 38.6 | 2216.5 | 1057.5 | 7.566 | 2312 | 38.7 |
| 1910 | 799 | 792 | 4.265 | 4.204 | 27.308 | 34.424 | 4.05 | 0.0 | 33.4 | 33.0 | 2207.3 | 1065.2 | 7.597 | 2306 | 41.4 |
| 1911 | 700 | 693 | 4.852 | 4.796 | 27.247 | 34.430 | 3.92 | 0.0 | 33.5 | 27.6 | 2208.3 | 1067.3 | 7.559 | 2296 | 29.5 |
| 1912 | 600 | 594 | 5.803 | 5.751 | 27.169 | 34.474 | 3.80 | 0.0 | 31.7 | 22.0 | 2197.6 | 1032.3 | 7.572 | 2284 | 55.3 |
| 1913 | 501 | 498 | 7.739 | 7.689 | 27.022 | 34.621 | 3.61 | 0.0 | 29.0 | 14.4 | 2183.3 | 925.4 | 7.607 | 2291 | 42.0 |
| 1914 | 401 | 398 | 10.197 | 10.149 | 26.811 | 34.851 | 4.23 | 0.0 | 23.1 | 7.7 | 2155.5 | 746.3 | 7.733 | 2297 | 48.1 |
| 1915 | 349 | 346 | 11.589 | 11.544 | 26.672 | 34.989 | 4.04 | 0.0 | 17.4 | 4.7 | 2142.0 | 661.8 | 7.708 | 2294 | 42.0 |
| 1916 | 302 | 300 | 13.330 | 13.288 | 26.473 | 35.189 | 4.25 | 0.0 | 11.7 | 2.3 | 2114.5 | 548.1 | 7.808 | 2310 | 42.0 |
| 1917 | 251 | 249 | 15.144 | 15.106 | 26.287 | 35.433 | 4.51 | 0.0 | 7.2 | 1.1 | 2101.9 | 481.1 | 7.817 | 2309 | 73.8 |
| 1918 | 202 | 200 | 17.361 | 17.327 | 26.049 | 35.792 | 4.68 | 0.0 | 3.6 | 0.0 | 2085.3 | 412.9 | 7.817 | 2309 | 48.7 |
| 1919 | 153 | 152 | 20.901 | 20.872 | 25.655 | 36.479 | 4.86 | 0.0 | 0.0 | 0.0 | 2087.3 | 355.0 | 7.956 | 2352 | 65.9 |
| 1920 | 102 | 101 | 23.106 | 23.085 | 25.422 | 35.074 | 4.78 | 0.0 | 0.0 | 0.0 | 2087.4 | 314.3 | 7.917 | 2380 | 47.6 |
| 1921 | 75 | 75 | 23.121 | 23.105 | 25.423 | 36.997 | 4.88 | 0.0 | 0.0 | 0.0 | 2083.7 | 313.2 | 8.028 | 2422 | 75.7 |
| 1922 | 44 | 43 | 23.131 | 23.122 | 25.417 | 36.997 | 4.83 | 0.0 | 0.0 | 0.0 | 2085.5 | 315.9 | 8.024 | 2453 | 76.4 |
| 1923 | 28 | 28 | 23.124 | 23.118 | 25.416 | 36.997 | 4.85 | 0.0 | 0.0 | 0.0 | 2081.5 | 313.5 | 8.024 | 2428 | 86.2 |
| 1924 | 3 | 2 | 23.111 | 23.110 | 25.421 | 37.005 | 4.87 | 0.0 | 0.0 | 0.0 | 2084.4 | 311.4 | 7.980 | 2422 | 114.0 |
| | | | | | | | | | | | | | | | 86.1 |

NOAA South Atlantic 1991 Long Lines

Leg 1
 Station 24
 Cast 20

Niskin Bottle hydrographic data
 Operation # 0912060188.0
 Date 7/25/1991
 Time (GMT) 1001

Latitude -20.00
 Longitude -25.00
 Bottom Depth 5648

| Sample # | Pres. db | Depth m | Temp. deg. C | Pot. T. deg. C | Sigma theta | Salinity | Oxygen mL/L | NO2 umol/L | NO3 umol/L | SiO4 umol/L | TCO2 (coul.) umol/Kg | TCO2 (titr.) umol/Kg | TALK uEg/Kg | TCO2 (20 deg.) uatm | pH | TALK (calc.) uEg/Kg | DOC umol/L |
|----------|----------|---------|--------------|----------------|-------------|----------|-------------|------------|------------|-------------|----------------------|----------------------|-------------|---------------------|-------|---------------------|------------|
| 2001 | 1003 | 993 | 3.540 | 3.468 | 27.443 | 34.507 | 4.31 | 0.0 | 32.5 | 42.6 | 2215.4 | 1028.0 | 2306 | 2228 | 7.611 | 2322.5 | |
| 2002 | 901 | 892 | 3.783 | 3.717 | 27.369 | 34.438 | 4.32 | 0.0 | 32.2 | 38.4 | 2211.4 | 1037.8 | 2304 | 2220 | 7.573 | 2318.3 | |
| 2003 | 901 | 893 | 3.783 | 3.717 | 27.368 | 34.438 | 4.29 | 0.0 | 30.7 | 32.0 | 2203.7 | 1034.7 | 2297 | 2213 | 7.579 | 2308.4 | |
| 2004 | 803 | 795 | 4.307 | 4.246 | 27.288 | 34.403 | 4.26 | 0.0 | 30.6 | 24.8 | 2195.6 | 1004.9 | 2292 | 2210 | 7.616 | 2304.2 | |
| 2005 | 802 | 795 | 4.311 | 4.250 | 27.286 | 34.418 | 4.19 | 0.0 | 27.5 | 17.9 | 2186.4 | 957.8 | 2292 | 2198 | 7.607 | 2302.3 | |
| 2006 | 702 | 695 | 5.133 | 5.075 | 27.206 | 34.525 | 3.89 | 0.0 | 23.1 | 11.0 | 2167.5 | 838.0 | 2298 | 2182 | 7.697 | 2304.8 | |
| 2007 | 702 | 696 | 5.122 | 5.064 | 27.207 | 34.735 | 3.78 | 0.0 | 16.9 | 6.0 | 2142.3 | 677.0 | 2301 | 2154 | 7.734 | 2316.5 | |
| 2008 | 601 | 596 | 6.702 | 6.646 | 27.095 | 34.965 | 4.00 | 0.0 | 10.6 | 3.0 | 2116.9 | 544.6 | 2318 | 2135 | 7.853 | 2332.8 | |
| 2009 | 602 | 596 | 6.678 | 6.622 | 27.096 | 35.204 | 4.34 | 0.0 | 2.7 | 0.0 | 2086.6 | 414.2 | 2356 | 2103 | 7.944 | 2363.7 | |
| 2010 | 502 | 497 | 9.035 | 8.980 | 26.915 | 36.408 | 4.94 | 0.0 | 0.0 | 0.0 | 2079.2 | 348.6 | 2387 | 2102 | 8.022 | 2402.8 | |
| 2011 | 501 | 497 | 9.036 | 8.981 | 26.914 | 36.408 | 4.94 | 0.0 | 0.0 | 0.0 | 2082.9 | 319.4 | 2417 | 2105 | 8.016 | 2435.3 | |
| 2012 | 402 | 398 | 11.307 | 11.256 | 26.706 | 36.934 | 4.91 | 0.0 | 0.0 | 0.0 | 2084.1 | 315.7 | 2423 | 2114 | 8.045 | 2440.2 | |
| 2013 | 401 | 397 | 11.327 | 11.276 | 26.702 | 36.932 | 4.87 | 0.0 | 0.0 | 0.0 | 2084.1 | 315.7 | 2423 | 2114 | 8.045 | 2440.2 | |
| 2014 | 301 | 298 | 13.434 | 13.391 | 26.475 | 36.932 | 4.87 | 0.0 | 0.0 | 0.0 | 2084.1 | 315.7 | 2423 | 2114 | 8.045 | 2440.2 | |
| 2015 | 302 | 299 | 13.395 | 13.352 | 26.480 | 36.932 | 4.87 | 0.0 | 0.0 | 0.0 | 2084.1 | 315.7 | 2423 | 2114 | 8.045 | 2440.2 | |
| 2016 | 200 | 199 | 17.699 | 17.665 | 26.019 | 36.932 | 4.87 | 0.0 | 0.0 | 0.0 | 2084.1 | 315.7 | 2423 | 2114 | 8.045 | 2440.2 | |
| 2017 | 200 | 199 | 17.669 | 17.635 | 26.020 | 36.932 | 4.87 | 0.0 | 0.0 | 0.0 | 2084.1 | 315.7 | 2423 | 2114 | 8.045 | 2440.2 | |
| 2018 | 138 | 137 | 20.729 | 20.703 | 25.647 | 36.932 | 4.87 | 0.0 | 0.0 | 0.0 | 2084.1 | 315.7 | 2423 | 2114 | 8.045 | 2440.2 | |
| 2019 | 138 | 136 | 20.732 | 20.706 | 25.646 | 36.932 | 4.87 | 0.0 | 0.0 | 0.0 | 2084.1 | 315.7 | 2423 | 2114 | 8.045 | 2440.2 | |
| 2020 | 73 | 72 | 22.845 | 22.830 | 25.457 | 36.932 | 4.87 | 0.0 | 0.0 | 0.0 | 2084.1 | 315.7 | 2423 | 2114 | 8.045 | 2440.2 | |
| 2021 | 73 | 72 | 22.845 | 22.830 | 25.455 | 36.932 | 4.87 | 0.0 | 0.0 | 0.0 | 2084.1 | 315.7 | 2423 | 2114 | 8.045 | 2440.2 | |
| 2022 | 3 | 3 | 22.836 | 22.835 | 25.453 | 36.932 | 4.87 | 0.0 | 0.0 | 0.0 | 2084.1 | 315.7 | 2423 | 2114 | 8.045 | 2440.2 | |
| 2023 | 3 | 3 | 22.830 | 22.829 | 25.454 | 36.932 | 4.87 | 0.0 | 0.0 | 0.0 | 2084.1 | 315.7 | 2423 | 2114 | 8.045 | 2440.2 | |

NOAA South Atlantic 1991 Long Lines

Leg 1
 Station 26
 Cast 21

Niskin Bottle hydrographic data

Operation # 0912060199.0

Date 7/25/1991

Time (GMT) 2253

Latitude -22.00
 Longitude -25.00
 Bottom Depth 5672

| Sample # | Pres. db | Depth m | Temp. | | Pot. T. deg. C | Sigma theta | Salinity | Oxygen mL/L | NO2 umol/L | NO3 umol/L | SiO4 umol/L | TCO2 (coul.) umol/Kg | pCO2 (20 deg.) uatm | TALK uEq/Kg | TCO2 (titr.) umol/Kg | pH | TALK (calc.) uEq/Kg | DOC umol/L |
|----------|----------|---------|--------|--------|----------------|-------------|----------|-------------|------------|------------|-------------|----------------------|---------------------|-------------|----------------------|--------|---------------------|------------|
| | | | deg. C | deg. C | | | | | | | | | | | | | | |
| 2101 | 5220 | 5118 | 0.683 | 0.250 | 27.857 | 34.764 | 5.30 | 0.0 | 0.0 | 2236.4 | 896.9 | 2354 | 2247 | 7.628 | 2367.9 | | | |
| 2102 | 4495 | 4415 | 1.177 | 0.812 | 27.868 | 34.764 | 5.33 | 0.0 | 28.7 | 2234.8 | 893.9 | 2308 | 2229 | 7.567 | 2304.1 | | | |
| 2103 | 4495 | 4414 | 1.181 | 0.816 | 27.869 | 34.764 | 5.63 | 0.0 | 22.3 | 2200.4 | 782.8 | 2339 | 2211 | 7.687 | 2368.5 | | 36.1 | |
| 2104 | 3746 | 3685 | 2.068 | 1.760 | 27.880 | 34.862 | 5.77 | 0.0 | 21.7 | 2172.0 | 742.3 | 2325 | 2187 | 7.704 | 2354.6 | | | |
| 2105 | 2995 | 2951 | 2.698 | 2.454 | 27.870 | 34.927 | 5.73 | 0.0 | 20.6 | 2178.9 | 741.0 | 2318 | 2190 | 7.678 | 2360.5 | | 34.2 | |
| 2106 | 2493 | 2460 | 2.942 | 2.744 | 27.854 | 34.931 | 5.73 | 0.0 | 20.4 | 2173.1 | 784.5 | 2321 | 2175 | 7.734 | 2340.8 | | | |
| 2107 | 1995 | 1971 | 3.209 | 3.054 | 27.828 | 34.933 | 5.66 | 0.0 | 26.9 | 2203.1 | 907.6 | 2295 | 2210 | 7.620 | 2323.7 | | 40.8 | |
| 2108 | 1496 | 1480 | 3.255 | 3.144 | 27.695 | 34.776 | 4.77 | 0.0 | 0.0 | 42.1 | 2215.9 | 1079.4 | 2295 | 2210 | 7.620 | 2330.8 | | |
| 2109 | 1000 | 990 | 3.613 | 3.540 | 27.404 | 34.460 | 4.23 | 0.0 | 32.8 | 2199.8 | 1034.4 | 2308 | 2229 | 7.567 | 2315.1 | | 35.9 | |
| 2110 | 800 | 793 | 4.539 | 4.476 | 27.252 | 34.392 | 4.26 | 0.0 | 30.1 | 2183.9 | 955.9 | 2280 | 2198 | 7.592 | 2304.1 | | | |
| 2111 | 699 | 693 | 5.855 | 5.794 | 27.136 | 34.438 | 4.27 | 0.0 | 26.9 | 2172.0 | 881.5 | 2281 | 2183 | 7.612 | 2299.5 | | 37.7 | |
| 2112 | 601 | 595 | 7.310 | 7.251 | 27.030 | 34.549 | 4.20 | 0.0 | 20.6 | 2146.4 | 724.1 | 2294 | 2160 | 7.736 | 2300.4 | | | |
| 2113 | 501 | 497 | 9.425 | 9.368 | 26.860 | 34.744 | 4.38 | 0.0 | 14.8 | 2113.4 | 599.1 | 2304 | 2133 | 7.788 | 2307.4 | | 39.1 | |
| 2114 | 401 | 397 | 11.985 | 11.932 | 26.627 | 35.030 | 4.46 | 0.0 | 10.3 | 2105.7 | 522.4 | 2315 | 2119 | 7.862 | 2307.9 | | 47.4 | |
| 2115 | 351 | 348 | 13.258 | 13.209 | 26.480 | 35.178 | 4.67 | 0.2 | 6.5 | 2093.2 | 471.4 | 2318 | 2101 | 7.872 | 2328.6 | | 43.8 | |
| 2116 | 301 | 298 | 14.673 | 14.628 | 26.333 | 35.352 | 5.19 | 0.0 | 1.8 | 2088.1 | 391.2 | 2353 | 2105 | 7.914 | 2337.9 | | 46.1 | |
| 2117 | 202 | 200 | 18.191 | 18.156 | 25.969 | 35.954 | 4.67 | 0.0 | 0.0 | 2085.3 | 365.3 | 2381 | 2102 | 7.976 | 2384.3 | | 59.5 | |
| 2118 | 166 | 164 | 20.049 | 20.018 | 25.768 | 36.324 | 4.82 | 0.2 | 0.0 | 2085.4 | 317.7 | 2423 | 2099 | 8.018 | 2397.2 | | 52.4 | |
| 2119 | 153 | 152 | 22.740 | 22.709 | 25.490 | 36.900 | 4.87 | 0.0 | 0.0 | 2082.1 | 310.6 | 2431 | 2099 | 8.067 | 2439.9 | | 74.9 | |
| 2120 | 105 | 104 | 22.896 | 22.875 | 25.475 | 36.978 | 4.89 | 0.0 | 0.0 | 2084.0 | 310.5 | 2424 | 2120 | 7.959 | 2442.7 | | 70.4 | |
| 2121 | 79 | 79 | 22.896 | 22.880 | 25.475 | 36.980 | 4.88 | 0.0 | 0.0 | 2075.1 | 310.2 | 2424 | 2120 | 7.959 | 2445.2 | | 76.5 | |
| 2122 | 44 | 44 | 22.885 | 22.876 | 25.476 | 36.980 | 4.88 | 0.0 | 0.0 | 2086.4 | 310.4 | 2428 | 2098 | 8.037 | 2434.2 | | 79.8 | |
| 2123 | 28 | 28 | 22.881 | 22.875 | 25.476 | 36.982 | 4.88 | 0.0 | 0.0 | 2086.4 | 310.4 | 2428 | 2098 | 8.037 | 2448.3 | | 76.9 | |
| 2124 | 2 | 2 | 22.922 | 22.922 | 25.465 | 36.983 | 4.82 | 0.0 | 0.0 | | | | | | | | 74.0 | |

NOAA South Atlantic 1991 Long Lines

Leg 1
 Station 27
 Cast 22
 Niskin Bottle hydrographic data
 Operation # 0912070207.0
 Date 7/26/1991
 Time (GMT) 1048

Latitude -24.00
 Longitude -25.00
 Bottom Depth 5304

| Sample # | Pres. db | Depth m | Temp. deg. C | Pot. T. deg. C | Sigma theta | Salinity | Oxygen mL/L | NO2 umol/L | NO3 umol/L | SiO4 umol/L | TCO2 (cool.) umol/Kg | TCO2 (titr.) umol/Kg | TALK uEq/Kg | PH | TALK (calc.) uEq/Kg | DOC umol/L |
|----------|----------|---------|--------------|----------------|-------------|----------|-------------|------------|------------|-------------|----------------------|----------------------|-------------|------|---------------------|------------|
| 2201 | 998 | 989 | 3.769 | 3.695 | 27.377 | 34.445 | 4.25 | 0.0 | 32.4 | 36.1 | 2211.3 | 1049.2 | 2299 | 2230 | 7.561 | 2314.6 |
| 2202 | 900 | 892 | 4.121 | 4.053 | 27.290 | 34.382 | 4.48 | 0.0 | 0.0 | 31.2 | 2202.7 | 1016.2 | 2289 | 2217 | 7.540 | 2309.7 |
| 2203 | 900 | 891 | 4.124 | 4.056 | 27.290 | 34.382 | 4.40 | 0.0 | 33.2 | 31.2 | 2202.7 | 1016.2 | 2289 | 2217 | 7.540 | 2309.7 |
| 2204 | 900 | 891 | 4.124 | 4.056 | 27.290 | 34.382 | 4.40 | 0.0 | 33.2 | 31.2 | 2202.7 | 1016.2 | 2289 | 2217 | 7.540 | 2309.7 |
| 2205 | 803 | 795 | 4.754 | 4.690 | 27.210 | 34.369 | 4.52 | 0.0 | 31.9 | 25.5 | 2187.1 | 964.1 | 2284 | 2198 | 7.572 | 2301.4 |
| 2206 | | | | | 34.371 | | | | | | | | | | | |
| 2207 | 703 | 697 | 5.787 | 5.726 | 27.133 | 34.424 | 4.47 | 0.0 | 29.8 | 17.2 | 2180.2 | 926.1 | 2276 | 2200 | 7.517 | 2300.6 |
| 2208 | | | | | 34.423 | | | | | | | | | | | |
| 2209 | 602 | 596 | 7.606 | 7.546 | 27.006 | 34.582 | 4.20 | 0.0 | 26.6 | 11.9 | 2166.5 | 845.8 | 2285 | 2182 | 7.650 | 2301.4 |
| 2210 | | | | | 34.580 | | | | | | | | | | | |
| 2211 | 501 | 496 | 9.437 | 9.380 | 26.859 | 34.746 | 4.34 | 0.0 | 20.3 | 6.9 | 2147.7 | 733.3 | 2278 | 2162 | 7.632 | 2306.6 |
| 2212 | | | | | 34.747 | | | | | | | | | | | |
| 2213 | 402 | 398 | 11.811 | 11.759 | 26.646 | 35.011 | 4.55 | 0.0 | 8.5 | 0.0 | 2119.1 | 584.4 | 2298 | 2136 | 7.751 | 2319.5 |
| 2214 | 401 | 397 | 11.985 | 11.932 | 26.627 | 35.011 | 4.55 | 0.0 | 8.5 | 0.0 | 2119.1 | 584.4 | 2298 | 2136 | 7.751 | 2319.5 |
| 2215 | 301 | 299 | 14.004 | 13.960 | 26.406 | 35.285 | 4.67 | 0.0 | 2.3 | 0.0 | 2096.8 | 499.1 | 2316 | 2111 | 7.872 | 2328.6 |
| 2216 | 303 | 300 | 13.976 | 13.932 | 26.403 | | | | | | | | | | | |
| 2217 | 201 | 199 | 16.891 | 16.858 | 26.099 | 35.721 | 4.86 | 0.0 | 0.0 | 0.0 | 2080.1 | 404.6 | 2335 | 2092 | 7.914 | 2360.8 |
| 2218 | 201 | 199 | 16.896 | 16.863 | 26.099 | 35.716 | 4.86 | 0.0 | 0.0 | 0.0 | 2080.1 | 404.6 | 2335 | 2092 | 7.914 | 2360.8 |
| 2219 | 132 | 131 | 21.926 | 21.900 | 25.548 | 36.706 | 4.97 | 0.0 | 0.0 | 0.0 | 2075.1 | 316.3 | 2278 | 2162 | 7.632 | 2306.6 |
| 2220 | 105 | 104 | 22.896 | 22.875 | 25.475 | 36.978 | 5.00 | 0.0 | 0.0 | 0.0 | 2075.0 | 315.2 | 2404 | 2107 | 8.037 | 2427.6 |
| 2221 | 62 | 62 | 21.906 | 21.894 | 25.546 | 36.704 | 5.00 | 0.0 | 0.0 | 0.0 | 2075.0 | 315.2 | 2404 | 2107 | 8.037 | 2427.6 |
| 2222 | 63 | 63 | 21.905 | 21.892 | 25.548 | 36.704 | 5.00 | 0.0 | 0.0 | 0.0 | 2075.0 | 315.2 | 2404 | 2107 | 8.037 | 2427.6 |
| 2223 | 2 | 2 | 21.945 | 21.945 | 25.533 | 36.709 | 5.11 | 0.0 | 0.0 | 0.0 | 2072.3 | 315.8 | 2423 | 2101 | 7.999 | 2423.7 |
| 2224 | 2 | 2 | 21.967 | 21.967 | 25.527 | 36.707 | 5.11 | 0.0 | 0.0 | 0.0 | 2072.3 | 315.8 | 2423 | 2101 | 7.999 | 2423.7 |

NOAA South Atlantic 1991 Long Lines

Leg 1
 Station 28
 Cast 23

Niskin Bottle hydrographic data
 Operation # 0912070216.0
 Date 7/26/1991
 Time (GMT) 2316

Latitude -25.99
 Longitude -24.99
 Bottom Depth 4979

| Sample # | Pres. db | Depth m | Temp. deg. C | Pot. T. deg. C | Sigma theta | Salinity | Oxygen mL/L | NO2 umol/L | NO3 umol/L | SiO4 umol/L | TCO2 (goul.) umol/Kg | fCO2 (20 deg.) uatm | TALK uEq/Kg | TCO2 (titr.) umol/Kg | pH | TALK (calc.) uEq/Kg | DOC umol/L |
|----------|----------|---------|--------------|----------------|-------------|----------|-------------|------------|------------|-------------|----------------------|---------------------|-------------|----------------------|-------|---------------------|------------|
| 2301 | 4960 | 4866 | 0.998 | 0.585 | 27.865 | 34.741 | 5.11 | 0.0 | 28.9 | 99.8 | 2244.6 | 933.6 | 2866 | 2241 | 7.658 | 2372.4 | |
| 2302 | 3992 | 3925 | 1.617 | 1.295 | 27.877 | 34.812 | 5.37 | 0.0 | 26.5 | 70.5 | 2216.4 | 849.9 | 2331 | 2221 | 7.645 | 2357.4 | 49.3 |
| 2303 | 3491 | 3436 | 2.340 | 2.053 | 27.879 | 34.898 | 5.71 | 0.0 | 22.6 | 41.3 | 2187.3 | 763.1 | 2336 | 2200 | 7.704 | 2344.6 | |
| 2304 | 2994 | 2950 | 2.688 | 2.445 | 27.872 | 34.921 | 5.77 | 0.0 | 21.7 | 31.7 | 2175.4 | 743.9 | 2315 | 2206 | 7.649 | 2336.1 | 67.7 |
| 2305 | 2492 | 2458 | 2.895 | 2.698 | 27.857 | 34.929 | 5.78 | 0.0 | 21.7 | 27.6 | 2175.8 | 736.4 | 2332 | 2175 | 7.740 | 2338.4 | |
| 2306 | 1991 | 1967 | 2.909 | 2.759 | 27.799 | 34.862 | 5.63 | 0.0 | 24.6 | 37.5 | 2190.2 | 814.0 | 2325 | 2205 | 7.665 | 2336.3 | 57.0 |
| 2307 | 1593 | 1575 | 2.988 | 2.872 | 27.700 | 34.749 | 4.96 | 0.0 | 29.4 | 47.1 | 2212.4 | 926.2 | 2325 | 2225 | 7.618 | 2337.7 | |
| 2308 | 1393 | 1378 | 3.086 | 2.986 | 27.610 | 34.650 | 4.02 | 0.0 | 29.4 | 47.0 | 2219.1 | 1014.9 | 2325 | 2229 | 7.599 | 2329.3 | 45.9 |
| 2309 | 1193 | 1181 | 3.143 | 3.059 | 27.486 | 34.503 | 4.27 | 0.0 | 33.7 | 47.8 | 2224.4 | 1070.5 | 2324 | 2225 | 7.612 | 2325.9 | |
| 2310 | 996 | 986 | 3.614 | 3.542 | 27.338 | 34.374 | 4.64 | 0.0 | 33.7 | 37.5 | 2203.5 | 1023.8 | 2338 | 2233 | 7.623 | 2309.7 | 48.6 |
| 2311 | 796 | 789 | 4.840 | 4.776 | 27.176 | 34.335 | 4.86 | 0.0 | 27.0 | 19.3 | 2175.0 | 910.3 | 2289 | 2188 | 7.617 | 2297.4 | |
| 2312 | 697 | 691 | 6.210 | 6.147 | 27.083 | 34.426 | 4.86 | 0.0 | 27.0 | 12.9 | 2160.2 | 843.0 | 2277 | 2188 | 7.556 | 2294.5 | 44.3 |
| 2313 | 596 | 591 | 7.978 | 7.917 | 26.964 | 34.588 | 4.86 | 0.0 | 23.7 | 9.0 | 2151.4 | 773.1 | 2272 | 2163 | 7.647 | 2300.4 | |
| 2314 | 496 | 492 | 10.292 | 10.233 | 26.791 | 34.842 | 4.72 | 0.2 | 17.3 | 4.4 | 2128.5 | 643.0 | 2289 | 2166 | 7.633 | 2310.2 | 64.1 |
| 2315 | 395 | 391 | 12.267 | 12.214 | 26.620 | 35.089 | 4.72 | 0.0 | 12.3 | 1.6 | 2112.5 | 561.3 | 2357 | 2189 | 7.734 | 2320.6 | 67.1 |
| 2316 | 299 | 297 | 14.257 | 14.213 | 26.395 | 35.324 | 4.75 | 0.0 | 7.4 | 0.0 | 2090.5 | 561.3 | 2322 | 2098 | 7.890 | 2320.6 | 62.4 |
| 2317 | 248 | 246 | 15.482 | 15.443 | 26.254 | 35.488 | 4.88 | 0.0 | 4.5 | 0.0 | 2084.6 | 561.3 | 2327 | 2099 | 7.900 | 2320.6 | 50.2 |
| 2318 | 199 | 197 | 17.035 | 17.002 | 26.088 | 35.746 | 4.87 | 0.0 | 2.4 | 0.0 | 2076.8 | 561.3 | 2347 | 2092 | 7.921 | 2320.6 | 58.2 |
| 2319 | 149 | 148 | 19.048 | 19.021 | 25.824 | 36.057 | 5.02 | 0.0 | 0.0 | 0.0 | 2065.0 | 561.3 | 2357 | 2091 | 7.931 | 2320.6 | 73.5 |
| 2320 | 102 | 101 | 21.125 | 21.105 | 25.611 | 36.498 | 5.03 | 0.0 | 0.0 | 0.0 | 2061.7 | 333.5 | 2396 | 2073 | 8.047 | 2393.8 | 83.4 |
| 2321 | 78 | 77 | 21.187 | 21.172 | 25.598 | 36.509 | 5.03 | 0.0 | 0.0 | 0.0 | 2064.3 | 316.5 | 2380 | 2087 | 7.963 | 2411.7 | 74.6 |
| 2322 | 43 | 43 | 21.173 | 21.165 | 25.598 | 36.504 | 5.04 | 0.0 | 0.0 | 0.0 | 2060.9 | 321.2 | 2395 | 2081 | 8.011 | 2403.3 | 61.9 |
| 2323 | 30 | 30 | 21.172 | 21.166 | 25.597 | 36.504 | 4.99 | 0.0 | 0.0 | 0.0 | 2063.2 | 315.9 | 2379 | 2100 | 7.943 | 2410.9 | 70.2 |
| 2324 | 3 | 3 | 21.162 | 21.161 | 25.599 | 36.513 | 5.07 | 0.0 | 0.0 | 0.0 | 2059.7 | 314.9 | 2393 | 2086 | 7.998 | 2407.3 | 88.1 |

NOAA South Atlantic 1991 Long Lines

Leg 1
 Station 29
 Cast 24

Latitude -27.00
 Longitude -25.00
 Bottom Depth 4806

Niskin Bottle hydrographic data
 Operation # 090208220.0
 Date 7/27/1991
 Time (GMT) 701

| Sample # | Pres. db | Depth m | Temp. deg. C | Pot. T. deg. C | Sigma theta | Salinity | Oxygen mL/L | NO2 umol/L | NO3 umol/L | SiO4 umol/L | TCO2 (cool.) umol/Kg | fCO2 (20 deg.) uatm | TALK uEq/Kg | TCO2 (titr.) umol/Kg | pH | TALK (calc.) uEq/Kg |
|----------|----------|---------|--------------|----------------|-------------|----------|-------------|------------|------------|-------------|----------------------|---------------------|-------------|----------------------|-------|---------------------|
| 2401 | 1011 | 1001 | 3.661 | 3.587 | 27.310 | 34.349 | 4.72 | 0.0 | 28.2 | 29.0 | 2200.2 | 987.3 | 2302 | 2218 | 7.569 | 2311.9 |
| 2402 | 1010 | 1000 | 3.663 | 3.589 | 27.311 | 34.321 | 4.63 | 0.0 | 28.2 | 29.0 | 2200.9 | 992.6 | 2287 | 2197 | 7.589 | 2311.0 |
| 2403 | 904 | 895 | 4.198 | 4.129 | 27.233 | 34.321 | 4.84 | 0.0 | 26.8 | 22.4 | 2184.8 | 940.4 | 2288 | 2179 | 7.681 | 2302.8 |
| 2404 | 901 | 893 | 4.235 | 4.166 | 27.230 | 34.391 | 4.84 | 0.0 | 24.4 | 14.5 | 2166.8 | 871.1 | 2288 | 2164 | 7.681 | 2296.0 |
| 2405 | 752 | 745 | 5.741 | 5.676 | 27.112 | 34.391 | 4.84 | 0.0 | 20.4 | 9.3 | 2153.5 | 782.6 | 2288 | 2137 | 7.749 | 2300.6 |
| 2406 | 753 | 746 | 5.735 | 5.670 | 27.114 | 34.558 | 4.70 | 0.0 | 14.9 | 5.0 | 2132.5 | 651.6 | 2303 | 2113 | 7.806 | 2312.1 |
| 2407 | 631 | 626 | 7.681 | 7.617 | 26.983 | 34.558 | 4.68 | 0.0 | 8.0 | 1.9 | 2106.3 | 531.4 | 2322 | 2102 | 7.891 | 2325.7 |
| 2408 | 632 | 626 | 7.667 | 7.603 | 26.983 | 34.558 | 4.93 | 0.0 | 5.5 | 1.4 | 2093.4 | 470.4 | 2340 | 2095 | 7.921 | 2338.4 |
| 2409 | 528 | 523 | 10.013 | 9.951 | 26.813 | 34.811 | 4.92 | 0.0 | 1.4 | 0.0 | 2077.6 | 402.4 | 2388 | 2095 | 8.039 | 2359.0 |
| 2410 | 529 | 524 | 10.007 | 9.945 | 26.815 | 34.811 | 5.02 | 0.0 | 0.0 | 0.0 | 2065.4 | 319.7 | 2388 | 2095 | 8.039 | 2409.1 |
| 2411 | 400 | 397 | 12.897 | 12.842 | 26.672 | 35.189 | 5.03 | 0.0 | 0.0 | 0.0 | 2065.4 | 319.7 | 2394 | 2090 | 8.003 | 2414.0 |
| 2412 | 401 | 397 | 12.888 | 12.833 | 26.671 | 35.189 | 5.02 | 0.0 | 0.0 | 0.0 | 2065.9 | 315.9 | 2394 | 2090 | 8.057 | 2417.7 |
| 2413 | 302 | 299 | 14.370 | 14.325 | 26.383 | 35.342 | 5.01 | 0.0 | 0.0 | 0.0 | 2069.6 | 317.6 | 2395 | 2088 | 8.007 | 2417.1 |
| 2414 | 301 | 299 | 14.375 | 14.330 | 26.382 | 35.342 | 5.00 | 0.0 | 0.0 | 0.0 | 2067.8 | 315.9 | 2395 | 2088 | 8.007 | 2417.1 |
| 2415 | 201 | 200 | 16.814 | 16.781 | 26.102 | 35.694 | 4.99 | 0.0 | 0.0 | 0.0 | 2067.8 | 315.9 | 2395 | 2088 | 8.007 | 2417.1 |
| 2416 | 202 | 200 | 16.814 | 16.781 | 26.102 | 35.694 | 4.99 | 0.0 | 0.0 | 0.0 | 2067.8 | 315.9 | 2395 | 2088 | 8.007 | 2417.1 |
| 2417 | 123 | 122 | 20.908 | 20.884 | 25.649 | 36.471 | 5.02 | 0.0 | 0.0 | 0.0 | 2065.4 | 319.7 | 2388 | 2095 | 8.039 | 2409.1 |
| 2418 | 122 | 121 | 20.909 | 20.886 | 25.649 | 36.471 | 5.03 | 0.0 | 0.0 | 0.0 | 2065.4 | 319.7 | 2388 | 2095 | 8.039 | 2409.1 |
| 2419 | 83 | 82 | 20.965 | 20.949 | 25.651 | 36.501 | 5.02 | 0.0 | 0.0 | 0.0 | 2065.9 | 315.9 | 2394 | 2090 | 8.003 | 2414.0 |
| 2420 | 84 | 83 | 21.026 | 21.010 | 25.642 | 36.501 | 5.03 | 0.0 | 0.0 | 0.0 | 2065.9 | 315.9 | 2394 | 2090 | 8.057 | 2417.7 |
| 2421 | 45 | 44 | 21.205 | 21.196 | 25.633 | 36.568 | 5.01 | 0.0 | 0.0 | 0.0 | 2069.6 | 317.6 | 2395 | 2088 | 8.007 | 2417.1 |
| 2422 | 45 | 44 | 21.219 | 21.210 | 25.635 | 36.568 | 5.00 | 0.0 | 0.0 | 0.0 | 2067.8 | 315.9 | 2395 | 2088 | 8.007 | 2417.1 |
| 2423 | 6 | 6 | 21.205 | 21.204 | 25.634 | 36.568 | 4.99 | 0.0 | 0.0 | 0.0 | 2067.8 | 315.9 | 2395 | 2088 | 8.007 | 2417.1 |
| 2424 | 7 | 7 | 21.202 | 21.201 | 25.633 | 36.568 | 4.99 | 0.0 | 0.0 | 0.0 | 2067.8 | 315.9 | 2395 | 2088 | 8.007 | 2417.1 |

NOAA South Atlantic 1991 Long Lines

Leg 1
 Station 31
 Cast 25

Niskin Bottle hydrographic data
 Operation # 0912090234.0
 Date 7/28/1991
 Time (GMT) 423

Latitude -29.50
 Longitude -28.50
 Bottom Depth 4456

| Sample # | Pres. db | Depth m | Temp. deg. C | Pot. T. deg. C | Sigma theta | Salinity | Oxygen mL/L | NO2 umol/L | NO3 umol/L | SiO4 umol/L | TCO2 (cool.) umol/Kg | pCO2 (20 deg.) uatm | TALK uEg/Kg | TCO2 (titr.) umol/Kg | pH | TALK (calc.) uEg/Kg | DOC umol/L |
|----------|----------|---------|--------------|----------------|-------------|----------|-------------|------------|------------|-------------|----------------------|---------------------|-------------|----------------------|-------|---------------------|------------|
| | | | | | | | | | | | | | | | | | |
| 2501 | 4182 | 4110 | 1.166 | 0.836 | 27.858 | 34.762 | 5.14 | 0.0 | 25.9 | 80.8 | 2243.1 | 949.5 | 2357 | 2264 | 7.608 | 2367.4 | 47.5 |
| 2502 | 4000 | 3933 | 1.353 | 1.038 | 27.858 | 34.770 | 5.18 | 0.0 | | | 2236.5 | 926.8 | 2350 | 2250 | 7.603 | 2363.9 | 38.3 |
| 2503 | 3499 | 3444 | 2.258 | 1.972 | 27.871 | 34.870 | 5.60 | 0.0 | | | 2194.9 | 781.3 | 2334 | 2210 | 7.714 | 2348.8 | 39.4 |
| 2504 | 2996 | 2953 | 2.691 | 2.447 | 27.860 | 34.905 | 5.65 | 0.0 | 18.1 | 30.3 | 2182.3 | 750.7 | 2325 | 2198 | 7.683 | 2342.1 | 35.6 |
| 2505 | 2497 | 2464 | 2.798 | 2.592 | 27.835 | 34.890 | 5.52 | 0.0 | 18.1 | 30.6 | 2183.9 | 795.1 | 2327 | 2209 | 7.701 | 2333.2 | 43.1 |
| 2506 | 1997 | 1972 | 2.784 | 2.635 | 27.766 | 34.809 | 5.06 | 0.0 | | 39.2 | 2201.9 | 870.9 | 2329 | 2224 | 7.628 | 2336.8 | 46.8 |
| 2507 | 1696 | 1676 | 2.841 | 2.718 | 27.677 | 34.707 | 4.60 | 0.0 | 25.1 | 45.0 | 2220.9 | 970.1 | 2330 | 2242 | 7.657 | 2339.0 | 42.3 |
| 2508 | 1438 | 1422 | 2.932 | 2.830 | 27.571 | 34.586 | 4.35 | 0.0 | 28.6 | 47.5 | 2229.0 | 1053.4 | 2325 | 2247 | 7.568 | 2333.9 | 45.8 |
| 2509 | 1297 | 1283 | 3.052 | 2.960 | 27.482 | 34.490 | 4.37 | 0.0 | 28.2 | 42.4 | 2224.1 | 1072.2 | 2322 | 2228 | 7.608 | 2325.3 | 37.2 |
| 2510 | 1198 | 1186 | 3.205 | 3.120 | 27.412 | 34.418 | 4.50 | 0.0 | | | 2216.3 | 1039.1 | 2313 | 2235 | 7.565 | 2321.5 | 50.8 |
| 2511 | 1099 | 1088 | 3.370 | 3.292 | 27.350 | 34.361 | 4.71 | 0.0 | 29.3 | 34.1 | 2205.6 | 1014.7 | 2298 | 2215 | 7.573 | 2313.4 | |
| 2512 | 1002 | 992 | 3.713 | 3.640 | 27.271 | 34.307 | 5.01 | 0.0 | | | 2189.4 | 944.6 | 2289 | 2211 | 7.561 | 2307.1 | 50.6 |
| 2513 | 909 | 900 | 4.104 | 4.035 | 27.213 | 34.285 | 5.27 | 0.0 | 28.5 | 33.0 | 2175.9 | 896.4 | 2277 | 2192 | 7.575 | 2300.9 | |
| 2514 | 839 | 831 | 4.867 | 4.799 | 27.158 | 34.319 | 5.15 | 0.0 | 27.3 | 25.7 | 2167.4 | 874.9 | 2274 | 2189 | 7.568 | 2296.4 | 40.1 |
| 2515 | 800 | 792 | 5.095 | 5.029 | 27.130 | 34.317 | 5.29 | 0.0 | 26.3 | 19.7 | 2161.3 | 848.0 | 2292 | 2189 | 7.610 | 2294.2 | |
| 2516 | 700 | 693 | 6.596 | 6.531 | 27.045 | 34.444 | 4.94 | 0.0 | 25.5 | 15.3 | 2154.8 | 800.9 | 2280 | 2182 | 7.578 | 2297.5 | 53.5 |
| 2517 | 601 | 595 | 8.593 | 8.528 | 26.927 | 35.152 | 4.77 | 0.0 | 24.4 | 13.5 | 2112.7 | 548.4 | 2318 | 2126 | 7.861 | 2323.8 | |
| 2518 | 498 | 494 | 10.722 | 10.661 | 26.768 | 34.910 | 4.69 | 0.0 | 21.8 | 10.3 | 2126.0 | 614.2 | 2303 | 2141 | 7.757 | 2316.8 | 52.4 |
| 2519 | 401 | 398 | 12.847 | 12.792 | 26.592 | 35.199 | 4.79 | 0.0 | | | 2106.2 | 523.5 | 2321 | 2111 | 7.870 | 2328.8 | 69.2 |
| 2520 | 301 | 298 | 14.013 | 13.969 | 26.466 | 35.375 | 4.81 | 0.0 | 13.1 | 4.5 | 2097.4 | 481.6 | 2323 | 2115 | 7.855 | 2336.9 | 66.7 |
| 2521 | 202 | 201 | 16.070 | 16.038 | 26.199 | 35.597 | 4.81 | 0.0 | 8.3 | 2.2 | 2080.5 | 421.4 | 2338 | 2083 | 7.943 | 2350.6 | 72.0 |
| 2522 | 102 | 101 | 20.374 | 20.355 | 25.570 | 36.178 | 5.12 | 0.0 | 6.1 | 2.2 | 2050.7 | 320.0 | 2374 | 2070 | 8.003 | 2389.4 | 78.2 |
| 2523 | 54 | 53 | 20.373 | 20.363 | 25.567 | 36.181 | 5.12 | 0.2 | 1.7 | 0.0 | 2048.3 | 318.3 | 2368 | 2059 | 8.028 | 2387.9 | 80.8 |
| 2524 | 6 | 5 | 20.362 | 20.361 | 25.570 | 36.181 | 5.12 | 0.0 | 0.0 | 0.0 | 2049.3 | 316.7 | 2370 | 2072 | 7.993 | 2390.6 | 72.5 |

NOAA South Atlantic 1991 Long Lines

Leg 1
 Station 33
 Cast 26

Niskin Bottle hydrographic data
 Operation #0912100249.0
 Date 7/29/1991
 Time (GMT) 12Z

Latitude -32.00
 Longitude -32.00
 Bottom Depth 3956

| Sample # | Pres. db | Depth m | Temp. deg. C | Pot. T. deg. C | Sigma theta | Salinity | Oxygen mL/L | NO2 umol/L | NO3 umol/L | SO4 umol/L | TCO2 (cool.) umol/Kg | TCO2 (titr.) umol/Kg | TALK uEq/Kg | pH | TALK (calc.) uEq/Kg | DOC umol/L |
|----------|----------|---------|--------------|----------------|-------------|----------|-------------|------------|------------|------------|----------------------|----------------------|-------------|-------|---------------------|------------|
| 2601 | 4151 | 4080 | 0.956 | 0.636 | 27.854 | 34.736 | 5.07 | 0.0 | 31.9 | 96.6 | 2250.5 | 970.9 | 2359 | 7.634 | 2371.7 | |
| 2602 | 3892 | 3925 | 1.298 | 0.985 | 27.858 | 34.765 | 5.17 | 0.0 | 30.6 | 92.1 | 2237.9 | 937.0 | 2345 | 7.521 | 2364.6 | |
| 2603 | 3493 | 3438 | 2.250 | 1.965 | 27.866 | 34.862 | 5.54 | 0.0 | 24.7 | 53.7 | 2197.4 | 812.5 | 2338 | 7.666 | 2344.3 | |
| 2604 | 2995 | 2951 | 2.709 | 2.465 | 27.852 | 34.897 | 5.56 | 0.0 | 24.2 | 36.9 | 2187.5 | 777.0 | | | | |
| 2605 | 2493 | 2460 | 2.786 | 2.591 | 27.812 | 34.860 | 5.34 | 0.0 | 24.7 | 40.8 | 2192.5 | 936.5 | 2324 | 7.660 | 2314.0 | 36.6 |
| 2606 | 1995 | 1971 | 2.857 | 2.708 | 27.730 | 34.771 | 4.78 | 0.0 | 29.4 | 50.6 | 2214.4 | 825.1 | 2324 | 7.611 | 2360.3 | 53.0 |
| 2607 | 1796 | 1775 | 2.868 | 2.736 | 27.686 | 34.718 | 4.57 | 0.0 | 31.7 | 55.2 | 2223.2 | 998.4 | 2316 | 7.570 | 2336.7 | |
| 2608 | 1597 | 1579 | 2.861 | 2.747 | 27.605 | 34.620 | 4.40 | 0.0 | 34.4 | 56.3 | 2228.2 | 1048.3 | 2324 | 7.619 | 2333.9 | 38.3 |
| 2609 | 1397 | 1382 | 2.988 | 2.889 | 27.490 | 34.490 | 4.39 | 0.0 | 36.7 | 53.5 | 2224.3 | 1081.0 | 2312 | 7.559 | 2324.2 | |
| 2610 | 1197 | 1184 | 3.303 | 3.217 | 27.355 | 34.358 | 4.74 | 0.0 | 35.2 | 40.8 | 2206.9 | 1029.4 | 2304 | 7.619 | 2312.6 | 50.3 |
| 2611 | 998 | 988 | 3.982 | 3.907 | 27.227 | 34.294 | 5.23 | | 36.8 | 24.4 | 2177.2 | 923.7 | 2287 | 7.611 | 2297.3 | |
| 2612 | 900 | 891 | 4.681 | 4.609 | 27.168 | 34.303 | 5.22 | | 32.7 | 19.1 | 2171.8 | 881.0 | 2282 | 7.656 | 2299.3 | 40.2 |
| 2613 | 801 | 793 | 5.676 | 5.607 | 27.094 | 34.356 | 5.21 | 0.0 | 28.5 | 13.3 | 2157.1 | 826.6 | 2279 | 7.637 | 2294.1 | |
| 2614 | 701 | 694 | 7.592 | 7.521 | 26.986 | 34.541 | 4.81 | 0.0 | 25.0 | 8.7 | 2150.3 | 760.9 | 2289 | 7.724 | 2301.9 | 41.6 |
| 2615 | 601 | 596 | 9.338 | 9.270 | 26.868 | 34.733 | 4.71 | 0.0 | 20.6 | 6.2 | 2135.8 | 676.3 | 2292 | 7.720 | 2308.3 | |
| 2616 | 400 | 396 | 13.535 | 13.478 | 26.577 | 35.356 | 4.97 | 0.0 | 9.6 | 0.9 | 2101.3 | 483.6 | 2325 | 7.899 | 2341.6 | 52.3 |
| 2617 | 350 | 347 | 14.262 | 14.210 | 26.522 | 35.488 | 4.99 | 0.0 | 6.6 | 0.0 | 2093.7 | 458.1 | 2332 | 7.877 | 2345.8 | |
| 2618 | 301 | 299 | 14.625 | 14.580 | 26.461 | 35.512 | 4.92 | 0.0 | | | 2092.8 | 449.6 | 2330 | 7.918 | 2349.3 | 50.4 |
| 2619 | 250 | 248 | 15.339 | 15.300 | 26.341 | 35.558 | 4.86 | 0.0 | 6.5 | 0.0 | 2088.2 | 435.0 | 2331 | 7.879 | 2351.8 | 50.5 |
| 2620 | 201 | 199 | 16.062 | 16.030 | 26.229 | 35.628 | 4.86 | 0.0 | 5.0 | 0.0 | 2081.5 | 423.8 | 2337 | 7.904 | 2350.6 | 50.2 |
| 2621 | 152 | 151 | 17.523 | 17.497 | 26.042 | 35.843 | 4.92 | 0.0 | 4.3 | 0.0 | 2075.4 | 386.5 | 2345 | 7.974 | 2367.4 | 49.1 |
| 2622 | 103 | 102 | 18.764 | 18.746 | 25.762 | 35.978 | 5.27 | 0.0 | 2.0 | 0.0 | 2044.4 | 334.0 | 2351 | 7.990 | 2372.9 | 60.3 |
| 2623 | 44 | 43 | 18.749 | 18.741 | 25.762 | 35.876 | 5.28 | 0.2 | 0.0 | 0.0 | 2046.2 | 331.5 | 2350 | 8.036 | 2372.2 | 52.1 |
| 2624 | 3 | 3 | 18.740 | 18.740 | 25.763 | 35.878 | 5.25 | 0.0 | 0.0 | 0.0 | 2044.3 | 330.5 | 2352 | 7.997 | 2370.6 | 53.5 |

NOAA South Atlantic 1991 Long Lines

Leg 1
 Station 34
 Cast 27

Latitude -34.00
 Longitude -32.00
 Bottom Depth 4204

Niskin Bottle hydrographic data
 Operation # 0912100259.0
 Date 7/29/1991
 Time (GMT) 1355

| Sample # | Pres. db | Depth m | Temp. deg. C | Pot. T. deg. C | Sigma theta | Salinity | Oxygen mL/L | NO2 umol/L | NO3 umol/L | SiO4 umol/L | TCO2 (outl.) umol/Kg | TCO2 (titr.) umol/Kg | TALK uEq/Kg | pH | TALK (calc.) uEq/Kg | DOC umol/L |
|----------|----------|---------|--------------|----------------|-------------|----------|-------------|------------|------------|-------------|----------------------|----------------------|-------------|-------|---------------------|------------|
| 2701 | 1999 | 1975 | 2.894 | 2.744 | 27.730 | 34.776 | 4.79 | 0.0 | 29.9 | 52.4 | 2212.3 | 2216 | 2331 | 7.670 | 2338.2 | |
| 2702 | 1999 | 1975 | 2.894 | 2.744 | 27.730 | 34.776 | 4.79 | 0.0 | 32.2 | 53.3 | 922.8 | 2224.2 | 2336 | 7.650 | 2350.8 | |
| 2703 | 1853 | 1831 | 2.859 | 2.722 | 27.688 | 34.721 | 4.55 | 0.0 | 32.1 | 58.1 | 2224.2 | 2224 | 2331 | 7.670 | | |
| 2704 | 1723 | 1703 | 2.833 | 2.708 | 27.629 | 34.656 | 4.43 | 0.0 | 33.6 | 60.9 | 2229.0 | 2245 | 2330 | | | |
| 2705 | 1724 | 1704 | 2.833 | 2.708 | 27.629 | 34.656 | 4.45 | 0.0 | 34.0 | 60.0 | 1044.8 | 2239 | 2330 | | | |
| 2706 | 1600 | 1581 | 2.829 | 2.715 | 27.577 | 34.581 | 4.37 | 0.0 | 35.2 | 60.7 | 1067.5 | 2235 | 2330 | | | |
| 2707 | 1498 | 1482 | 2.838 | 2.732 | 27.532 | 34.528 | 4.31 | 0.0 | 35.9 | 59.1 | 1088.4 | 2227 | 2330 | | | 40.1 |
| 2708 | 1401 | 1386 | 2.801 | 2.803 | 27.473 | 34.462 | 4.50 | 0.0 | 37.0 | 55.3 | 1059.3 | 2227 | 2330 | | | |
| 2709 | 1201 | 1188 | 3.104 | 3.020 | 27.344 | 34.322 | 4.95 | 0.0 | 35.7 | 39.3 | 2205.0 | 2227 | 2306 | | | 40.0 |
| 2710 | 1100 | 1089 | 3.372 | 3.294 | 27.290 | 34.287 | 5.22 | 0.0 | 35.2 | 32.4 | 1084.2 | 2200 | 2290 | | | |
| 2711 | 999 | 990 | 3.723 | 3.650 | 27.245 | 34.275 | 5.29 | 0.0 | 34.6 | 26.5 | 875.8 | 2185 | 2285 | | | |
| 2712 | 901 | 892 | 3.933 | 3.866 | 27.201 | 34.248 | 5.55 | 0.0 | 34.2 | 21.3 | 2173.5 | 2175 | 2285 | | | |
| 2713 | 871 | 863 | 3.998 | 3.933 | 27.188 | 34.240 | 5.56 | 0.0 | 31.4 | 20.0 | 2164.1 | 2166 | 2290 | | | 43.3 |
| 2714 | 870 | 862 | 3.999 | 3.934 | 27.188 | 34.240 | 5.63 | 0.0 | 31.7 | 20.2 | 806.0 | 2160 | 2282 | | | |
| 2715 | 751 | 744 | 4.952 | 4.861 | 27.108 | 34.269 | 5.61 | 0.0 | 29.4 | 13.5 | 2154.0 | 2160 | 2282 | | | |
| 2716 | 650 | 644 | 5.847 | 5.790 | 27.054 | 34.335 | 5.37 | 0.0 | 28.0 | 10.7 | 805.4 | 2156 | 2282 | | | 46.3 |
| 2717 | 652 | 646 | 5.789 | 5.742 | 27.056 | 34.335 | 5.46 | 0.0 | 27.0 | 10.7 | 658.1 | 2156 | 2282 | | | |
| 2718 | 501 | 497 | 9.294 | 9.238 | 26.855 | 34.713 | 4.92 | 0.0 | 20.0 | 5.3 | 508.7 | 2126 | 2288 | | | 50.5 |
| 2719 | 351 | 348 | 13.220 | 13.171 | 26.600 | 35.311 | 5.09 | 0.0 | 9.5 | 1.4 | 448.2 | 2106 | 2318 | | | 57.4 |
| 2720 | 251 | 249 | 14.109 | 14.072 | 26.534 | 35.465 | 5.10 | 0.0 | 6.9 | 0.9 | 433.2 | 2106 | 2336 | | | 41.5 |
| 2721 | 167 | 165 | 15.053 | 15.028 | 26.412 | 35.572 | 4.98 | 0.0 | 5.2 | 0.0 | 373.2 | 2062 | 2335 | | | 45.9 |
| 2722 | 103 | 102 | 15.988 | 15.972 | 26.088 | 35.433 | 5.44 | 0.0 | 0.0 | 0.0 | 363.3 | 2067 | 2331 | | | 82.7 |
| 2723 | 53 | 53 | 16.243 | 16.235 | 26.049 | 35.464 | 5.48 | 0.0 | 0.0 | 0.0 | 359.7 | 2067 | 2329 | | | 68.2 |
| 2724 | 2 | 2 | 16.436 | 16.436 | 26.016 | 35.476 | 5.58 | 0.0 | 0.0 | 0.0 | 2047.2 | 2067 | 2329 | | | 81.5 |

NOAA South Atlantic 1991 Long Lines

Leg 1
 Station 35
 Cast 28

Latitude -36.00
 Longitude -32.00
 Bottom Depth 4363

Niskin Bottle hydrographic data
 Operation # 0912110267.5
 Date 7/30/1991
 Time (GMT) 123

| Sample # | Pres. db | Depth m | Temp. deg. C | Pot. T. deg. C | Sigma theta | Salinity | Oxygen mL/L | NO2 umol/L | NO3 umol/L | SiO4 umol/L | TCO2 (couli.) umol/Kg | ICO2 (20 deg.) uatm | TALK uEq/Kg | TCO2 (titr.) umol/Kg | pH | TALK (calc.) uEq/Kg | DOC umol/L |
|----------|----------|---------|--------------|----------------|-------------|----------|-------------|------------|------------|-------------|-----------------------|---------------------|-------------|----------------------|-------|---------------------|------------|
| 2801 | 4424 | 4346 | 0.362 | 0.031 | 27.846 | 34.679 | 5.02 | | | | 2263.2 | 1062.0 | 2355 | 2264 | 7.575 | 2370.5 | |
| 2802 | 3996 | 3929 | 0.946 | 0.643 | 27.846 | 34.725 | 4.94 | | | | 2263.4 | 1057.1 | 2349 | 2266 | 7.594 | 2361.7 | |
| 2803 | 3493 | 3438 | 1.771 | 1.498 | 27.844 | 34.792 | 5.07 | | | | 2228.0 | 928.3 | 2343 | 2239 | 7.655 | 2354.7 | |
| 2804 | 2995 | 2951 | 2.618 | 2.376 | 27.846 | 34.881 | 5.45 | | | | 2193.9 | 811.0 | | | | | |
| 2805 | 2496 | 2462 | 2.910 | 2.712 | 27.810 | 34.871 | 5.28 | | | | 2193.9 | 891.5 | 2321 | 2217 | 7.621 | 2336.3 | 53.7 |
| 2806 | 1999 | 1974 | 2.914 | 2.763 | 27.717 | 34.775 | 4.62 | | | | 2222.5 | 962.2 | 2331 | 2229 | 7.657 | 2342.3 | 36.6 |
| 2807 | 1700 | 1690 | 2.815 | 2.692 | 27.608 | 34.615 | 4.26 | | | | 2202.6 | 1077.9 | 2335 | 2255 | 7.566 | 2301.2 | |
| 2808 | 1399 | 1384 | 2.789 | 2.692 | 27.470 | 34.443 | 4.41 | 0.0 | | 66.7 | 2229.0 | 1099.4 | 2315 | 2230 | 7.601 | 2326.6 | |
| 2809 | 1201 | 1189 | 2.966 | 2.883 | 27.351 | 34.323 | 4.94 | 0.0 | 33.3 | | 2202.2 | 1021.6 | 2311 | 2226 | 7.604 | 2308.4 | |
| 2810 | 1000 | 990 | 3.492 | 3.421 | 27.242 | 34.242 | 5.45 | | | | 2179.3 | 920.2 | 2292 | 2185 | 7.664 | 2300.1 | 52.1 |
| 2811 | 899 | 891 | 3.882 | 3.816 | 27.198 | 34.234 | 5.61 | 0.0 | | 31.2 | 2167.3 | 877.3 | 2278 | 2174 | 7.635 | 2294.8 | |
| 2812 | 801 | 793 | 4.478 | 4.416 | 27.140 | 34.241 | 5.71 | 0.0 | | 21.7 | 2157.1 | 825.1 | 2276 | 2161 | 7.700 | 2294.0 | 39.9 |
| 2813 | 703 | 697 | 5.201 | 5.143 | 27.081 | 34.270 | 5.62 | 0.0 | | 15.8 | 2146.3 | 783.7 | 2288 | 2173 | 7.665 | 2291.1 | |
| 2814 | 601 | 596 | 6.409 | 6.354 | 27.008 | 34.368 | 5.39 | 0.0 | | 9.1 | 2144.3 | 762.1 | 2265 | 2165 | 7.639 | 2294.2 | 46.9 |
| 2815 | 501 | 497 | 8.592 | 8.538 | 26.883 | 34.606 | 5.03 | 0.0 | 19.7 | 2.3 | 2132.6 | 684.4 | 2287 | 2162 | 7.657 | 2301.8 | |
| 2816 | 402 | 398 | 11.275 | 11.224 | 26.723 | 34.984 | 4.88 | 0.0 | 11.8 | 0.6 | 2112.6 | 564.7 | 2322 | 2152 | 7.753 | 2318.9 | 56.9 |
| 2817 | 351 | 348 | 12.778 | 12.730 | 26.627 | 35.230 | 5.35 | 0.0 | 9.4 | 0.0 | 2100.1 | 520.2 | 2316 | 2159 | 7.740 | 2323.2 | |
| 2818 | 301 | 298 | 13.418 | 13.375 | 26.585 | 35.346 | 5.14 | 0.0 | 7.0 | 0.0 | 2098.7 | 467.1 | 2319 | 2104 | 7.904 | 2346.4 | 48.2 |
| 2819 | 253 | 251 | 14.051 | 14.014 | 26.544 | 35.462 | | 0.1 | 5.8 | 0.0 | 2095.2 | 455.0 | 2339 | 2121 | 7.856 | 2349.1 | 62.3 |
| 2820 | 203 | 201 | 14.529 | 14.499 | 26.502 | 35.552 | 5.01 | 0.2 | 5.3 | 0.0 | 2094.7 | 450.0 | 2332 | 2117 | 7.893 | 2354.7 | 53.7 |
| 2821 | 172 | 170 | 14.925 | 14.899 | 26.452 | | | | | | | | | | | | |
| 2822 | 104 | 103 | 15.366 | 15.350 | 26.194 | 35.383 | 5.44 | 0.3 | 3.6 | 0.0 | 2061.2 | 384.5 | 2334 | 2090 | 7.912 | 2348.6 | 53.0 |
| 2823 | 45 | 44 | 15.572 | 15.565 | 26.153 | 35.415 | 5.61 | 0.0 | 0.0 | 0.0 | 2052.8 | 373.5 | 2317 | 2069 | 7.973 | 2345.8 | 68.8 |
| 2824 | 2 | 2 | 15.585 | 15.585 | 26.151 | | 5.60 | 0.0 | 0.0 | 0.0 | 2057.0 | 373.7 | 2317 | 2067 | 7.932 | 2350.6 | 65.2 |

NOAA South Atlantic 1991 Long Lines

Leg 1
 Station 36
 Cast 29

Niskin Bottle hydrographic data
 Operation # 0912110292.0
 Date 7/30/1991
 Time (GMT) 1427

Latitude -38.00
 Longitude -32.00
 Bottom Depth 4540

| Sample # | Pres. db | Depth m | Temp. deg. C | Pot. T. deg. C | Sigma theta | Salinity | Oxygen mL/L | NO2 umol/L | NO3 umol/L | SiO4 umol/L | TCO2 (cool.) umol/Kg | TCO2 (titr.) umol/Kg | TALK uEq/Kg | pH | TALK (calc.) uEq/Kg | DOC umol/L | |
|----------|----------|---------|--------------|----------------|-------------|----------|-------------|------------|------------|-------------|----------------------|----------------------|-------------|------|---------------------|------------|------|
| 2901 | 1999 | 1974 | 2.802 | 2.653 | 27.712 | 34.720 | 4.40 | 0.0 | | | 2231.7 | 1024.1 | 2324 | 2258 | 7.569 | 2342.0 | 45.4 |
| 2902 | 1999 | 1974 | 2.801 | 2.653 | 27.712 | 34.715 | 4.39 | 0.0 | | 53.8 | 2236.0 | 1074.5 | 2331 | 2263 | 7.528 | 2338.8 | 45.4 |
| 2903 | 1798 | 1777 | 2.791 | 2.661 | 27.648 | 34.638 | 4.22 | 0.0 | | 54.9 | 2233.7 | 1126.6 | 2325 | 2249 | 7.599 | 2328.0 | 39.9 |
| 2904 | 1598 | 1580 | 2.751 | 2.639 | 27.560 | 34.525 | 4.26 | 0.0 | | 49.1 | 2227.5 | 1083.9 | 2321 | 2247 | 7.550 | 2327.1 | 50.7 |
| 2905 | 1401 | 1385 | 2.776 | 2.680 | 27.469 | 34.415 | 4.53 | 0.0 | | 36.3 | 2172.9 | 1005.9 | 2293 | 2187 | 7.667 | 2278.6 | 71.6 |
| 2906 | 1200 | 1188 | 2.991 | 2.909 | 27.359 | 34.306 | 5.07 | 0.0 | | 21.8 | 2158.2 | 903.8 | 2288 | 2172 | 7.700 | 2279.6 | 62.8 |
| 2907 | 1002 | 992 | 3.615 | 3.544 | 27.247 | 34.237 | 5.56 | 0.0 | | | | | | | | | |
| 2908 | 1002 | 992 | 3.614 | 3.543 | 27.248 | 34.241 | 5.59 | 0.0 | | | | | | | | | |
| 2909 | 900 | 891 | 4.077 | 4.011 | 27.194 | 34.229 | 5.74 | 0.0 | | 18.2 | | | | | | | 57.6 |
| 2910 | 801 | 793 | 4.463 | 4.402 | 27.154 | 34.230 | 5.78 | 0.0 | | 11.0 | 2199.0 | 815.1 | 2306 | 2213 | 7.599 | 2344.5 | |
| 2911 | 702 | 695 | 5.064 | 5.008 | 27.107 | 34.258 | 5.76 | 0.0 | | 11.1 | 2149.7 | 782.7 | 2284 | 2167 | 7.660 | 2295.1 | 44.8 |
| 2912 | 603 | 597 | 6.203 | 6.151 | 27.041 | 34.371 | 5.46 | 0.0 | | 8.5 | 2142.1 | 760.1 | 2275 | 2167 | 7.646 | 2292.1 | |
| 2913 | 498 | 494 | 8.330 | 8.280 | 26.928 | 34.588 | 5.04 | 0.0 | | 4.9 | 2137.7 | 691.8 | 2282 | 2160 | 7.657 | 2305.5 | 32.1 |
| 2914 | 504 | 499 | 8.285 | 8.234 | 26.933 | 34.593 | 5.03 | 0.0 | | 5.4 | | | | | | | |
| 2915 | 401 | 398 | 11.180 | 11.132 | 26.749 | 35.011 | 4.95 | 0.0 | | 1.9 | 2114.4 | 566.7 | 2304 | 2130 | 7.824 | 2320.3 | |
| 2916 | 301 | 298 | 13.051 | 13.013 | 26.624 | 35.284 | 5.20 | 0.0 | | 0.8 | 2101.0 | 479.6 | 2326 | 2120 | 7.846 | 2342.7 | 36.7 |
| 2917 | 255 | 253 | 13.615 | 13.582 | 26.586 | 35.380 | 5.16 | 0.0 | | | | | 2332 | 2107 | 7.924 | | |
| 2918 | 256 | 254 | 13.611 | 13.578 | 26.584 | 35.375 | 5.14 | 0.0 | | | 2094.5 | 459.0 | | | | 2345.6 | 57.9 |
| 2919 | 203 | 202 | 14.167 | 14.140 | 26.546 | 35.480 | 5.13 | 0.0 | | 0.7 | 2095.3 | 449.5 | 2337 | 2110 | 7.901 | 2352.2 | 79.3 |
| 2920 | 156 | 155 | 14.556 | 14.536 | 26.465 | 35.486 | 5.11 | 0.0 | | 0.0 | 2085.6 | 435.5 | 2330 | 2107 | 7.868 | 2348.1 | |
| 2921 | 152 | 151 | 14.567 | 14.547 | 26.459 | 35.476 | 5.12 | 0.0 | | 0.0 | | | | | | | |
| 2922 | 105 | 105 | 14.812 | 14.800 | 26.305 | 35.354 | 5.64 | 0.0 | | 0.0 | 2060.3 | 387.4 | 2325 | 2093 | 7.893 | 2345.4 | 78.0 |
| 2923 | 56 | 56 | 14.904 | 14.899 | 26.292 | 35.369 | 5.67 | 0.0 | | 0.0 | 2057.9 | 382.9 | 2326 | 2084 | 7.882 | 2345.6 | 73.6 |
| 2924 | 3 | 3 | 14.952 | 14.955 | 26.280 | 35.367 | 5.71 | 0.0 | | 0.0 | 2058.9 | 382.4 | 2320 | 2084 | 7.874 | 2347.7 | 84.6 |

NOAA South Atlantic 1991 Long Lines

Niskin Bottle hydrographic data

Latitude -40.00
 Longitude -32.00
 Bottom Depth 4743

Leg 1
 Station 37
 Cast 30

Operation #0912120306.0
 Date 7/31/1991
 Time (GMT) 142

| Sample # | Pres. db | Depth m | Temp. deg. C | Pot. T. deg. C | Sigma theta | Salinity | Oxygen mL/L | NO2 umol/L | NO3 umol/L | SiO4 umol/L | TCO2 (couli.) umol/Kg | fCO2 (20 deg.) uatm | TALK uEq/Kg | TCO2 (titr.) umol/Kg | pH | TALK (calc.) uEq/Kg | DOC umol/L |
|----------|----------|---------|--------------|----------------|-------------|----------|-------------|------------|------------|-------------|-----------------------|---------------------|-------------|----------------------|-------|---------------------|------------|
| 3001 | 4784 | 4695 | 0.246 | -0.121 | 27.849 | 34.669 | 5.12 | 0.0 | 0.0 | 116.6 | 2261.5 | 1056.5 | 2368 | 2282 | 7.565 | 2369.2 | |
| 3002 | 4497 | 4416 | 0.285 | -0.052 | 27.848 | 34.679 | 5.06 | 0.0 | 0.0 | 115.7 | 2263.5 | 1041.7 | 2363 | 2284 | 7.631 | | |
| 3003 | 3997 | 3930 | 0.620 | 0.326 | 27.841 | 34.690 | 4.92 | 0.0 | 0.0 | 112.7 | 2259.7 | 1068.7 | | | | | |
| 3004 | 3497 | 3442 | 1.265 | 1.005 | 27.831 | 34.730 | 4.75 | 0.0 | 0.0 | 99.2 | 2253.9 | 1034.3 | 2353 | 2265 | 7.624 | 2354.8 | |
| 3005 | 2894 | 2852 | 2.227 | 2.004 | 27.826 | 34.816 | 4.99 | 0.0 | 0.0 | 61.1 | 2221.0 | 912.5 | 2342 | 2232 | 7.633 | 2350.0 | |
| 3006 | 2498 | 2464 | 2.643 | 2.450 | 27.800 | 34.832 | 4.98 | 0.0 | 0.0 | 45.7 | 2217.6 | 899.9 | 2334 | 2224 | 7.648 | 2348.7 | |
| 3007 | 1997 | 1973 | 2.791 | 2.642 | 27.715 | 34.745 | 4.49 | 0.0 | 0.0 | 51.9 | 2229.7 | | 2335 | 2248 | 7.581 | | |
| 3008 | 1701 | 1682 | 2.822 | 2.699 | 27.641 | 34.658 | 4.27 | 0.0 | 0.0 | 50.3 | 2238.4 | 1072.8 | 2326 | 2232 | 7.611 | 2341.5 | |
| 3009 | 1498 | 1482 | 2.745 | 2.640 | 27.568 | 34.561 | 4.18 | 0.0 | 0.0 | 45.3 | 2238.7 | 1115.2 | 2324 | 2237 | 7.599 | 2335.3 | |
| 3010 | 1199 | 1187 | 2.808 | 2.727 | 27.416 | 34.381 | 4.59 | 0.0 | 0.0 | 44.5 | 2224.3 | 1084.9 | 2316 | 2236 | 7.564 | 2323.3 | |
| 3011 | 1001 | 991 | 3.085 | 3.017 | 27.331 | 34.308 | 5.00 | 0.0 | 0.0 | 34.9 | 2201.4 | 1008.3 | 2307 | 2222 | 7.584 | 2309.7 | 49.7 |
| 3012 | 799 | 791 | 3.731 | 3.674 | 27.209 | 34.230 | 5.88 | 0.0 | 0.0 | 19.8 | 2174.3 | 883.8 | 2292 | 2178 | 7.674 | 2301.3 | |
| 3013 | 701 | 695 | 4.015 | 3.964 | 27.164 | 34.213 | 5.83 | 0.0 | 0.0 | 13.5 | 2158.0 | 832.5 | 2285 | 2170 | 7.666 | 2293.3 | |
| 3014 | 601 | 596 | 4.457 | 4.411 | 27.118 | 34.213 | 6.13 | 0.0 | 0.0 | 8.1 | 2146.3 | 784.6 | 2272 | 2163 | 7.656 | 2290.7 | |
| 3015 | 505 | 500 | 4.900 | 4.860 | 27.078 | 34.226 | 6.03 | 0.0 | 0.0 | 7.6 | 2143.4 | 765.8 | 2277 | 2166 | 7.638 | 2291.8 | 56.1 |
| 3016 | 400 | 397 | 6.073 | 6.038 | 27.015 | 34.381 | 5.52 | 0.0 | 0.0 | 8.5 | 2142.1 | 761.0 | 2279 | 2147 | 7.719 | 2291.8 | |
| 3017 | 301 | 299 | 7.868 | 7.838 | 26.899 | 34.485 | 5.46 | | | 5.2 | 2128.2 | 658.3 | 2284 | 2141 | 7.725 | 2303.8 | |
| 3018 | 256 | 254 | 9.431 | 9.402 | 26.795 | 34.679 | 5.17 | | | 4.1 | 2122.6 | 627.7 | 2296 | 2139 | 7.753 | 2307.5 | |
| 3019 | 205 | 203 | 11.299 | 11.273 | 26.687 | 34.959 | 4.87 | | | 2.9 | 2116.0 | 502.7 | 2308 | 2119 | 7.823 | 2348.1 | 73.2 |
| 3020 | 153 | 152 | 13.296 | 13.275 | 26.553 | 35.280 | 4.88 | | | 1.4 | 2106.0 | 499.7 | 2325 | 2126 | 7.832 | 2339.3 | 58.1 |
| 3021 | 106 | 105 | 14.403 | 14.387 | 26.452 | | | | | | | | | | | | |
| 3022 | 84 | 83 | 14.511 | 14.499 | 26.341 | 35.335 | 5.23 | | | 0.6 | 2077.0 | 425.5 | 2329 | 2083 | 7.945 | 2342.5 | 57.2 |
| 3023 | 45 | 45 | 14.613 | 14.606 | 26.271 | 35.272 | 5.61 | | | 1.5 | 2064.2 | 395.1 | 2332 | 2084 | 7.925 | 2344.8 | 74.2 |
| 3024 | 0 | 0 | | | | | | | | 0.8 | 2062.2 | 395.6 | 2332 | 2090 | 7.915 | 2342.1 | 88.0 |

NOAA South Atlantic 1991 Long Lines

Niskin Bottle hydrographic data

Latitude -42.00
 Longitude -32.00
 Bottom Depth 4593

Operation # 0912120322.0
 Date 7/31/1991
 Time (GMT) 1444

Leg 1
 Station 38
 Cast 31

| Sample # | Pres. db | Depth m | Temp. deg. C | Pot. T. deg. C | Sigma theta | Salinity | Oxygen mL/L | NO2 umol/L | NO3 umol/L | SiO4 umol/L | TCO2 (cool.) umol/Kg | TCO2 (titr.) umol/Kg | TALK uEq/Kg | pH | TALK (calc.) uEq/Kg | DOC umol/L |
|----------|----------|---------|--------------|----------------|-------------|----------|-------------|------------|------------|-------------|----------------------|----------------------|-------------|-------|---------------------|------------|
| 3101 | 4794 | 4705 | 0.336 | -0.035 | 27.847 | 34.682 | 5.07 | | | 124.6 | 2261.5 | 2297 | 2364 | 7.611 | 2369.1 | |
| 3102 | 4499 | 4418 | 0.419 | 0.078 | 27.846 | 34.688 | 5.03 | | | 126.5 | 2261.9 | 2288 | 2367 | 7.558 | 2368.7 | |
| 3103 | 4002 | 3935 | 0.829 | 0.529 | 27.838 | 34.705 | 4.86 | | | 128.4 | 2256.3 | 2270 | 2364 | 7.635 | 2362.4 | |
| 3104 | 3498 | 3443 | 1.379 | 1.116 | 27.829 | 34.754 | 4.72 | | | 115.0 | 2251.5 | 2282 | 2369 | 7.576 | 2362.3 | |
| 3105 | 2999 | 2955 | 2.128 | 1.897 | 27.821 | 34.803 | 4.92 | | | 100.7 | 2227.0 | 2228 | 2339 | 7.676 | 2342.1 | |
| 3106 | 2493 | 2460 | 2.728 | 2.534 | 27.799 | 34.843 | 5.07 | | | 71.2 | 2210.0 | 2245 | 2339 | 7.604 | 2340.0 | |
| 3107 | 1992 | 1968 | 2.890 | 2.740 | 27.712 | 34.756 | 4.49 | | | 55.0 | 2223.9 | 2252 | 2319 | 7.537 | 2337.3 | 51.0 |
| 3108 | 1498 | 1481 | 2.739 | 2.634 | 27.534 | 34.518 | 4.24 | | | 48.1 | 2240.1 | 2223 | 2296 | 7.550 | 2304.9 | |
| 3109 | 1003 | 993 | 3.210 | 3.141 | 27.287 | 34.274 | 5.28 | | | 57.8 | 2188.9 | 2205 | 2277 | 7.564 | 2303.4 | 44.2 |
| 3110 | 903 | 894 | 3.537 | 3.473 | 27.236 | 34.245 | 5.56 | | | 46.6 | 2180.1 | 2205 | 2277 | 7.575 | 2295.7 | 57.3 |
| 3111 | 802 | 794 | 3.903 | 3.845 | 27.188 | 34.240 | 5.65 | | | 34.3 | 2165.7 | 2177 | 2289 | 7.657 | 2294.2 | 82.2 |
| 3112 | 701 | 695 | 4.331 | 4.278 | 27.141 | 34.225 | 5.81 | | | 25.3 | 2154.8 | 2171 | 2282 | 7.655 | 2290.7 | 58.6 |
| 3113 | 602 | 597 | 4.789 | 4.742 | 27.094 | 34.232 | 5.94 | | | 20.0 | 2144.3 | 2185 | 2263 | 7.749 | 2294.2 | 65.9 |
| 3114 | 503 | 499 | 5.402 | 5.361 | 27.056 | 34.282 | 5.77 | | | 13.6 | 2144.9 | 2152 | 2301 | 7.573 | 2299.3 | 80.5 |
| 3115 | 403 | 400 | 7.094 | 7.056 | 26.956 | 34.423 | 5.40 | | | 12.3 | 2134.9 | 2163 | 2311 | 7.689 | 2306.2 | 67.3 |
| 3116 | 353 | 350 | 8.749 | 8.711 | 26.858 | 34.611 | 5.24 | | | 8.9 | 2127.0 | 2121 | 2303 | 7.806 | 2316.8 | 76.2 |
| 3117 | 327 | 324 | 9.467 | 9.430 | 26.807 | 34.691 | 5.19 | | | 6.7 | 2118.1 | 2124 | 2325 | 7.828 | 2327.2 | 73.3 |
| 3118 | 302 | 299 | 10.478 | 10.442 | 26.759 | 34.851 | 5.08 | | | 4.6 | 2117.1 | 2091 | 2316 | 7.890 | 2319.1 | 90.4 |
| 3119 | 278 | 275 | 11.751 | 11.715 | 26.683 | 35.053 | 5.59 | | | 2.9 | 2092.0 | 2089 | 2316 | 7.904 | 2331.0 | 87.4 |
| 3120 | 252 | 250 | 11.380 | 11.348 | 26.659 | 34.932 | 5.86 | | | 1.1 | 2084.8 | 2089 | 2316 | 7.904 | 2348.5 | 91.8 |
| 3121 | 202 | 201 | 12.019 | 11.993 | 26.656 | 35.086 | 5.82 | | | 1.3 | 2081.7 | 2109 | 2318 | 7.853 | 2366.1 | 78.0 |
| 3122 | 104 | 103 | 12.053 | 12.039 | 26.651 | | | | | 0.8 | 2081.6 | 2097 | 2321 | 7.907 | 2337.7 | 88.6 |
| 3123 | 44 | 44 | 12.026 | 12.020 | 26.639 | 35.065 | 5.87 | | | 0.0 | 2083.4 | | | | | |
| 3124 | 8 | 8 | 12.040 | 12.039 | 26.638 | 35.072 | 5.80 | | | 0.0 | 2083.4 | | | | | |

NOAA South Atlantic 1991 Long Lines

Leg 1
 Station 38
 Cast 32

Niskin Bottle hydrographic data
 Operation # 0912160397.0
 Date 8/4/1991
 Time (GMT) 240

Latitude -39.08
 Longitude -48.55
 Bottom Depth 5392

| Sample # | Pres. db | Depth m | Temp. deg. C | Pot. T. deg. C | Sigma theta | Salinity | Oxygen mL/L | NO2 umol/L | NO3 umol/L | SiO4 umol/L | TCO2 (cool.) umol/Kg | ICO2 (20 deg.) uatm | TALK uEg/Kg | TCO2 (titr.) umol/Kg | pH | TALK (calc.) uEg/Kg | DOC umol/L |
|----------|----------|---------|--------------|----------------|-------------|----------|-------------|------------|------------|-------------|----------------------|---------------------|-------------|----------------------|-------|---------------------|------------|
| 3201 | 1008 | 998 | 2.971 | 2.903 | 27.324 | 34.258 | 5.31 | 0.0 | 0.0 | 29.9 | 2182.9 | 957.0 | 2301 | 2206 | 7.600 | 2308.7 | |
| 3202 | 901 | 892 | 3.281 | 3.219 | 27.268 | 34.223 | 5.67 | 0.0 | 0.0 | 23.3 | 2181.6 | 913.6 | 2308 | 2211 | 7.591 | 2303.6 | |
| 3203 | 819 | 811 | 3.589 | 3.531 | 27.236 | 34.221 | 5.88 | 0.0 | 0.0 | 19.5 | 2168.5 | 857.5 | 2298 | 2184 | 7.677 | 2300.0 | |
| 3204 | 739 | 733 | 4.062 | 4.007 | 27.209 | 34.247 | 5.71 | 0.0 | 0.0 | 17.7 | 2168.2 | 856.0 | 2292 | 2184 | 7.631 | 2300.0 | |
| 3205 | 660 | 654 | 4.741 | 4.689 | 27.175 | 34.296 | 5.34 | 0.0 | 0.0 | 15.7 | 2164.9 | 854.0 | 2284 | 2170 | 7.685 | 2296.9 | |
| 3206 | 579 | 574 | 5.072 | 5.025 | 27.132 | 34.291 | 5.38 | 0.0 | 0.0 | 11.5 | 2155.6 | 810.4 | 2284 | 2170 | 7.652 | 2295.6 | |
| 3207 | 514 | 510 | 5.515 | 5.472 | 27.097 | 34.314 | 5.54 | 0.0 | 0.0 | 9.9 | 2150.6 | 789.4 | 2280 | 2172 | 7.664 | 2294.7 | |
| 3208 | 445 | 442 | 6.330 | 6.290 | 27.060 | 34.397 | 5.23 | 0.0 | 0.0 | 8.8 | 2151.1 | 779.5 | 2287 | 2162 | 7.711 | 2297.8 | |
| 3209 | 365 | 361 | 7.064 | 7.029 | 26.979 | 34.421 | 4.98 | 0.0 | 0.0 | 6.5 | 2137.6 | 724.3 | 2289 | 2151 | 7.748 | 2296.2 | |
| 3210 | 286 | 283 | 9.113 | 9.081 | 26.857 | 34.658 | 4.92 | 0.0 | 0.0 | 3.7 | 2130.4 | 652.2 | 2294 | 2147 | 7.741 | 2308.5 | |
| 3211 | 211 | 209 | 11.608 | 11.581 | 26.674 | 34.984 | | 0.0 | 0.0 | 1.7 | 2115.2 | 554.6 | 2282 | 2125 | 7.749 | 2325.8 | |
| 3212 | 159 | 158 | 13.281 | 13.259 | 26.585 | 35.293 | | 0.0 | 0.0 | 0.0 | 2093.0 | 455.7 | 2313 | 2114 | 7.807 | 2345.2 | |
| 3213 | 110 | 109 | 13.014 | 12.999 | 26.537 | 35.162 | 0.3 | 0.3 | 0.0 | 0.0 | 2090.0 | 442.4 | 2313 | 2114 | 7.807 | 2345.2 | |
| 3214 | 69 | 69 | 12.987 | 12.978 | 26.535 | 35.154 | 0.4 | 0.4 | 0.0 | 0.0 | 2082.0 | 442.6 | 2320 | 2095 | 7.904 | 2338.1 | |
| 3215 | 1 | 1 | 12.919 | 12.919 | 26.524 | 35.125 | 5.74 | 0.4 | 0.0 | 0.0 | 2080.4 | 445.7 | 2322 | 2108 | 7.863 | 2334.4 | |

NOAA South Atlantic 1991 Long Lines

Leg 1
 Station 38
 Cast 33

Niskin Bottle hydrographic data
 Operation # 0912160398.0
 Date 8/4/1991
 Time (GMT) 628

Latitude -39.08
 Longitude -48.55
 Bottom Depth 5392

| Sample # | Pres. db | Depth m | Temp. deg. C | Pot. T. deg. C | Sigma theta | Salinity | Oxygen mL/L | NO2 umol/L | NO3 umol/L | SiO4 umol/L | TCO2 (cool.) umol/Kg | TCO2 (titr.) umol/Kg | TALK uEq/Kg | pH | TALK (calc.) uEq/Kg | DOC umol/L |
|----------|----------|---------|--------------|----------------|-------------|----------|-------------|------------|------------|-------------|----------------------|----------------------|-------------|-------|---------------------|------------|
| | | | | | | | | | | | | | | | | |
| 3301 | 5342 | 5236 | 0.249 | -0.183 | 27.869 | 34.669 | 5.13 | | | | 2263.7 | 1081.3 | 2367 | 7.548 | 2371.1 | |
| 3302 | 5089 | 4991 | 0.249 | -0.154 | 27.869 | 34.672 | | | | | 2264.0 | 1071.1 | 2365 | 7.599 | 2370.0 | |
| 3303 | 4889 | 4797 | 0.264 | -0.115 | 27.869 | 34.673 | 5.15 | | | | 2263.1 | 1070.0 | 2365 | 7.549 | 2369.2 | |
| 3304 | 4594 | 4511 | 0.310 | -0.038 | 27.867 | 34.676 | 5.11 | | | | 2267.5 | 1071.1 | 2371 | 7.615 | 2373.9 | |
| 3305 | 4288 | 4213 | 0.461 | 0.140 | 27.864 | 34.684 | 5.05 | | | | 2262.0 | 1063.8 | 2366 | 7.561 | 2369.0 | |
| 3306 | 3971 | 3905 | 0.836 | 0.538 | 27.859 | 34.705 | 4.89 | | | | 2259.5 | 1059.7 | 2367 | 7.619 | 2366.9 | |
| 3307 | 3691 | 3631 | 1.119 | 0.843 | 27.852 | 34.720 | 4.80 | | | 93.3 | 2256.8 | 1040.5 | 2364 | 7.575 | 2367.0 | |
| 3308 | 3395 | 3342 | 1.489 | 1.233 | 27.845 | 34.744 | 4.77 | | | 85.7 | 2251.8 | 1022.6 | 2364 | 7.573 | 2364.5 | |
| 3309 | 3093 | 3047 | 1.983 | 1.745 | 27.845 | 34.790 | 4.93 | | | 68.7 | 2233.3 | 946.0 | 2375 | 7.579 | 2357.4 | |
| 3310 | 2794 | 2754 | 2.526 | 2.306 | 27.848 | 34.850 | 5.19 | | | 48.4 | 2212.6 | 862.7 | 2352 | 7.670 | 2350.6 | |
| 3311 | 2596 | 2561 | 2.722 | 2.518 | 27.835 | 34.856 | 5.21 | | | 45.8 | 2201.0 | 826.0 | 2335 | 7.582 | 2345.4 | |
| 3312 | 2497 | 2463 | 2.767 | 2.572 | 27.823 | 34.847 | 5.13 | | | 43.5 | 2208.5 | 870.4 | 2332 | 7.571 | 2344.4 | |
| 3313 | 2392 | 2360 | 2.862 | 2.676 | | | | | | | | | | | | |
| 3314 | 2195 | 2167 | 2.926 | 2.757 | 27.779 | 34.812 | | | | 45.0 | 2215.7 | 924.9 | | | 2341.7 | |
| 3315 | 1990 | 1965 | 2.901 | 2.751 | 27.734 | 34.755 | 4.54 | | | 49.6 | 2221.7 | 990.7 | 2340 | | 2336.5 | |
| 3316 | 1796 | 1775 | 2.929 | 2.797 | 27.696 | 34.701 | 4.43 | | | 50.3 | 2230.3 | 1037.0 | 2362 | | 2338.2 | |
| 3317 | 1697 | 1678 | 2.869 | 2.746 | 27.653 | 34.653 | 4.33 | | | 52.6 | 2231.6 | 1068.4 | 2362 | | 2334.6 | |
| 3318 | 1597 | 1579 | 2.847 | 2.732 | 27.619 | 34.609 | 4.28 | | | 52.8 | 2231.1 | 1091.9 | 2349 | | 2330.4 | |
| 3319 | 1498 | 1481 | 2.808 | 2.702 | 27.579 | 34.556 | 4.31 | | | 50.2 | 2231.6 | 1108.8 | 2325 | | 2328.4 | |
| 3320 | 1395 | 1380 | 2.800 | 2.703 | 27.541 | 34.507 | 4.35 | | | 48.2 | 2235.6 | 1113.0 | 2335 | | 2332.0 | |
| 3321 | 1298 | 1284 | 2.832 | 2.742 | 27.486 | 34.443 | 4.39 | | | 45.6 | 2223.8 | 1102.5 | 2327 | | 2320.3 | |
| 3322 | 1199 | 1186 | 2.878 | 2.796 | 27.435 | 34.386 | 4.64 | | | 42.8 | 2220.0 | 1076.3 | 2315 | | 2319.8 | |
| 3323 | 1103 | 1092 | 2.804 | 2.730 | 27.364 | 34.289 | 5.41 | | | | 2195.6 | 991.0 | | | 2305.7 | |
| 3324 | 999 | 989 | 2.805 | 2.739 | 27.322 | 34.237 | | | | | 2186.2 | 928.2 | | | 2306.2 | |

NOAA South Atlantic 1991 Long Lines

Niskin Bottle hydrographic data

Latitude -24.13
Longitude -33.46
Bottom Depth 4613

Operation # 912300570
Date 8/18/1991
Time (GMT) 1337

Leg 2
Cast 1

| Sample # | Pres. db | Depth m | Temp. deg. C | Pot. T. deg. C | Sigma theta | Salinity | Oxygen mL/L | NO2 umol/L | NO3 umol/L | SiO4 umol/L | TCO2 (cool.) umol/Kg | TCO2 (20 deg.) uatm | TALK (calc.) uEg/Kg |
|----------|----------|---------|--------------|----------------|-------------|----------|-------------|------------|------------|-------------|----------------------|---------------------|---------------------|
| | | | | | | | | | | | | | |
| 101 | 4406 | 4328 | 1.206 | 0.850 | 27.865 | 34.835 | 5.89 | | | | | 826.1 | |
| 102 | 3996 | 3929 | 1.809 | 1.481 | 27.876 | 34.833 | 5.54 | | | | | 772.9 | 2299 |
| 103 | 3696 | 3636 | 2.301 | 1.992 | 27.879 | 34.884 | 5.70 | | | | 2177.1 | 742.4 | 2295 |
| 104 | 3295 | 3245 | 2.663 | 2.389 | 27.872 | 34.916 | 5.82 | | | | 2177.8 | 748.5 | 2297 |
| 105 | 2997 | 2954 | 2.807 | 2.561 | 27.865 | 34.924 | 5.74 | | | | 2175.3 | 739.2 | 2299 |
| 106 | 2696 | 2659 | 2.953 | 2.734 | 27.856 | 34.936 | 5.76 | | | | 2172.3 | 736.7 | 2299 |
| 107 | 2300 | 2270 | 3.176 | 2.992 | 27.842 | 34.948 | 5.78 | | | | 2171.7 | 749.5 | 2315 |
| 108 | 1996 | 1971 | 3.408 | 3.250 | 27.816 | 34.960 | 5.85 | | | | 2173.0 | 820.7 | 2309 |
| 109 | 1696 | 1677 | 3.399 | 3.269 | 27.759 | 34.873 | 5.14 | | | | 2213.7 | 942.6 | 2293 |
| 110 | 1496 | 1479 | 3.159 | 3.049 | 27.671 | 34.736 | 4.63 | | | | 2220.2 | 1007.8 | 2293 |
| 111 | 1400 | 1385 | 3.103 | 3.002 | 27.618 | 34.667 | 4.42 | | | | 2224.7 | 1043.5 | 2287 |
| 112 | 1302 | 1288 | 3.128 | 3.035 | 27.557 | 34.591 | 4.30 | | | | 2222.8 | 1065.3 | 2281 |
| 113 | 1200 | 1188 | 3.256 | 3.170 | 27.490 | 34.527 | 4.26 | | | | 2217.5 | 1064.3 | 2283 |
| 114 | 1102 | 1091 | 3.442 | 3.363 | 27.418 | 34.456 | 4.31 | | | | 2206.8 | 1041.2 | 2281 |
| 115 | 1000 | 990 | 3.865 | 3.791 | 27.335 | 34.406 | 4.35 | | | | 2192.1 | 996.3 | 2292 |
| 116 | 851 | 842 | 4.908 | 4.839 | 27.212 | 34.392 | 4.35 | | | | 2175.4 | 802.1 | 2323 |
| 117 | 702 | 695 | 7.147 | 7.079 | 27.051 | 34.545 | 4.08 | | | | 2144.5 | 715.3 | 2373 |
| 118 | 554 | 549 | 9.992 | 9.927 | 26.823 | 34.818 | 4.17 | | | | 2104.6 | 517.6 | 2315 |
| 119 | 400 | 397 | 13.573 | 13.516 | 26.472 | 35.234 | 4.83 | | | | 2080.8 | 426.5 | 2335 |
| 120 | 303 | 301 | 15.820 | 15.772 | 26.218 | 35.542 | 4.90 | | | | 2080.2 | 382.9 | 2368 |
| 121 | 203 | 201 | 18.353 | 18.318 | 25.947 | 36.028 | 4.79 | | | | 2074.1 | 314.0 | 2420 |
| 122 | 154 | 152 | 21.814 | 21.784 | 25.636 | 36.784 | 4.91 | | | | 2072.1 | 313.1 | 2420 |
| 123 | 53 | 53 | 21.784 | 21.773 | 25.628 | 36.768 | 4.92 | | | | 2072.0 | 312.6 | 2420 |
| | 5 | 5 | 21.786 | 21.785 | 25.625 | 36.770 | 5.00 | | | | | | |

NOAA South Atlantic 1991 Long Lines

Niskin Bottle hydrographic data

Latitude -2.00
Longitude -4.50
Bottom Depth 4967

Operation # 912370750
Date 8/25/1991
Time (GMT) 1553

Leg 2
Cast 3

| Sample # | Pres. db | Depth m | Temp. deg. C | Pot. T. deg. C | Sigma theta | Salinity | Oxygen mL/L | NO2 umol/L | NO3 umol/L | SiO4 umol/L | TCO2 (cool.) umol/Kg | fCO2 (20 deg.) uatm | TALK (calc.) uEq/Kg |
|----------|----------|---------|--------------|----------------|-------------|----------|-------------|------------|------------|-------------|----------------------|---------------------|---------------------|
| | | | | | | | | | | | | | |
| 301 | 5013 | 4917 | 2.180 | 1.720 | 27.881 | 34.863 | 5.56 | | | 56.3 | 2206.1 | 779.0 | 2381 |
| 302 | 4495 | 4414 | 2.237 | 1.839 | 27.881 | 34.871 | 5.57 | | | 52.8 | 2202.2 | 779.9 | 2381 |
| 303 | 3995 | 3928 | 2.336 | 1.993 | 27.879 | 34.885 | 5.57 | | | 48.5 | 2198.0 | 771.3 | 2381 |
| 304 | 3495 | 3440 | 2.456 | 2.165 | 27.876 | 34.897 | 5.80 | | | 44.0 | 2192.5 | 771.2 | 2304 |
| 305 | 2996 | 2952 | 2.602 | 2.360 | 27.866 | 34.906 | 5.48 | | | 41.6 | 2193.1 | 773.8 | 2306 |
| 306 | 2496 | 2462 | 2.951 | 2.752 | 27.849 | 34.926 | 5.53 | | | 33.2 | 2183.8 | 764.9 | 2310 |
| 307 | 2055 | 2030 | 3.505 | 3.340 | 27.822 | 34.961 | 5.66 | | | 20.4 | 2169.7 | 741.8 | 2316 |
| 308 | 1799 | 1777 | 3.759 | 3.614 | 27.795 | 34.961 | 5.47 | | | 18.7 | 2172.0 | 761.5 | 2319 |
| 309 | 1598 | 1580 | 4.053 | 3.923 | 27.763 | 34.961 | 5.36 | | | 17.1 | 2174.0 | 779.4 | 2322 |
| 310 | 1398 | 1383 | 4.354 | 4.239 | 27.692 | 34.912 | 5.08 | | | 18.2 | 2185.3 | 859.7 | 2326 |
| 311 | 1198 | 1185 | 4.426 | 4.329 | 27.596 | 34.804 | 4.16 | | | 24.2 | 2202.0 | 973.4 | 2314 |
| 312 | 1000 | 990 | 4.394 | 4.315 | 27.413 | 34.629 | 3.59 | | | 30.8 | 2222.0 | 1134.0 | 2300 |
| 313 | 909 | 900 | 4.635 | 4.562 | 27.355 | 34.533 | 3.46 | | | 30.1 | 2220.6 | 1176.7 | 2296 |
| 314 | 790 | 783 | 4.785 | 4.722 | 27.301 | 34.487 | 3.29 | | | 28.8 | 2218.3 | 1164.8 | 2298 |
| 315 | 702 | 695 | 5.186 | 5.128 | 27.253 | | | | | | | | |
| 316 | 601 | 596 | 5.849 | 5.797 | 27.202 | 34.527 | 3.40 | | | 23.5 | 2210.8 | 1141.3 | 2309 |
| 317 | 506 | 502 | 6.181 | 6.136 | 27.172 | 34.540 | 3.26 | | | 20.6 | 2205.9 | 1101.1 | 2313 |
| 318 | 403 | 400 | 7.205 | 7.166 | 27.100 | 34.625 | 3.02 | | | 17.0 | 2205.0 | 1101.1 | 2330 |
| 319 | 302 | 299 | 9.804 | 9.769 | 26.921 | | | | | | | | |
| 320 | 229 | 227 | 12.567 | 12.536 | 26.661 | 35.226 | 2.02 | | | 7.8 | 2196.8 | 929.2 | 2315 |
| 321 | 178 | 176 | 13.212 | 13.187 | 26.592 | 35.303 | 2.81 | | | 6.3 | 2179.9 | 805.4 | 2322 |
| 322 | 75 | 75 | 15.064 | 15.053 | 26.382 | 35.543 | 2.27 | | | 4.7 | 2178.1 | 749.8 | 2335 |
| 323 | 41 | 40 | 16.238 | 16.232 | 26.182 | | | | | | | | |
| 324 | 4 | 4 | 22.199 | 22.198 | 24.537 | 35.492 | 4.94 | | | 1.2 | 2042.6 | 354.9 | 2335 |

NOAA South Atlantic 1991 Long Lines

Latitude -0.09
 Longitude -17.65
 Bottom Depth 5908

Niskin Bottle hydrographic data
 Operation # 912410817
 Date 8/29/1991
 Time (GMT) 551

Leg 2
 Cast 4

| Sample # | Pres. db | Depth m | Temp. deg. C | Pot. T. deg. C | Sigma theta | Salinity | Oxygen mL/L | NO2 umol/L | NO3 umol/L | SiO4 umol/L | TCO2 (cool.) umol/Kg | fCO2 (20 deg.) uatm | TALK (calc.) uEq/Kg |
|----------|----------|---------|--------------|----------------|-------------|----------|-------------|------------|------------|-------------|----------------------|---------------------|---------------------|
| 401 | 5765 | 5646 | 1.194 | 0.674 | 27.866 | 34.753 | 5.25 | | | 92.1 | 2242.8 | 912.0 | |
| 402 | 5494 | 5383 | 1.159 | 0.675 | 27.868 | 34.761 | 5.24 | | | 91.9 | 2242.2 | 920.4 | |
| 403 | 5243 | 5141 | 1.132 | 0.680 | 27.867 | 34.750 | 5.25 | | | 91.9 | 2243.7 | 921.7 | |
| 404 | 4995 | 4900 | 1.115 | 0.694 | 27.867 | 34.753 | 5.25 | | | 90.9 | 2240.4 | 922.3 | |
| 405 | 4747 | 4659 | 1.122 | 0.730 | 27.869 | 34.756 | 5.30 | | | 90.6 | 2242.3 | 915.0 | |
| 406 | 4545 | 4463 | 1.189 | 0.818 | 27.871 | 34.766 | 5.34 | | | 86.9 | 2236.2 | 905.3 | |
| 407 | 4244 | 4170 | 1.586 | 1.237 | 27.880 | 34.812 | 5.55 | | | 67.3 | 2215.7 | 832.3 | |
| 408 | 3996 | 3929 | 2.149 | 1.811 | 27.887 | 34.874 | 5.82 | | | 43.3 | 2186.5 | 766.5 | 2381 |
| 409 | 3496 | 3441 | 2.456 | 2.165 | 27.879 | 34.900 | 5.77 | | | 37.3 | 2183.2 | 755.0 | 2297 |
| 410 | 2997 | 2953 | 2.699 | 2.455 | 27.866 | 34.914 | 5.63 | | | 35.7 | 2184.2 | 762.2 | 2300 |
| 411 | 2494 | 2460 | 2.966 | 2.767 | 27.854 | 34.931 | 5.64 | | | 29.3 | 2176.2 | 753.6 | 2304 |
| 412 | 1997 | 1972 | 3.544 | 3.384 | 27.821 | 34.965 | 5.71 | | | 19.0 | 2165.7 | 741.3 | 2303 |
| 413 | 1450 | 1434 | 4.361 | 4.241 | 27.708 | 34.932 | 4.89 | | | 18.2 | | 832.6 | |
| 414 | 999 | 989 | 4.515 | 4.435 | 27.409 | 34.582 | 3.52 | | | 30.1 | 2218.2 | 1134.1 | 2301 |
| 415 | 750 | 743 | 5.017 | 4.956 | 27.271 | 34.482 | 3.59 | | | 26.8 | 2211.2 | 1156.2 | 2300 |
| 416 | 649 | 643 | 5.679 | 5.623 | 27.222 | 34.520 | 3.27 | | | 23.7 | 2209.7 | 1159.3 | 2307 |
| 417 | 553 | 548 | 6.548 | 6.497 | 27.150 | 34.571 | 3.18 | | | 19.6 | 2202.4 | 1109.6 | 2323 |
| 418 | 452 | 448 | 8.265 | 8.218 | 27.030 | 34.731 | 2.59 | | | 12.0 | 2206.1 | 1125.8 | 2348 |
| 419 | 351 | 348 | 9.508 | 9.468 | 26.951 | 34.737 | 2.36 | | | 13.1 | 2211.7 | 1137.8 | 2361 |
| 420 | 252 | 250 | 12.687 | 12.653 | 26.646 | 34.880 | 3.07 | | | 11.9 | 2178.2 | 811.6 | 2295 |
| 421 | 155 | 153 | 13.337 | 13.315 | 26.579 | 35.316 | 2.80 | | | 6.2 | 2166.3 | 740.1 | 2322 |
| 422 | 105 | 104 | 16.993 | 16.976 | 26.147 | 35.802 | 3.35 | | | 5.0 | 2136.7 | 543.2 | 2355 |
| 423 | 57 | 57 | 22.604 | 22.592 | 24.758 | 35.926 | 4.27 | | | 2.2 | 2065.4 | 370.6 | 2361 |
| 424 | 3 | 3 | 24.076 | 24.075 | 24.126 | 35.666 | 4.86 | | | 0.0 | 2022.6 | 319.2 | 2348 |

NOAA South Atlantic 1991 Long Lines

Latitude -3.00
Longitude -25.00
Bottom Depth 5023

Niskin Bottle hydrographic data
Operation # 912420841
Date 8/30/1991
Time (GMT) 2119

Leg 2
Cast 5

| Sample # | Pres. db | Depth m | Temp. deg. C | Pot. T. deg. C | Sigma theta | Salinity | Oxygen mL/L | NO2 umol/L | NO3 umol/L | SiO4 umol/L | TCO2 (cool.) umol/Kg | fCO2 (20 deg.) uatm | TALK (calc.) uEq/Kg |
|----------|----------|---------|--------------|----------------|-------------|----------|-------------|------------|------------|-------------|----------------------|---------------------|---------------------|
| 501 | 4998 | 4903 | 0.726 | 0.318 | 27.857 | 34.714 | 5.09 | | | 114.6 | 2256.5 | 980.8 | 2367 |
| 502 | 4498 | 4417 | 0.941 | 0.583 | 27.865 | 34.742 | 5.22 | | | 103.7 | 2246.2 | 941.7 | 2367 |
| 503 | 3994 | 3927 | 1.941 | 1.609 | 27.886 | 34.855 | 5.75 | | | 55.6 | 2195.9 | 777.0 | 2381 |
| 504 | 3498 | 3443 | 2.501 | 2.209 | 27.882 | 34.909 | 5.87 | | | 35.0 | 2177.9 | 740.0 | 2298 |
| 505 | 2996 | 2953 | 2.633 | 2.391 | 27.868 | 34.911 | 5.65 | | | 39.0 | 2186.1 | 762.9 | 2299 |
| 506 | 2499 | 2466 | 2.965 | 2.766 | 27.854 | 34.933 | 5.70 | | | 30.9 | 2178.3 | 747.8 | 2303 |
| 507 | 1999 | 1975 | 3.476 | 3.316 | 27.823 | 34.960 | 5.70 | | | 21.9 | 2169.6 | 744.1 | 2316 |
| 508 | 1796 | 1775 | 3.745 | 3.601 | 27.805 | 34.972 | 5.68 | | | 18.6 | | | |
| 509 | 1598 | 1580 | 4.064 | 3.934 | 27.769 | 34.971 | 5.38 | | | 18.2 | 2167.3 | 765.9 | 2323 |
| 510 | 1400 | 1384 | 4.331 | 4.216 | 27.702 | 34.921 | 4.89 | | | 21.1 | 2185.6 | 844.6 | 2319 |
| 511 | 1200 | 1188 | 4.363 | 4.267 | 27.559 | 34.765 | 4.03 | | | 29.4 | 2208.5 | 1016.6 | 2313 |
| 512 | 1102 | 1091 | 4.312 | 4.225 | 27.487 | 34.655 | 3.86 | | | 31.8 | 2214.9 | 1070.3 | 2306 |
| 513 | 1001 | 991 | 4.328 | 4.250 | 27.404 | 34.552 | 3.70 | | | 33.6 | 2218.7 | 1124.9 | 2299 |
| 514 | 901 | 892 | 4.436 | 4.365 | 27.361 | 34.514 | 3.69 | | | 33.2 | | 1130.8 | |
| 515 | 801 | 793 | 4.553 | 4.490 | 27.320 | 34.480 | 3.70 | | | 32.2 | 2211.5 | 1124.0 | 2289 |
| 516 | 701 | 694 | 4.771 | 4.715 | 27.279 | 34.458 | 3.72 | | | 30.3 | 2207.6 | 1126.3 | 2291 |
| 517 | 600 | 595 | 5.508 | 5.457 | 27.216 | 34.489 | 3.35 | | | 24.7 | 2207.8 | 1144.6 | 2299 |
| 518 | 501 | 497 | 6.715 | 6.668 | 27.142 | 34.591 | 2.71 | | | 21.0 | 2215.2 | 1221.4 | 2325 |
| 519 | 402 | 399 | 8.833 | 8.789 | 26.996 | 34.801 | 1.70 | | | 15.8 | 2226.8 | 1313.4 | 2365 |
| 520 | 294 | 292 | 11.374 | 11.337 | 26.769 | 35.070 | 2.59 | | | 9.2 | 2182.3 | 886.1 | 2310 |
| 521 | 204 | 202 | 12.785 | 12.757 | 26.637 | 35.252 | 2.04 | | | 8.1 | 2192.2 | 910.5 | 2322 |
| 522 | 106 | 105 | 14.791 | 14.775 | 26.411 | 35.504 | 2.36 | | | 5.5 | 2174.5 | 756.2 | 2340 |
| 523 | 66 | 66 | 22.046 | 22.033 | 25.021 | 35.553 | 3.77 | | | 0.0 | 2095.1 | 408.7 | 2374 |
| 524 | 3 | 3 | 25.381 | 25.380 | 23.934 | 35.934 | | | | 0.0 | 2025.5 | 305.0 | 2368 |

APPENDIX C: Station Data for Productivity Casts

Casts are presented by cruise leg and in increasing cast number. The cruise leg number, the productivity cast number, geographic coordinates, operation number, and date are shown at the top of each data table. Data values that are suspect for various reasons are italicized. A blank space is left when either no data was collected, or the value was known to be in error. All coordinates are in fractional degrees with negative values indicating south or west.

NOAA South Atlantic 1991 Underway Values

Leg 1 Carbon and Related Parameters

| Date | Time | Lat [degrees] | Long [degrees] | XCO2,a [ppm] | XCO2,w [ppm] | SST [deg. C] | SST-Eq.T [deg. C] | Sal(CTD) | Pressure [mb] | fCO2, w [uatm] | fCO2,w-a [uatm] |
|---------|-------|------------------|-------------------|-----------------|-----------------|-----------------|----------------------|----------|------------------|-------------------|--------------------|
| 7/11/91 | 17:00 | -3.01 | -38.07 | 355.24 | 375.19 | 27.35 | -0.27 | | 1012.2 | 355.8 | 14.9 |
| 7/11/91 | 18:00 | -2.82 | -37.94 | 355.77 | 382.65 | 27.36 | -0.28 | | 1011.8 | 362.4 | 21.1 |
| 7/11/91 | 19:00 | -2.64 | -37.80 | 355.69 | 385.75 | 27.44 | -0.27 | | 1011.8 | 365.5 | 24.2 |
| 7/11/91 | 20:00 | -2.45 | -37.66 | 356.38 | 384.73 | 27.37 | -0.31 | | 1011.9 | 364.0 | 21.7 |
| 7/11/91 | 21:00 | -2.25 | -37.52 | 356.86 | 384.69 | 27.10 | -0.34 | | 1012.2 | 363.7 | 20.5 |
| 7/11/91 | 22:00 | -2.06 | -37.38 | 355.05 | 381.59 | 27.10 | -0.29 | | 1013.0 | 361.9 | 20.2 |
| 7/11/91 | 23:00 | -1.85 | -37.25 | 355.09 | 380.65 | 27.05 | -0.30 | | 1013.6 | 361.1 | 19.1 |
| 7/12/91 | 0:00 | -1.65 | -37.11 | 354.99 | 380.96 | 27.03 | -0.30 | | 1014.2 | 361.7 | 19.6 |
| 7/12/91 | 1:00 | -1.44 | -36.98 | 354.96 | 380.76 | 26.90 | -0.34 | | 1014.3 | 360.9 | 18.7 |
| 7/12/91 | 2:00 | -1.23 | -36.85 | 354.90 | 382.25 | 26.83 | -0.32 | | 1014.4 | 362.8 | 20.6 |
| 7/12/91 | 3:00 | -1.02 | -36.72 | 354.88 | 384.44 | 26.84 | -0.29 | | 1013.9 | 365.2 | 23.0 |
| 7/12/91 | 4:00 | -0.81 | -36.59 | 354.83 | 384.36 | 26.86 | -0.29 | 36.15 | 1013.2 | 364.7 | 22.8 |
| 7/12/91 | 5:00 | -0.66 | -36.51 | 354.83 | 384.66 | 26.86 | -0.31 | | 1012.5 | 364.5 | 22.6 |
| 7/12/91 | 6:00 | -0.66 | -36.51 | | 386.26 | 26.86 | -0.33 | | 1012.4 | 365.7 | |
| 7/12/91 | 10:00 | -0.66 | -36.52 | 355.97 | 386.02 | 26.82 | -0.33 | | 1013.9 | 366.1 | 22.9 |
| 7/12/91 | 11:00 | -0.66 | -36.52 | 355.18 | 385.50 | 26.81 | -0.33 | | 1014.9 | 365.9 | 23.3 |
| 7/12/91 | 12:00 | -0.66 | -36.51 | 355.38 | 385.40 | 26.82 | -0.34 | | 1015.1 | 365.7 | 23.2 |
| 7/12/91 | 13:00 | -0.67 | -36.51 | 355.38 | 385.57 | 26.85 | -0.34 | | 1015.1 | 365.9 | 23.3 |
| 7/12/91 | 14:00 | -0.60 | -36.39 | 355.52 | 386.04 | 26.85 | -0.32 | | 1014.6 | 366.4 | 24.2 |
| 7/12/91 | 15:00 | -0.51 | -36.19 | 354.72 | 384.17 | 26.90 | -0.24 | | 1014.0 | 365.7 | 24.4 |
| 7/12/91 | 16:00 | -0.49 | -36.18 | 354.60 | 384.87 | 26.89 | -0.32 | | 1013.3 | 364.8 | 24.0 |
| 7/13/91 | 7:00 | 0.38 | -34.40 | 354.60 | 385.77 | 26.27 | -0.32 | | 1013.0 | 366.0 | 24.1 |
| 7/13/91 | 8:00 | 0.48 | -34.18 | 354.42 | 385.14 | 26.27 | -0.25 | | 1013.6 | 366.8 | 24.8 |
| 7/13/91 | 9:00 | 0.58 | -33.97 | 354.40 | 385.05 | 26.31 | -0.24 | | 1013.7 | 367.0 | 25.0 |
| 7/13/91 | 10:00 | 0.70 | -33.76 | 354.39 | 384.38 | 26.27 | -0.29 | | 1014.5 | 365.8 | 23.8 |
| 7/13/91 | 11:00 | 0.80 | -33.56 | 354.36 | 384.28 | 26.43 | -0.10 | | 1015.0 | 368.9 | 26.9 |
| 7/13/91 | 19:00 | 1.54 | -32.00 | 354.12 | 366.05 | 27.79 | -0.17 | | 1013.4 | 348.7 | 7.7 |
| 7/13/91 | 20:00 | 1.62 | -31.81 | 354.24 | 362.65 | 27.78 | -0.19 | | 1013.7 | 345.3 | 3.7 |
| 7/13/91 | 21:00 | 1.71 | -31.62 | 354.20 | 362.04 | 27.71 | -0.25 | | 1014.4 | 344.1 | 2.3 |
| 7/13/91 | 22:00 | 1.81 | -31.42 | 354.30 | 362.37 | 27.45 | -0.42 | | 1015.3 | 342.2 | -0.2 |
| 7/13/91 | 23:00 | 1.91 | -31.23 | 354.42 | 364.98 | 27.11 | -0.51 | | 1015.9 | 343.7 | 0.8 |
| 7/14/91 | 0:00 | 2.02 | -31.04 | 354.36 | 368.88 | 26.19 | -0.21 | | 1016.3 | 353.1 | 9.9 |
| 7/14/91 | 1:00 | 2.12 | -30.84 | 354.27 | 383.55 | 26.19 | -0.21 | | 1016.5 | 367.1 | 24.2 |
| 7/14/91 | 2:00 | 2.22 | -30.65 | 354.39 | 382.14 | 26.25 | -0.22 | | 1016.1 | 365.4 | 22.4 |
| 7/14/91 | 3:00 | 2.32 | -30.45 | 354.52 | 378.65 | 26.31 | -0.23 | | 1015.6 | 361.7 | 18.7 |
| 7/14/91 | 4:00 | 2.43 | -30.25 | 354.72 | 376.07 | 26.50 | -0.10 | | 1015.2 | 361.0 | 18.2 |
| 7/14/91 | 5:00 | 2.54 | -30.06 | 354.74 | 374.06 | 26.63 | -0.15 | | 1014.8 | 358.1 | 15.4 |
| 7/14/91 | 6:00 | 2.63 | -29.85 | 354.96 | 372.18 | 26.74 | -0.15 | | 1014.7 | 356.1 | 13.3 |
| 7/14/91 | 7:00 | 2.73 | -29.65 | 354.92 | 371.23 | 26.84 | -0.14 | | 1015.0 | 355.4 | 12.7 |
| 7/14/91 | 8:00 | 2.82 | -29.45 | 354.87 | 369.72 | 26.99 | -0.10 | | 1015.2 | 354.6 | 12.0 |
| 7/14/91 | 9:00 | 2.92 | -29.24 | 354.69 | 367.06 | 27.09 | -0.14 | | 1015.7 | 351.5 | 9.1 |
| 7/14/91 | 10:00 | 2.97 | -29.14 | 354.79 | 366.24 | 27.18 | -0.16 | | 1016.1 | 350.4 | 8.1 |
| 7/14/91 | 11:00 | 3.11 | -28.82 | 354.80 | 364.46 | 27.23 | -0.21 | | 1016.3 | 348.0 | 5.8 |
| 7/14/91 | 12:00 | 3.21 | -28.61 | 355.09 | 364.21 | 27.27 | -0.21 | | 1016.0 | 347.6 | 5.5 |
| 7/14/91 | 13:00 | 3.30 | -28.39 | 355.10 | 364.48 | 27.32 | -0.21 | | 1015.7 | 347.7 | 5.8 |
| 7/14/91 | 14:00 | 3.40 | -28.18 | 355.16 | 365.58 | 27.37 | -0.21 | | 1015.4 | 348.7 | 6.9 |
| 7/14/91 | 15:00 | 3.52 | -27.97 | 355.07 | 366.69 | 27.41 | -0.23 | | 1015.1 | 349.3 | 7.7 |
| 7/14/91 | 16:00 | 3.63 | -27.75 | 355.05 | 367.54 | 27.46 | -0.22 | | 1014.6 | 350.1 | 8.7 |
| 7/14/91 | 17:00 | 3.74 | -27.54 | 355.14 | 368.90 | 27.47 | -0.25 | | 1014.2 | 350.6 | 9.4 |
| 7/14/91 | 18:00 | 3.85 | -27.31 | 355.09 | 370.22 | 27.47 | -0.26 | | 1013.8 | 351.6 | 10.5 |
| 7/14/91 | 19:00 | 3.95 | -27.09 | 355.10 | 370.52 | 27.47 | -0.21 | | 1014.3 | 352.9 | 11.6 |
| 7/14/91 | 20:00 | 4.06 | -26.87 | 355.15 | 370.71 | 27.78 | -0.03 | | 1014.7 | 355.9 | 14.0 |
| 7/14/91 | 21:00 | 4.18 | -26.65 | 355.36 | 363.38 | 27.94 | -0.11 | | 1015.0 | 347.5 | 5.2 |
| 7/14/91 | 22:00 | 4.29 | -26.43 | 355.67 | 359.83 | 27.96 | -0.19 | | 1015.5 | 343.0 | 0.2 |
| 7/14/91 | 23:00 | 4.41 | -26.20 | 355.88 | 359.61 | 27.92 | -0.22 | | 1016.0 | 342.6 | -0.6 |
| 7/15/91 | 0:00 | 4.52 | -25.97 | 355.93 | 359.53 | 27.93 | -0.18 | | 1016.4 | 343.3 | -0.1 |
| 7/15/91 | 1:00 | 4.63 | -25.73 | 355.56 | 363.73 | 27.96 | -0.16 | | 1016.5 | 347.7 | 4.6 |
| 7/15/91 | 2:00 | 4.73 | -25.50 | 355.62 | 363.36 | 27.89 | -0.24 | | 1016.2 | 346.0 | 2.7 |
| 7/15/91 | 3:00 | 4.84 | -25.26 | 355.62 | 356.29 | 27.94 | -0.13 | | 1015.5 | 340.6 | -2.4 |
| 7/15/91 | 4:00 | 4.97 | -25.04 | 355.68 | 357.53 | 27.84 | -0.25 | 35.23 | 1014.9 | 339.9 | -2.9 |
| 7/15/91 | 5:00 | 5.00 | -24.99 | 355.79 | 350.83 | 27.80 | -0.21 | | 1014.7 | 334.1 | -8.7 |

NOAA South Atlantic 1991 Underway Values

Leg 1 Carbon and Related Parameters

| Date | Time | Lat [degrees] | Long [degrees] | XCO2,a [ppm] | XCO2,w [ppm] | SST [deg. C] | SST-Eq.T [deg. C] | Sal(CTD) | Pressure [mb] | fCO2, w [uatm] | fCO2,w-a [uatm] |
|---------|-------|------------------|-------------------|-----------------|-----------------|-----------------|----------------------|----------|------------------|-------------------|--------------------|
| 7/15/91 | 6:00 | 4.89 | -24.97 | 355.78 | 348.94 | 27.79 | -0.24 | | 1014.4 | 331.7 | -10.7 |
| 7/15/91 | 7:00 | 4.65 | -24.97 | 355.70 | 349.52 | 27.83 | -0.15 | | 1014.7 | 333.7 | -9.0 |
| 7/15/91 | 8:00 | 4.40 | -24.98 | 355.49 | 353.95 | 27.87 | -0.17 | | 1014.9 | 337.6 | -5.1 |
| 7/15/91 | 9:00 | 4.16 | -24.99 | 355.49 | 360.34 | 27.83 | -0.25 | | 1015.4 | 342.7 | 0.2 |
| 7/15/91 | 10:00 | 4.01 | -24.99 | 355.28 | 361.89 | 27.81 | -0.24 | | 1016.1 | 344.6 | 1.8 |
| 7/15/91 | 11:00 | 4.00 | -24.99 | 355.15 | 358.17 | 27.82 | -0.23 | 35.50 | 1016.4 | 341.3 | -1.3 |
| 7/15/91 | 12:00 | 4.00 | -24.98 | 355.15 | 358.30 | 27.82 | -0.23 | | 1016.2 | 341.3 | -1.1 |
| 7/15/91 | 13:00 | 4.00 | -24.97 | 355.01 | 358.02 | 27.81 | -0.25 | | 1016.3 | 340.8 | -2.2 |
| 7/15/91 | 14:00 | 4.00 | -24.98 | 355.16 | 358.18 | 27.78 | -0.27 | | 1016.1 | 340.5 | -4.1 |
| 7/15/91 | 15:00 | 3.96 | -24.97 | 354.70 | 358.09 | 27.77 | -0.25 | | 1015.9 | 340.7 | -3.8 |
| 7/15/91 | 16:00 | 3.71 | -24.98 | 354.44 | 357.15 | 27.77 | -0.23 | | 1015.4 | 340.0 | -3.7 |
| 7/15/91 | 17:00 | 3.47 | -25.00 | 354.84 | 355.97 | 27.58 | -0.40 | | 1015.0 | 336.3 | -6.0 |
| 7/15/91 | 18:00 | 3.23 | -25.01 | 354.81 | 360.25 | 27.41 | -0.45 | | 1014.9 | 339.6 | -2.5 |
| 7/15/91 | 19:00 | 3.00 | -25.00 | 354.89 | 369.17 | 27.30 | -0.30 | 35.64 | 1014.8 | 350.4 | 7.8 |
| 7/15/91 | 20:00 | 3.00 | -25.01 | 354.72 | 370.62 | 27.30 | -0.30 | | 1015.3 | 352.0 | 9.5 |
| 7/15/91 | 21:00 | 2.88 | -25.01 | 354.66 | 370.36 | 27.33 | -0.24 | | 1015.5 | 352.8 | 10.6 |
| 7/15/91 | 22:00 | 2.64 | -25.01 | 354.76 | 368.17 | 27.64 | 0.00 | | 1016.1 | 354.5 | 11.9 |
| 7/15/91 | 23:00 | 2.40 | -25.01 | 354.52 | 364.98 | 27.40 | -0.42 | | 1016.3 | 345.1 | 2.5 |
| 7/16/91 | 1:00 | 2.00 | -25.01 | 354.50 | 362.35 | 27.78 | -0.03 | 34.58 | 1016.3 | 348.4 | 5.8 |
| 7/16/91 | 2:00 | 2.00 | -25.00 | 354.53 | 359.93 | 27.77 | -0.24 | | 1016.1 | 342.7 | 0.1 |
| 7/16/91 | 3:00 | 2.00 | -25.00 | 354.69 | 359.99 | 27.75 | -0.25 | | 1015.3 | 342.4 | -0.1 |
| 7/16/91 | 4:00 | 1.99 | -25.00 | 354.59 | 360.20 | 27.77 | -0.22 | | 1014.7 | 342.8 | 0.7 |
| 7/16/91 | 5:00 | 1.86 | -25.00 | 354.54 | 360.01 | 27.77 | -0.23 | | 1014.5 | 342.5 | 0.5 |
| 7/16/91 | 6:00 | 1.62 | -25.00 | 354.46 | 357.69 | 27.57 | -0.39 | | 1014.8 | 338.1 | -4.2 |
| 7/16/91 | 7:00 | 1.38 | -25.01 | 354.59 | 357.39 | 27.00 | -0.66 | | 1015.1 | 334.1 | -8.6 |
| 7/16/91 | 8:00 | 1.14 | -25.01 | 354.55 | 359.77 | 26.49 | -0.41 | | 1015.3 | 340.6 | -2.1 |
| 7/16/91 | 9:00 | 1.00 | -25.00 | 354.52 | 359.99 | 26.23 | -0.55 | 35.37 | 1015.6 | 338.9 | -4.0 |
| 7/16/91 | 10:00 | 0.99 | -25.01 | 354.54 | 364.06 | 26.12 | -0.46 | | 1016.1 | 344.4 | 1.3 |
| 7/16/91 | 11:00 | 0.90 | -25.00 | 354.33 | 364.53 | 25.90 | -0.49 | | 1016.6 | 344.7 | 1.8 |
| 7/16/91 | 12:00 | 0.81 | -25.00 | 354.40 | 366.09 | 25.88 | -0.36 | | 1017.0 | 348.3 | 5.4 |
| 7/16/91 | 13:00 | 0.61 | -25.00 | 354.45 | 368.53 | 25.70 | -0.53 | | 1016.8 | 348.0 | 5.0 |
| 7/16/91 | 14:00 | 0.38 | -25.00 | 354.15 | 370.16 | 25.28 | -0.68 | | 1016.5 | 347.4 | 4.9 |
| 7/16/91 | 15:00 | 0.15 | -25.00 | 354.24 | 380.99 | 25.18 | -0.39 | | 1015.8 | 362.1 | 19.6 |
| 7/16/91 | 16:00 | 0.00 | -25.00 | 354.19 | 376.99 | 25.12 | -0.41 | 35.85 | 1015.3 | 357.8 | 15.6 |
| 7/16/91 | 17:00 | 0.00 | -24.99 | 354.09 | 378.38 | 25.12 | -0.42 | | 1015.2 | 359.1 | 16.9 |
| 7/16/91 | 18:00 | 0.01 | -24.99 | 354.11 | 377.83 | 25.11 | -0.41 | | 1015.1 | 358.6 | 16.1 |
| 7/16/91 | 19:00 | 0.01 | -24.99 | 354.09 | 377.24 | 25.08 | -0.42 | | 1015.4 | 357.9 | 15.4 |
| 7/16/91 | 20:00 | -0.15 | -24.99 | 354.02 | 376.59 | 25.07 | -0.38 | | 1015.8 | 358.2 | 15.4 |
| 7/16/91 | 21:00 | -0.38 | -24.99 | 354.07 | 375.93 | 24.99 | -0.41 | | 1016.3 | 357.3 | 14.3 |
| 7/16/91 | 22:00 | -0.61 | -24.99 | 354.17 | 380.47 | 24.94 | -0.39 | | 1016.5 | 362.0 | 18.8 |
| 7/16/91 | 23:00 | -0.85 | -25.00 | 354.05 | 382.01 | 24.98 | -0.28 | | 1016.8 | 365.4 | 22.1 |
| 7/17/91 | 0:00 | -1.00 | -25.00 | 353.96 | 384.74 | 24.98 | -0.35 | 36.10 | 1017.2 | 367.0 | 23.8 |
| 7/17/91 | 1:00 | -1.00 | -25.00 | 353.84 | 384.42 | 24.97 | -0.39 | | 1016.8 | 366.0 | 23.0 |
| 7/17/91 | 2:00 | -1.00 | -25.00 | 353.92 | 384.30 | 25.02 | -0.32 | | 1016.3 | 366.8 | 23.8 |
| 7/17/91 | 3:00 | -1.11 | -25.00 | 353.97 | 385.03 | 24.98 | -0.40 | | 1016.0 | 366.0 | 23.1 |
| 7/17/91 | 4:00 | -1.33 | -25.01 | 353.96 | 385.07 | 25.02 | -0.28 | | 1015.4 | 367.7 | 25.1 |
| 7/17/91 | 5:00 | -1.55 | -25.01 | 353.91 | 384.82 | 25.08 | -0.31 | | 1015.0 | 366.9 | 24.5 |
| 7/17/91 | 6:00 | -1.77 | -25.01 | 353.84 | 385.30 | 25.20 | -0.23 | | 1015.0 | 368.6 | 26.3 |
| 7/17/91 | 7:00 | -2.00 | -25.00 | 353.82 | 387.08 | 25.28 | -0.27 | 36.08 | 1015.4 | 369.8 | 27.4 |
| 7/17/91 | 8:00 | -2.00 | -25.00 | 353.79 | 389.88 | 25.25 | -0.36 | | 1015.4 | 370.9 | 28.5 |
| 7/17/91 | 10:00 | -2.00 | -25.00 | 354.57 | 391.14 | 25.25 | -0.37 | | 1016.4 | 372.3 | 29.3 |
| 7/17/91 | 11:00 | -1.99 | -25.00 | 354.39 | 390.80 | 25.26 | -0.37 | | 1016.7 | 372.2 | 29.3 |
| 7/17/91 | 12:00 | -1.99 | -25.00 | 354.40 | 390.58 | 25.28 | -0.37 | | 1016.8 | 372.0 | 29.1 |
| 7/17/91 | 13:00 | -1.97 | -25.01 | 354.33 | 390.67 | 25.31 | -0.35 | | 1016.1 | 372.0 | 29.4 |
| 7/17/91 | 14:00 | -2.02 | -25.18 | 354.33 | 391.07 | 25.40 | -0.34 | | 1016.0 | 372.5 | 29.9 |
| 7/17/91 | 15:00 | -2.07 | -25.42 | 354.00 | 390.44 | 25.58 | -0.23 | | 1015.4 | 373.4 | 31.2 |
| 7/17/91 | 16:00 | -2.14 | -25.66 | 354.04 | 391.07 | 25.78 | -0.20 | | 1014.9 | 374.2 | 32.1 |
| 7/17/91 | 17:00 | -2.20 | -25.91 | 353.99 | 392.32 | 25.92 | -0.22 | | 1014.8 | 374.8 | 33.0 |
| 7/17/91 | 18:00 | -2.26 | -26.16 | 353.96 | 394.60 | 26.01 | -0.28 | | 1014.7 | 375.9 | 33.9 |
| 7/17/91 | 19:00 | -2.32 | -26.41 | 354.03 | 397.73 | 25.98 | -0.37 | | 1015.0 | 377.6 | 35.5 |
| 7/17/91 | 20:00 | -2.38 | -26.67 | 354.03 | 394.67 | 26.01 | -0.27 | | 1015.4 | 376.5 | 34.2 |

NOAA South Atlantic 1991 Underway Values

Leg 1 Carbon and Related Parameters

| Date | Time | Lat [degrees] | Long [degrees] | XCO2,a [ppm] | XCO2,w [ppm] | SST [deg. C] | SST-Eq.T [deg. C] | Sal(CTD) | Pressure [mb] | fCO2, w [uatm] | fCO2,w-a [uatm] |
|---------|-------|------------------|-------------------|-----------------|-----------------|-----------------|----------------------|----------|------------------|-------------------|--------------------|
| 7/17/91 | 21:00 | -2.43 | -26.93 | 354.06 | 392.36 | 26.03 | -0.29 | | 1015.9 | 374.1 | 31.7 |
| 7/17/91 | 22:00 | -2.49 | -27.19 | 354.09 | 392.69 | 26.11 | -0.25 | | 1016.4 | 375.2 | 32.5 |
| 7/17/91 | 23:00 | -2.55 | -27.44 | 354.10 | 392.78 | 25.86 | -0.54 | | 1016.8 | 370.7 | 27.8 |
| 7/18/91 | 0:00 | -2.60 | -27.69 | 354.17 | 388.74 | 25.78 | -0.38 | | 1017.1 | 369.7 | 26.6 |
| 7/18/91 | 1:00 | -2.66 | -27.94 | 354.07 | 387.33 | 25.69 | -0.37 | | 1017.0 | 368.6 | 25.6 |
| 7/18/91 | 2:00 | -2.73 | -28.20 | 354.08 | 386.50 | 25.60 | -0.36 | | 1016.9 | 367.9 | 24.8 |
| 7/18/91 | 3:00 | -2.79 | -28.44 | 354.08 | 385.93 | 25.72 | -0.20 | | 1016.4 | 369.9 | 27.0 |
| 7/18/91 | 4:00 | -2.85 | -28.69 | 354.04 | 386.91 | 26.00 | -0.03 | | 1016.2 | 373.4 | 30.6 |
| 7/18/91 | 5:00 | -2.92 | -28.93 | 353.98 | 387.94 | 26.34 | -0.08 | | 1015.9 | 373.1 | 30.5 |
| 7/18/91 | 6:00 | -2.98 | -29.17 | 354.01 | 390.65 | 26.48 | -0.16 | | 1016.0 | 374.3 | 31.7 |
| 7/18/91 | 7:00 | -3.04 | -29.40 | 354.22 | 389.51 | 26.47 | -0.30 | | 1016.0 | 370.9 | 28.1 |
| 7/18/91 | 8:00 | -3.10 | -29.64 | 354.09 | 390.75 | 26.41 | -0.37 | | 1016.4 | 371.1 | 28.3 |
| 7/18/91 | 9:00 | -3.15 | -29.89 | 354.09 | 391.65 | 26.45 | -0.28 | | 1016.7 | 373.5 | 30.7 |
| 7/18/91 | 10:00 | -3.20 | -30.13 | 354.03 | 392.66 | 26.47 | -0.28 | | 1017.0 | 374.6 | 31.8 |
| 7/18/91 | 11:00 | -3.26 | -30.38 | 354.23 | 391.35 | 26.49 | -0.29 | | 1017.3 | 373.2 | 30.0 |
| 7/18/91 | 12:00 | -3.31 | -30.63 | 353.96 | 391.59 | 26.59 | -0.21 | | 1017.2 | 374.7 | 31.1 |
| 7/18/91 | 13:00 | -3.37 | -30.87 | 353.83 | 389.64 | 26.67 | -0.24 | | 1017.4 | 372.4 | 28.9 |
| 7/18/91 | 14:00 | -3.43 | -31.12 | 353.76 | 387.97 | 26.73 | -0.26 | | 1016.9 | 370.3 | 27.7 |
| 7/18/91 | 15:00 | -3.48 | -31.36 | 353.82 | 385.73 | 26.79 | -0.26 | | 1016.2 | 367.8 | 25.8 |
| 7/18/91 | 16:00 | -3.55 | -31.60 | 353.83 | 387.59 | 26.83 | -0.29 | | 1015.5 | 368.8 | 27.2 |
| 7/18/91 | 17:00 | -3.62 | -31.84 | 353.85 | 388.50 | 26.81 | -0.36 | | 1014.9 | 368.3 | 26.9 |
| 7/18/91 | 18:00 | -3.68 | -32.08 | 353.79 | 388.92 | 26.81 | -0.34 | | 1014.7 | 368.9 | 27.5 |
| 7/18/91 | 19:00 | -3.74 | -32.33 | 353.85 | 390.68 | 26.68 | -0.46 | | 1014.9 | 368.7 | 27.3 |
| 7/18/91 | 20:00 | -3.83 | -32.42 | 353.89 | 390.87 | 26.68 | -0.35 | | 1015.1 | 370.9 | 29.2 |
| 7/18/91 | 21:00 | -3.82 | -32.42 | 353.87 | 390.09 | 26.66 | -0.37 | | 1015.6 | 370.0 | 28.0 |
| 7/18/91 | 22:00 | -3.82 | -32.42 | 354.23 | 389.60 | 26.65 | -0.35 | | 1016.0 | 369.9 | 27.5 |
| 7/18/91 | 23:00 | -3.76 | -32.40 | 354.13 | 390.35 | 26.63 | -0.35 | | 1016.4 | 370.8 | 28.4 |
| 7/19/94 | 0:00 | -3.77 | -32.19 | 353.95 | 387.25 | 26.64 | -0.31 | | 1016.8 | 368.7 | 25.4 |
| 7/19/94 | 1:00 | -3.77 | -31.97 | 353.90 | 388.88 | 26.69 | -0.27 | | 1017.0 | 371.0 | 27.3 |
| 7/19/94 | 2:00 | -3.78 | -31.75 | 353.94 | 388.06 | 26.73 | -0.26 | | 1016.5 | 370.1 | 26.6 |
| 7/19/94 | 3:00 | -3.78 | -31.53 | 353.98 | 387.84 | 26.77 | -0.25 | | 1016.0 | 369.9 | 27.0 |
| 7/19/94 | 4:00 | -3.79 | -31.31 | 353.92 | 386.57 | 26.65 | -0.41 | | 1015.4 | 366.0 | 23.3 |
| 7/19/94 | 5:00 | -3.79 | -31.09 | 353.75 | 389.19 | 26.60 | -0.33 | | 1015.0 | 369.6 | 27.5 |
| 7/19/94 | 6:00 | -3.80 | -30.87 | 353.77 | 389.43 | 26.56 | -0.33 | | 1015.1 | 369.8 | 27.4 |
| 7/19/94 | 7:00 | -3.81 | -30.65 | 353.86 | 392.30 | 26.59 | -0.27 | | 1015.6 | 373.8 | 31.0 |
| 7/19/94 | 8:00 | -3.81 | -30.44 | 353.81 | 388.80 | 26.68 | -0.21 | | 1015.7 | 371.5 | 29.0 |
| 7/19/94 | 9:00 | -3.81 | -30.22 | 353.84 | 387.04 | 26.74 | -0.24 | | 1016.2 | 369.4 | 27.2 |
| 7/19/94 | 10:00 | -3.81 | -30.00 | 353.94 | 385.10 | 26.55 | -0.46 | | 1017.0 | 364.3 | 21.0 |
| 7/19/94 | 11:00 | -3.81 | -29.78 | 353.83 | 386.37 | 26.50 | -0.30 | | 1017.4 | 368.3 | 24.7 |
| 7/19/94 | 12:00 | -3.84 | -29.56 | 353.83 | 386.16 | 26.31 | 0.13 | | 1017.6 | 375.6 | 32.4 |
| 7/19/94 | 13:00 | -3.85 | -29.35 | 353.77 | 389.87 | 26.37 | -0.29 | | 1017.2 | 371.9 | 29.1 |
| 7/19/94 | 14:00 | -3.87 | -29.13 | 353.81 | 391.51 | 26.21 | -0.48 | | 1016.7 | 370.2 | 27.6 |
| 7/19/94 | 15:00 | -3.88 | -28.91 | 353.81 | 391.47 | 26.09 | -0.47 | | 1016.2 | 370.2 | 27.3 |
| 7/19/94 | 16:00 | -3.89 | -28.70 | 354.06 | 390.62 | 25.74 | -0.53 | | 1015.4 | 368.4 | 26.2 |
| 7/19/94 | 17:00 | -3.90 | -28.49 | 354.12 | 387.66 | 25.80 | -0.29 | | 1015.2 | 369.6 | 27.4 |
| 7/19/94 | 19:00 | -3.91 | -28.07 | 354.15 | 388.64 | 25.96 | -0.27 | | 1015.7 | 370.8 | 27.8 |
| 7/19/94 | 20:00 | -3.91 | -27.85 | 354.14 | 388.56 | 26.04 | -0.25 | | 1016.0 | 371.2 | 27.9 |
| 7/19/94 | 21:00 | -3.91 | -27.64 | 354.08 | 387.42 | 26.14 | -0.24 | | 1016.1 | 370.2 | 27.1 |
| 7/19/94 | 22:00 | -3.91 | -27.42 | 354.12 | 388.89 | 26.15 | -0.29 | | 1016.7 | 371.0 | 27.6 |
| 7/19/94 | 23:00 | -3.91 | -27.21 | 354.24 | 391.14 | 26.15 | -0.30 | | 1017.0 | 373.1 | 30.1 |
| 7/20/91 | 0:00 | -3.92 | -26.99 | 354.26 | 389.52 | 26.16 | -0.29 | | 1017.2 | 371.7 | 28.5 |
| 7/20/91 | 1:00 | -3.93 | -26.78 | 354.28 | 387.22 | 26.21 | -0.28 | | 1017.0 | 369.6 | 26.7 |
| 7/20/91 | 2:00 | -3.93 | -26.56 | 354.28 | 387.26 | 26.25 | -0.19 | | 1016.8 | 371.1 | 27.8 |
| 7/20/91 | 3:00 | -3.94 | -26.35 | 354.31 | 385.20 | 26.28 | -0.18 | | 1016.2 | 368.9 | 25.5 |
| 7/20/91 | 4:00 | -3.95 | -26.13 | 354.25 | 383.93 | 26.30 | -0.18 | | 1015.7 | 367.6 | 24.9 |
| 7/20/91 | 5:00 | -3.95 | -25.91 | 354.30 | 384.59 | 26.32 | -0.18 | | 1015.5 | 368.2 | 25.6 |
| 7/20/91 | 6:00 | -3.96 | -25.70 | 354.32 | 383.31 | 26.28 | -0.24 | | 1015.6 | 366.0 | 23.3 |
| 7/20/91 | 7:00 | -3.97 | -25.48 | 354.37 | 375.60 | 26.06 | -0.31 | | 1015.8 | 357.8 | 14.9 |
| 7/20/91 | 8:00 | -3.97 | -25.27 | 354.38 | 395.55 | 26.04 | -0.14 | | 1016.0 | 379.8 | 36.8 |
| 7/20/91 | 9:00 | -3.99 | -25.05 | 354.26 | 404.53 | 26.07 | 0.07 | 35.91 | 1016.4 | 392.2 | 49.3 |
| 7/20/91 | 10:00 | -4.00 | -25.00 | 354.31 | 414.20 | 26.08 | 0.26 | | 1017.1 | 405.2 | 62.4 |

NOAA South Atlantic 1991 Underway Values

Leg 1 Carbon and Related Parameters

| Date | Time | Lat [degrees] | Long [degrees] | XCO2,a [ppm] | XCO2,w [ppm] | SST [deg. C] | SST-Eq.T [deg. C] | Sal(CTD) | Pressure [mb] | fCO2, w [uatm] | fCO2,w-a [uatm] |
|---------|-------|------------------|-------------------|-----------------|-----------------|-----------------|----------------------|----------|------------------|-------------------|--------------------|
| 7/20/91 | 11:00 | -3.99 | -25.00 | 354.16 | 440.25 | 26.10 | 0.53 | | 1017.1 | 435.9 | 93.1 |
| 7/22/91 | 0:00 | -8.19 | -24.99 | | 356.86 | 26.20 | -0.21 | | 1017.4 | 341.8 | |
| 7/22/91 | 1:00 | -8.41 | -24.99 | 353.63 | 359.98 | 26.03 | -0.39 | | 1017.4 | 342.2 | -1.1 |
| 7/22/91 | 2:00 | -8.63 | -24.99 | 353.62 | 361.87 | 25.99 | -0.42 | | 1017.3 | 343.5 | 0.1 |
| 7/22/91 | 3:00 | -8.85 | -25.00 | 353.68 | 363.98 | 25.93 | -0.48 | | 1017.0 | 344.4 | 1.0 |
| 7/22/91 | 4:00 | -9.00 | -25.00 | 353.57 | 362.03 | 25.86 | -0.56 | 36.53 | 1016.9 | 341.4 | -1.9 |
| 7/22/91 | 5:00 | -9.00 | -25.01 | 353.66 | 362.76 | 25.85 | -0.56 | | 1016.7 | 342.0 | -1.4 |
| 7/22/91 | 6:00 | -9.21 | -25.01 | 353.58 | 362.61 | 25.82 | -0.38 | | 1016.9 | 344.8 | 1.4 |
| 7/22/91 | 7:00 | -9.43 | -25.02 | 353.65 | 363.37 | 25.77 | -0.37 | | 1017.1 | 345.7 | 2.3 |
| 7/22/91 | 8:00 | -9.66 | -25.02 | 353.64 | 363.63 | 25.56 | -0.51 | | 1017.5 | 344.1 | 0.5 |
| 7/22/91 | 9:00 | -9.88 | -25.02 | 353.75 | 364.24 | 25.59 | -0.28 | | 1018.8 | 348.8 | 4.1 |
| 7/22/91 | 10:00 | -10.10 | -25.01 | 353.77 | 364.96 | 25.59 | -0.36 | | 1019.3 | 348.4 | 4.2 |
| 7/22/91 | 11:00 | -10.33 | -25.00 | 353.73 | 362.79 | 25.60 | -0.34 | | 1020.2 | 346.9 | 2.0 |
| 7/22/91 | 12:00 | -10.54 | -25.01 | 353.80 | 363.41 | 25.65 | -0.29 | | 1020.3 | 348.3 | 3.6 |
| 7/22/91 | 13:00 | -10.54 | -25.02 | 353.47 | 363.71 | 25.67 | -0.37 | | 1019.9 | 347.2 | 2.9 |
| 7/22/91 | 14:00 | -10.68 | -25.02 | 353.67 | 363.97 | 25.67 | -0.41 | | 1019.0 | 346.5 | 2.3 |
| 7/22/91 | 15:00 | -10.91 | -25.01 | 353.48 | 364.33 | 25.62 | -0.41 | 36.84 | 1018.2 | 346.5 | 2.7 |
| 7/22/91 | 16:00 | -11.00 | -25.01 | 353.63 | 364.15 | 25.51 | -0.46 | | 1017.5 | 345.5 | 1.9 |
| 7/22/91 | 17:00 | -11.00 | -25.02 | 353.95 | 363.73 | 25.51 | -0.41 | | 1017.0 | 345.6 | 1.8 |
| 7/22/91 | 18:00 | -11.00 | -25.03 | 353.94 | 364.05 | 25.51 | -0.41 | | 1017.0 | 345.9 | 1.4 |
| 7/22/91 | 19:00 | -11.00 | -25.04 | 353.94 | 363.69 | 25.48 | -0.43 | | 1017.3 | 345.4 | 1.6 |
| 7/22/91 | 20:00 | -11.01 | -25.04 | 354.36 | 363.16 | 25.47 | -0.41 | | 1017.9 | 345.4 | 0.9 |
| 7/22/91 | 21:00 | -11.01 | -25.05 | 353.90 | 362.81 | 25.48 | -0.39 | | 1018.1 | 345.5 | 1.4 |
| 7/22/91 | 22:00 | -11.17 | -25.05 | 354.28 | 362.93 | 25.41 | -0.45 | | 1018.4 | 344.8 | 0.2 |
| 7/22/91 | 23:00 | -11.39 | -25.04 | 353.78 | 361.89 | 25.31 | -0.45 | | 1019.0 | 344.1 | -0.3 |
| 7/23/91 | 0:00 | -11.61 | -25.03 | 354.07 | 363.13 | 25.35 | -0.30 | | 1019.3 | 347.6 | 2.9 |
| 7/23/91 | 1:00 | -11.83 | -25.02 | 354.02 | 363.08 | 25.28 | -0.42 | | 1019.3 | 345.8 | 1.1 |
| 7/23/91 | 2:00 | -12.05 | -25.02 | 354.09 | 362.23 | 25.19 | -0.46 | | 1019.2 | 344.4 | -0.4 |
| 7/23/91 | 3:00 | -12.28 | -25.02 | 354.12 | 361.20 | 25.09 | -0.45 | | 1018.8 | 343.4 | -2.1 |
| 7/23/91 | 4:00 | -12.51 | -25.01 | 354.13 | 361.01 | 25.10 | -0.38 | | 1018.1 | 344.2 | -0.7 |
| 7/23/91 | 5:00 | -12.74 | -25.01 | 354.29 | 358.76 | 24.91 | -0.55 | | 1017.8 | 339.4 | -5.4 |
| 7/23/91 | 6:00 | -12.96 | -25.01 | 354.38 | 359.20 | 24.95 | -0.28 | 37.01 | 1018.2 | 344.1 | -1.0 |
| 7/23/91 | 7:00 | -13.00 | -25.02 | 354.47 | 359.84 | 24.97 | -0.34 | | 1018.8 | 344.0 | -1.9 |
| 7/23/91 | 8:00 | -13.05 | -25.02 | 354.47 | 358.84 | 24.97 | -0.38 | | 1019.3 | 342.6 | -3.4 |
| 7/23/91 | 9:00 | -13.28 | -25.01 | 354.62 | 358.87 | 24.93 | -0.41 | | 1019.9 | 342.4 | -3.5 |
| 7/23/91 | 10:00 | -13.51 | -25.00 | 354.52 | 357.96 | 25.00 | -0.31 | | 1021.1 | 343.5 | -3.0 |
| 7/23/91 | 11:00 | -13.74 | -24.99 | 354.46 | 358.86 | 24.92 | -0.40 | | 1021.7 | 343.2 | -3.3 |
| 7/23/91 | 12:00 | -13.96 | -24.99 | 354.48 | 358.92 | 24.84 | -0.41 | | 1021.6 | 343.1 | -3.3 |
| 7/23/91 | 13:00 | -13.95 | -25.01 | 354.29 | 358.70 | 24.83 | -0.43 | | 1021.3 | 342.5 | -3.5 |
| 7/23/91 | 14:00 | -14.07 | -25.02 | 354.00 | 358.81 | 24.87 | -0.38 | | 1020.6 | 343.2 | -2.3 |
| 7/23/91 | 15:00 | -14.29 | -25.01 | 353.85 | 359.32 | 24.70 | -0.59 | | 1020.0 | 340.2 | -5.0 |
| 7/23/91 | 16:00 | -14.51 | -25.00 | 354.01 | 357.73 | 24.47 | -0.50 | | 1019.4 | 340.0 | -5.0 |
| 7/23/91 | 17:00 | -14.74 | -25.00 | 353.88 | 359.13 | 24.45 | -0.42 | | 1019.0 | 342.5 | -2.3 |
| 7/23/91 | 18:00 | -14.97 | -25.00 | 353.84 | 359.86 | 24.43 | -0.41 | 37.08 | 1019.3 | 343.4 | -1.4 |
| 7/23/91 | 19:00 | -15.00 | -25.01 | 353.83 | 360.09 | 24.41 | -0.43 | | 1020.0 | 343.6 | -1.6 |
| 7/23/91 | 20:00 | -15.01 | -25.02 | 353.87 | 359.59 | 24.40 | -0.43 | | 1020.5 | 343.4 | -2.0 |
| 7/23/91 | 21:00 | -15.01 | -25.03 | 354.33 | 358.73 | 24.40 | -0.41 | | 1020.8 | 342.9 | -3.1 |
| 7/23/91 | 22:00 | -15.02 | -25.03 | 354.76 | 358.15 | 24.41 | -0.40 | | 1021.6 | 342.8 | -3.9 |
| 7/23/91 | 23:00 | -15.02 | -25.03 | 354.00 | 358.09 | 24.40 | -0.41 | | 1021.8 | 342.6 | -3.5 |
| 7/24/91 | 0:00 | -15.13 | -25.04 | 354.00 | 358.01 | 24.36 | -0.45 | | 1021.7 | 342.0 | -4.0 |
| 7/24/91 | 1:00 | -15.36 | -25.03 | 354.00 | 358.76 | 24.29 | -0.41 | | 1021.6 | 343.3 | -2.8 |
| 7/24/91 | 2:00 | -15.59 | -25.02 | 353.86 | 358.86 | 24.09 | -0.54 | | 1021.4 | 341.4 | -4.6 |
| 7/24/91 | 3:00 | -15.82 | -25.02 | 353.90 | 363.01 | 24.02 | -0.42 | | 1021.1 | 347.1 | 1.2 |
| 7/24/91 | 4:00 | -16.05 | -25.01 | 354.14 | 362.63 | 23.99 | -0.38 | | 1020.7 | 347.3 | 1.1 |
| 7/24/91 | 5:00 | -16.28 | -25.00 | 354.06 | 362.91 | 23.85 | -0.47 | | 1020.5 | 346.3 | 0.2 |
| 7/24/91 | 6:00 | -16.51 | -25.00 | 354.13 | 362.67 | 23.84 | -0.38 | | 1020.6 | 347.5 | 1.3 |
| 7/24/91 | 7:00 | -16.74 | -25.00 | 354.21 | 362.87 | 23.80 | -0.43 | | 1020.8 | 346.9 | 0.6 |
| 7/24/91 | 8:00 | -16.97 | -25.00 | 354.24 | 361.26 | 23.78 | -0.38 | 37.17 | 1021.2 | 346.3 | -0.2 |
| 7/24/91 | 14:00 | -16.98 | -24.99 | 355.29 | 365.39 | 23.78 | -0.40 | | 1021.7 | 350.1 | 2.7 |
| 7/24/91 | 15:00 | -17.11 | -25.00 | 355.48 | 365.98 | 23.77 | -0.46 | | 1020.7 | 349.4 | 2.2 |
| 7/24/91 | 16:00 | -17.35 | -24.99 | 354.90 | 365.54 | 23.77 | -0.40 | | 1019.9 | 349.6 | 3.1 |

NOAA South Atlantic 1991 Underway Values

Leg 1 Carbon and Related Parameters

| Date | Time | Lat [degrees] | Long [degrees] | XCO2,a [ppm] | XCO2,w [ppm] | SST [deg. C] | SST-Eq.T [deg. C] | Sai(CTD) | Pressure [mb] | fCO2, w [uatm] | fCO2,w-a [uatm] |
|---------|-------|------------------|-------------------|-----------------|-----------------|-----------------|----------------------|----------|------------------|-------------------|--------------------|
| 7/24/91 | 17:00 | -17.59 | -24.98 | 354.85 | 365.53 | 23.65 | -0.52 | | 1019.6 | 347.6 | 1.4 |
| 7/24/91 | 18:00 | -17.82 | -24.98 | 354.56 | 365.87 | 23.60 | -0.47 | | 1019.9 | 349.0 | 2.9 |
| 7/24/91 | 19:00 | -18.06 | -24.98 | 354.60 | 365.66 | 23.45 | -0.58 | | 1020.7 | 347.4 | 0.7 |
| 7/24/91 | 20:00 | -18.30 | -24.98 | 354.75 | 365.87 | 23.28 | -0.53 | | 1021.3 | 348.6 | 1.3 |
| 7/24/91 | 21:00 | -18.53 | -24.98 | 354.55 | 365.29 | 23.14 | -0.52 | | 1021.9 | 348.5 | 1.2 |
| 7/24/91 | 22:00 | -18.77 | -24.99 | 354.58 | 366.35 | 23.17 | -0.35 | | 1022.6 | 352.5 | 5.0 |
| 7/24/91 | 23:00 | -19.00 | -25.00 | 354.55 | 365.54 | 23.18 | -0.37 | 37.00 | 1023.1 | 351.6 | 3.8 |
| 7/25/91 | 0:00 | -19.00 | -25.00 | 354.54 | 363.83 | 23.17 | -0.42 | | 1023.4 | 349.3 | 1.3 |
| 7/25/91 | 6:00 | -19.43 | -25.01 | 354.80 | 363.54 | 23.03 | -0.37 | | 1022.8 | 349.7 | 1.5 |
| 7/25/91 | 12:00 | -20.24 | -25.01 | 354.55 | 360.42 | 22.68 | -0.37 | | 1025.5 | 347.8 | -1.5 |
| 7/25/91 | 17:00 | -21.35 | -24.99 | 354.21 | 361.46 | 22.94 | -0.35 | | 1023.4 | 348.2 | 0.6 |
| 7/26/91 | 1:00 | -22.00 | -25.00 | 354.15 | 359.34 | 22.94 | -0.37 | 36.98 | 1025.3 | 346.6 | -1.8 |
| 7/26/91 | 6:00 | -23.02 | -25.01 | 354.20 | 351.11 | 22.35 | -0.36 | | 1024.9 | 339.0 | -9.7 |
| 7/26/91 | 13:00 | -24.02 | -24.99 | 354.10 | 350.05 | 22.07 | -0.30 | | 1027.1 | 339.7 | -8.7 |
| 7/26/91 | 18:00 | -25.21 | -25.00 | 353.81 | 341.03 | 21.56 | -0.57 | 36.71 | 1026.1 | 326.9 | -21.4 |
| 7/27/91 | 0:00 | -26.00 | -24.99 | 353.85 | 337.46 | 21.22 | -0.37 | | 1028.0 | 327.3 | -22.3 |
| 7/27/91 | 6:00 | -26.89 | -25.00 | 353.65 | 340.81 | 21.04 | -0.30 | | 1028.2 | 331.7 | -18.6 |
| 7/27/91 | 12:00 | -27.57 | -25.86 | 354.05 | 332.33 | 20.87 | -0.33 | | 1032.5 | 324.5 | -27.6 |
| 7/27/91 | 18:00 | -28.17 | -26.72 | 353.62 | 332.53 | 21.05 | -0.31 | | 1031.7 | 324.6 | -27.1 |
| 7/28/91 | 0:00 | -29.08 | -27.90 | 353.56 | 328.29 | 20.94 | -0.35 | | 1034.1 | 320.7 | -32.2 |
| 7/28/91 | 6:24 | -29.50 | -28.50 | 353.73 | 326.84 | 20.39 | -0.32 | 36.18 | 1033.5 | 319.7 | -33.3 |
| 7/28/91 | 11:00 | -30.18 | -29.43 | 353.92 | 327.81 | 19.85 | -0.43 | | 1035.4 | 320.0 | -33.8 |
| 7/28/91 | 12:00 | -30.31 | -29.63 | 354.16 | 327.45 | 19.64 | -0.04 | | 1035.6 | 325.4 | -28.8 |
| 7/28/91 | 13:00 | -30.31 | -29.64 | 354.21 | 327.16 | 19.65 | -0.32 | | 1034.9 | 320.8 | -32.7 |
| 7/28/91 | 14:00 | -30.46 | -29.85 | 354.21 | 327.07 | 19.75 | -0.20 | | 1034.3 | 322.3 | -31.1 |
| 7/28/91 | 15:00 | -30.61 | -30.06 | 354.08 | 327.87 | 19.60 | | | 1033.7 | 325.7 | |
| 7/28/91 | 17:00 | -30.93 | -30.49 | 354.16 | 327.39 | 19.25 | -0.47 | | 1033.8 | 318.7 | -34.7 |
| 7/28/91 | 18:00 | -31.08 | -30.70 | 354.13 | 325.76 | 19.25 | -0.27 | | 1034.0 | 320.2 | -33.3 |
| 7/28/91 | 19:00 | -31.24 | -30.92 | 354.17 | 324.82 | 19.15 | -0.33 | | 1033.9 | 318.3 | -35.1 |
| 7/28/91 | 20:00 | -31.40 | -31.13 | 354.19 | 323.97 | 19.21 | -0.17 | | 1034.1 | 319.8 | -33.8 |
| 7/28/91 | 21:00 | -31.56 | -31.35 | 354.15 | 323.94 | 19.37 | -0.09 | | 1034.1 | 320.9 | -32.6 |
| 7/28/91 | 22:00 | -31.72 | -31.56 | 354.12 | 323.52 | 19.26 | -0.38 | | 1034.0 | 316.3 | -37.2 |
| 7/28/91 | 23:00 | -31.87 | -31.78 | 354.16 | 322.93 | 19.11 | -0.44 | | 1034.0 | 315.0 | -38.3 |
| 7/29/91 | 0:00 | -32.00 | -31.99 | 354.17 | 321.95 | 19.01 | -0.37 | 35.88 | 1033.9 | 315.0 | -38.2 |
| 7/29/91 | 1:00 | -31.99 | -31.99 | 354.16 | 322.02 | 18.78 | -0.34 | | 1033.4 | 315.4 | -37.8 |
| 7/29/91 | 2:00 | -31.99 | -31.98 | 354.14 | 321.68 | 18.77 | -0.30 | | 1033.3 | 315.7 | -37.4 |
| 7/29/91 | 3:00 | -31.99 | -31.96 | 354.14 | 321.54 | 18.79 | -0.26 | | 1032.7 | 315.8 | -37.1 |
| 7/29/91 | 4:00 | -32.06 | -31.95 | 354.27 | 321.90 | 18.98 | -0.13 | | 1031.8 | 317.7 | -34.9 |
| 7/29/91 | 5:00 | -32.30 | -31.96 | 354.20 | 322.34 | 18.70 | -0.61 | | 1031.6 | 311.4 | -41.1 |
| 7/29/91 | 6:00 | -32.54 | -31.97 | 354.11 | 320.56 | 18.01 | -0.36 | | 1031.5 | 313.4 | -39.0 |
| 7/29/91 | 7:00 | -32.78 | -31.98 | 354.08 | 319.70 | 17.66 | -0.46 | | 1031.6 | 311.4 | -41.0 |
| 7/29/91 | 8:00 | -33.01 | -31.98 | 354.09 | 318.98 | 17.06 | -0.82 | | 1031.6 | 305.9 | -46.7 |
| 7/29/91 | 9:00 | -33.24 | -31.99 | 354.07 | 319.37 | 16.70 | -0.32 | | 1031.7 | 313.4 | -39.1 |
| 7/29/91 | 10:00 | -33.48 | -32.01 | 354.04 | 320.44 | 16.65 | -0.31 | | 1031.4 | 314.6 | -37.8 |
| 7/29/91 | 11:00 | -33.72 | -32.01 | 353.96 | 320.05 | 16.65 | -0.18 | | 1031.4 | 315.9 | -36.3 |
| 7/29/91 | 12:00 | -33.95 | -32.00 | 354.05 | 320.69 | 16.59 | -0.28 | | 1031.5 | 315.3 | -37.1 |
| 7/29/91 | 13:00 | -34.00 | -32.00 | 353.86 | 319.83 | 16.43 | -0.26 | 35.47 | 1031.2 | 314.5 | -37.5 |
| 7/29/91 | 14:00 | -34.00 | -32.00 | 353.72 | 318.39 | 16.44 | -0.26 | | 1030.6 | 313.0 | -38.7 |
| 7/29/91 | 15:00 | -34.00 | -31.99 | 353.88 | 318.61 | 16.46 | -0.24 | | 1029.9 | 313.2 | -38.4 |
| 7/29/91 | 16:00 | -34.17 | -32.00 | 353.99 | 318.93 | 16.48 | -0.24 | | 1029.5 | 313.4 | -38.1 |
| 7/29/91 | 17:00 | -34.40 | -32.00 | 353.96 | 319.25 | 16.39 | -0.34 | | 1029.1 | 312.2 | -39.3 |
| 7/29/91 | 18:00 | -34.64 | -32.00 | 353.83 | 318.58 | 16.52 | -0.07 | | 1028.7 | 315.2 | -36.0 |
| 7/29/91 | 19:00 | -34.88 | -31.99 | 353.98 | 319.82 | 16.49 | -0.27 | | 1028.5 | 313.6 | -38.0 |
| 7/29/91 | 20:00 | -35.12 | -31.99 | 353.89 | 319.10 | 16.02 | -0.73 | | 1028.0 | 306.5 | -44.8 |
| 7/29/91 | 21:00 | -35.35 | -31.99 | 353.86 | 319.18 | 15.71 | -0.44 | | 1027.7 | 310.6 | -40.5 |
| 7/29/91 | 22:00 | -35.59 | -32.00 | 353.78 | 318.34 | 15.52 | -0.76 | | 1027.3 | 305.3 | -45.7 |
| 7/29/91 | 23:00 | -35.82 | -32.01 | 353.75 | 318.77 | 15.43 | -0.27 | 35.45 | 1026.6 | 312.3 | -38.6 |
| 7/30/91 | 0:00 | -36.00 | -32.00 | 353.80 | 318.82 | 15.50 | -0.16 | | 1026.5 | 313.8 | -37.0 |
| 7/30/91 | 1:00 | -36.01 | -32.00 | 353.96 | 319.40 | 15.60 | -0.24 | | 1026.4 | 313.2 | -37.8 |
| 7/30/91 | 2:00 | -36.02 | -32.01 | 353.51 | 317.95 | 15.60 | -0.25 | | 1026.5 | 311.7 | -38.9 |
| 7/30/91 | 3:00 | -36.02 | -32.01 | 353.71 | 317.92 | 15.60 | -0.25 | | 1026.3 | 311.6 | -39.0 |

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Leg 1 Carbon and Related Parameters

| Date | Time | Lat [degrees] | Long [degrees] | XCO _{2,a} [ppm] | XCO _{2,w} [ppm] | SST [deg. C] | SST-Eq.T [deg. C] | Sal(CTD) | Pressure [mb] | fCO _{2, w} [uatm] | fCO _{2,w-a} [uatm] |
|---------|-------|------------------|-------------------|-----------------------------|-----------------------------|-----------------|----------------------|----------|------------------|-------------------------------|--------------------------------|
| 7/30/91 | 6:00 | -36.58 | -32.00 | 353.89 | 318.89 | 15.47 | -0.07 | | 1024.2 | 314.5 | -35.8 |
| 7/30/91 | 7:00 | -36.82 | -32.00 | 354.07 | 319.64 | 15.37 | -0.29 | | 1023.8 | 312.0 | -38.2 |
| 7/30/91 | 8:00 | -37.05 | -32.00 | 353.96 | 320.35 | 15.37 | -0.12 | | 1023.3 | 315.0 | -34.9 |
| 7/30/91 | 9:00 | -37.28 | -32.00 | 354.06 | 320.84 | 15.14 | -0.29 | | 1022.9 | 313.0 | -36.8 |
| 7/30/91 | 10:00 | -37.52 | -32.00 | 353.87 | 322.08 | 15.12 | -0.24 | | 1022.5 | 314.8 | -34.7 |
| 7/30/91 | 11:00 | -37.75 | -32.00 | 353.78 | 320.52 | 15.10 | -0.23 | | 1022.3 | 313.4 | -36.0 |
| 7/30/91 | 12:00 | -37.98 | -32.00 | 353.73 | 321.11 | 15.02 | -0.27 | | 1022.4 | 313.5 | -35.9 |
| 7/30/91 | 13:00 | -38.01 | -32.00 | 353.73 | 321.17 | 15.00 | -0.24 | 35.37 | 1022.0 | 313.9 | -35.4 |
| 7/30/91 | 14:00 | -38.03 | -31.99 | 353.70 | 321.65 | 15.00 | -0.28 | | 1021.1 | 313.5 | -35.4 |
| 7/30/91 | 15:00 | -38.03 | -31.98 | | 321.93 | 15.01 | -0.25 | | 1020.9 | 314.1 | |
| 7/30/91 | 16:00 | -38.15 | -31.96 | | 322.63 | 14.92 | -0.35 | | 1019.8 | 313.0 | |
| 7/30/91 | 17:00 | -38.39 | -31.97 | 354.68 | 322.46 | 14.68 | -0.42 | | 1019.5 | 311.9 | -37.4 |
| 7/30/91 | 18:00 | -38.62 | -31.98 | 353.63 | 322.59 | 14.85 | -0.21 | | 1019.0 | 314.8 | -33.4 |
| 7/30/91 | 19:00 | -38.86 | -31.98 | 353.55 | 322.71 | 14.99 | -0.10 | | 1018.5 | 316.2 | -31.7 |
| 7/30/91 | 20:00 | -39.09 | -31.98 | 353.60 | 323.42 | 14.95 | -0.24 | | 1017.7 | 314.7 | -33.0 |
| 7/30/91 | 21:00 | -39.33 | -31.98 | 353.60 | 321.62 | 14.96 | -0.20 | | 1016.6 | 313.2 | -34.2 |
| 7/30/91 | 22:00 | -39.57 | -31.98 | 353.75 | 321.55 | 15.11 | -0.07 | | 1015.6 | 314.5 | -32.6 |
| 7/30/91 | 23:00 | -39.81 | -31.98 | 353.66 | 323.47 | 14.86 | -0.46 | | 1014.7 | 310.8 | -35.9 |
| 7/31/91 | 0:00 | -40.00 | -32.00 | 353.73 | 325.77 | 13.75 | -0.55 | 35.18 | 1014.6 | 312.0 | -35.0 |
| 7/31/91 | 1:00 | -40.02 | -31.99 | 353.75 | 325.22 | 14.47 | -0.24 | | 1014.0 | 315.5 | -31.2 |
| 7/31/91 | 2:00 | -40.03 | -31.99 | 353.55 | 327.53 | 14.51 | -0.20 | | 1013.5 | 318.1 | -28.2 |
| 7/31/91 | 3:00 | -40.04 | -31.98 | 353.68 | 328.25 | 14.30 | -0.47 | | 1013.2 | 314.9 | -31.4 |
| 7/31/91 | 4:00 | -40.11 | -31.98 | 353.72 | 327.54 | 14.04 | -0.52 | | 1011.9 | 313.1 | -32.8 |
| 7/31/91 | 5:00 | -40.35 | -31.98 | 353.76 | 328.23 | 12.72 | -0.47 | | 1009.6 | 314.2 | -31.5 |
| 7/31/91 | 6:00 | -40.58 | -31.99 | 353.69 | 326.44 | 12.46 | -0.23 | | 1008.6 | 315.6 | -29.8 |
| 7/31/91 | 7:00 | -40.82 | -32.01 | 353.58 | 324.39 | 12.20 | -0.33 | | 1007.6 | 312.0 | -33.0 |
| 7/31/91 | 8:00 | -41.04 | -32.02 | 353.62 | 326.58 | 12.13 | -0.57 | | 1006.8 | 310.6 | -34.1 |
| 7/31/91 | 9:00 | -41.28 | -32.04 | 353.68 | 335.18 | 12.34 | -0.05 | | 1005.6 | 325.8 | -18.7 |
| 7/31/91 | 10:00 | -41.51 | -32.03 | 353.73 | 330.89 | 12.20 | -0.64 | | 1004.8 | 313.1 | -31.0 |
| 7/31/91 | 11:00 | -41.74 | -32.01 | 353.69 | 333.45 | 11.41 | -0.97 | | 1004.9 | 310.9 | -33.3 |
| 7/31/91 | 12:00 | -41.97 | -32.00 | 353.80 | 341.74 | 12.18 | -0.20 | | 1005.9 | 330.0 | -14.7 |
| 7/31/91 | 13:00 | -42.00 | -32.01 | 353.91 | 345.02 | 12.12 | -0.51 | 35.07 | 1006.1 | 328.8 | -16.0 |
| 7/31/91 | 14:00 | -42.01 | -32.02 | 354.03 | 344.61 | 12.08 | -0.54 | | 1006.1 | 327.9 | -17.1 |
| 7/31/91 | 15:00 | -42.02 | -32.03 | 354.36 | 344.32 | 12.06 | -0.52 | | 1006.6 | 328.0 | -17.6 |
| 7/31/91 | 16:00 | -42.03 | -32.03 | 354.51 | 344.20 | 12.06 | -0.50 | | 1007.3 | 328.5 | -17.5 |
| 7/31/91 | 17:00 | -42.03 | -32.04 | 354.69 | 344.39 | 12.04 | -0.51 | | 1007.9 | 328.7 | -17.6 |
| 7/31/91 | 18:00 | -42.03 | -32.05 | 354.71 | 343.83 | 12.07 | -0.46 | | 1009.3 | 329.4 | -17.5 |
| 7/31/91 | 22:00 | -41.90 | -32.75 | 353.98 | 357.98 | 11.37 | -0.64 | | 1012.5 | 341.5 | -6.1 |
| 7/31/91 | 23:00 | -41.86 | -32.93 | 354.04 | 339.49 | 11.97 | -0.05 | | 1013.1 | 332.6 | -15.3 |
| 8/1/91 | 0:00 | -41.82 | -33.12 | 354.14 | 329.51 | 12.14 | -0.49 | | 1013.1 | 316.5 | -31.3 |
| 8/1/91 | 1:00 | -41.79 | -33.30 | 354.05 | 326.63 | 11.87 | -0.73 | | 1013.4 | 310.5 | -37.3 |
| 8/1/91 | 2:00 | -41.76 | -33.48 | 354.07 | 327.29 | 11.68 | -0.77 | | 1013.0 | 310.4 | -37.3 |
| 8/1/91 | 3:00 | -41.73 | -33.66 | 354.01 | 326.74 | 11.47 | -0.76 | | 1013.0 | 310.2 | -37.4 |
| 8/1/91 | 4:00 | -41.70 | -33.85 | 353.96 | 326.45 | 12.15 | -0.23 | | 1012.5 | 316.9 | -30.5 |
| 8/1/91 | 5:00 | -41.67 | -34.03 | 354.02 | 324.85 | 12.14 | -0.51 | | 1012.2 | 311.3 | -36.1 |
| 8/1/91 | 6:00 | -41.63 | -34.22 | 353.98 | 324.96 | 11.75 | -0.56 | | 1011.7 | 310.7 | -36.5 |
| 8/1/91 | 7:00 | -41.58 | -34.44 | 353.85 | 325.77 | 11.11 | -0.74 | | 1011.3 | 309.0 | -37.9 |
| 8/1/91 | 8:00 | -41.53 | -34.69 | 353.89 | 328.82 | 11.39 | -0.46 | | 1011.1 | 315.7 | -31.1 |
| 8/1/91 | 9:00 | -41.49 | -34.94 | 353.81 | 326.08 | 11.42 | -0.70 | | 1011.0 | 309.8 | -37.0 |
| 8/1/91 | 10:00 | -41.44 | -35.19 | 353.76 | 324.97 | 10.95 | -0.84 | | 1010.4 | 306.7 | -39.8 |
| 8/1/91 | 11:00 | -41.40 | -35.43 | 353.79 | 328.21 | 11.41 | -0.38 | | 1009.1 | 315.6 | -30.4 |
| 8/1/91 | 12:00 | -41.36 | -35.68 | 353.76 | 324.96 | 11.61 | -0.47 | | 1008.3 | 310.9 | -34.7 |
| 8/1/91 | 13:00 | -41.33 | -35.93 | 353.78 | 326.06 | 12.13 | -0.17 | | 1007.2 | 315.7 | -29.5 |
| 8/1/91 | 14:00 | -41.29 | -36.18 | 353.84 | 324.59 | 11.65 | -0.69 | | 1005.3 | 306.7 | -38.0 |
| 8/1/91 | 14:54 | -41.25 | -36.44 | 353.83 | 325.08 | 11.81 | | | 1003.3 | | |
| 8/1/91 | 16:00 | -39.96 | -41.65 | 353.69 | 326.91 | 15.43 | | | 1002.3 | 316.8 | -27.5 |

NOAA South Atlantic 1991 Underway Values

Leg 2 Carbon and Related Parameters

| Date | Time | Lat [degrees] | Long [degrees] | XCO2,a [ppm] | XCO2,w [ppm] | SST [deg. C] | SST-Eq.T [deg. C] | Sal(TSG) | Pressure [mb] | fCO2, w [uatm] | fCO2,w-a [uatm] |
|---------|-------|------------------|-------------------|-----------------|-----------------|-----------------|----------------------|----------|------------------|-------------------|--------------------|
| 8/14/91 | 00:00 | | | 353.18 | 284.46 | 10.33 | -0.49 | | 1026.1 | 277.1 | -74.4 |
| 8/14/91 | 01:00 | | | 353.90 | 325.96 | 10.40 | -0.33 | | 1026.1 | 319.9 | -32.4 |
| 8/14/91 | 02:00 | | | 353.88 | 263.26 | 10.51 | -0.53 | | 1026.1 | 255.9 | -96.2 |
| 8/14/91 | 03:00 | -34.63 | -53.57 | 354.75 | 222.69 | 10.68 | -0.34 | | 1026.1 | 218.4 | -134.6 |
| 8/14/91 | 04:00 | -34.56 | -53.45 | 355.23 | 272.76 | 10.65 | -0.32 | | 1026.1 | 267.7 | -85.8 |
| 8/14/91 | 05:00 | -34.50 | -53.33 | 353.95 | 311.56 | 10.57 | -0.37 | | 1026.5 | 305.3 | -47.1 |
| 8/14/91 | 06:00 | -34.44 | -53.21 | 352.81 | 340.61 | 10.55 | -0.24 | | 1026.0 | 335.5 | -15.7 |
| 8/14/91 | 07:00 | -34.38 | -53.09 | 352.80 | 342.87 | 10.50 | -0.35 | | 1025.9 | 336.0 | -15.1 |
| 8/14/91 | 08:00 | -34.33 | -52.97 | 353.25 | 293.77 | 10.48 | -0.22 | | 1025.9 | 289.6 | -62.0 |
| 8/14/91 | 09:00 | -34.28 | -52.85 | 354.31 | 305.76 | 10.92 | -0.34 | | 1025.9 | 299.7 | -52.8 |
| 8/14/91 | 10:00 | -34.26 | -52.72 | 354.39 | 308.70 | 11.07 | -0.38 | | 1026.2 | 302.0 | -50.5 |
| 8/14/91 | 11:00 | -34.20 | -52.61 | 354.04 | 299.09 | 11.14 | -0.37 | | 1026.2 | 292.9 | -59.3 |
| 8/14/91 | 12:00 | -34.14 | -52.41 | 354.15 | 292.94 | 11.33 | -0.21 | | 1026.2 | 288.7 | -63.6 |
| 8/14/91 | 13:00 | -34.12 | -52.16 | 353.15 | 301.26 | 11.11 | -0.48 | | 1027.8 | 294.0 | -57.8 |
| 8/14/91 | 14:00 | -34.10 | -51.92 | 353.04 | 288.26 | 12.09 | -0.54 | | 1027.8 | 280.3 | -71.1 |
| 8/14/91 | 15:00 | -34.08 | -51.68 | 353.23 | 313.55 | 14.74 | -0.46 | | 1027.8 | 305.3 | -45.5 |
| 8/14/91 | 16:00 | -34.00 | -51.46 | 353.20 | 321.73 | 14.46 | 0.22 | 34.01 | 1027.6 | 322.7 | -28.3 |
| 8/14/91 | 17:00 | -33.93 | -51.31 | 353.16 | 323.71 | 13.40 | -0.38 | | 1027.6 | 316.6 | -34.5 |
| 8/14/91 | 18:00 | -33.85 | -51.15 | 353.25 | 323.60 | 13.06 | -0.71 | | 1027.2 | 311.7 | -39.3 |
| 8/14/91 | 19:00 | -33.74 | -50.94 | 353.40 | 324.42 | 16.72 | -0.39 | 34.51 | 1027.2 | 315.9 | -34.1 |
| 8/14/91 | 20:00 | -33.61 | -50.74 | 353.50 | 323.63 | 16.37 | -0.73 | | 1027.2 | 310.4 | -39.7 |
| 8/14/91 | 21:00 | -33.50 | -50.53 | 353.49 | 310.66 | 17.60 | -0.23 | | 1027.7 | 304.5 | -45.5 |
| 8/14/91 | 22:00 | -33.39 | -50.33 | 353.56 | 309.94 | 17.94 | -0.48 | 34.38 | 1027.7 | 300.3 | -49.5 |
| 8/14/91 | 23:00 | -33.28 | -50.12 | 353.49 | 325.90 | 19.46 | -0.25 | | 1029.3 | 319.0 | -30.7 |
| 8/15/91 | 00:00 | -33.17 | -49.92 | 353.48 | 324.30 | 19.42 | -0.48 | | 1029.5 | 314.2 | -35.5 |
| 8/15/91 | 01:00 | -33.07 | -49.71 | 353.50 | 322.72 | 19.38 | -0.44 | 36.25 | 1030.2 | 313.5 | -36.5 |
| 8/15/91 | 02:00 | -32.97 | -49.51 | 353.60 | 327.87 | 20.35 | -0.77 | | 1030.2 | 313.2 | -36.2 |
| 8/15/91 | 03:00 | -32.87 | -49.32 | 353.61 | 328.27 | 21.13 | -0.33 | | 1030.2 | 319.6 | -29.6 |
| 8/15/91 | 04:00 | -32.78 | -49.14 | 353.63 | 328.69 | 21.20 | -0.38 | 36.49 | 1030.2 | 319.3 | -29.9 |
| 8/15/91 | 05:00 | -32.68 | -48.98 | 353.61 | 331.09 | 21.34 | -0.41 | | 1031.2 | 321.5 | -28.0 |
| 8/15/91 | 06:00 | -32.60 | -48.85 | 353.53 | 327.99 | 20.62 | 0.00 | | 1031.2 | 324.6 | -25.3 |
| 8/15/91 | 07:00 | -32.53 | -48.72 | 353.51 | 325.08 | 21.03 | -0.14 | 36.57 | 1031.2 | 319.6 | -30.1 |
| 8/15/91 | 08:00 | -32.48 | -48.61 | 353.51 | 329.67 | 20.38 | -0.43 | | 1031.2 | 320.2 | -29.6 |
| 8/15/91 | 09:00 | -32.41 | -48.50 | 353.39 | 325.92 | 20.11 | -0.22 | | 1031.2 | 319.7 | -30.2 |
| 8/15/91 | 10:00 | -32.34 | -48.37 | 353.38 | 322.59 | 19.59 | -0.31 | 36.23 | 1031.2 | 315.4 | -34.7 |
| 8/15/91 | 11:00 | -32.26 | -48.25 | 353.54 | 321.21 | 19.43 | -0.47 | | 1031.2 | 311.9 | -38.4 |
| 8/15/91 | 12:00 | -32.16 | -48.10 | 353.51 | 320.01 | 19.46 | -0.17 | | 1031.2 | 314.8 | -35.6 |
| 8/15/91 | 13:00 | -32.07 | -47.94 | 353.52 | 319.70 | 18.57 | -0.31 | 36.08 | 1031.2 | 312.9 | -37.8 |
| 8/15/91 | 14:00 | -31.97 | -47.77 | 353.56 | 318.41 | 18.82 | -0.51 | | 1031.2 | 308.8 | -41.8 |
| 8/15/91 | 15:00 | -31.87 | -47.60 | 353.52 | 319.79 | 18.91 | -0.53 | 36.12 | 1031.2 | 309.8 | -40.7 |
| 8/15/91 | 16:00 | -31.77 | -47.44 | 353.44 | 320.39 | 19.02 | -0.75 | 36.18 | 1031.2 | 307.2 | -43.0 |
| 8/15/91 | 17:00 | -31.68 | -47.28 | 353.45 | 318.98 | 19.12 | -0.61 | | 1031.2 | 307.9 | -42.4 |
| 8/15/91 | 18:00 | -31.60 | -47.12 | 353.49 | 319.24 | 19.20 | -0.53 | 36.17 | 1033.8 | 310.0 | -41.3 |
| 8/15/91 | 19:00 | -31.52 | -46.97 | 353.55 | 312.81 | 18.83 | -0.50 | 36.17 | 1033.8 | 304.3 | -47.2 |
| 8/15/91 | 20:00 | -31.44 | -46.80 | 353.54 | 314.71 | 18.99 | -0.46 | | 1033.8 | 306.7 | -44.8 |
| 8/15/91 | 21:00 | -31.38 | -46.56 | 353.55 | 316.66 | 17.73 | -0.31 | 35.90 | 1033.8 | 311.1 | -41.0 |
| 8/15/91 | 22:00 | -31.32 | -46.30 | 353.59 | 316.12 | 19.08 | -0.70 | 36.20 | 1033.8 | 304.6 | -46.7 |
| 8/15/91 | 23:00 | -31.25 | -46.06 | 353.62 | 319.78 | 19.41 | -0.45 | | 1033.8 | 311.6 | -39.8 |
| 8/16/91 | 00:00 | -31.16 | -45.82 | 353.60 | 320.19 | 19.53 | -0.42 | 36.31 | 1033.8 | 312.3 | -38.9 |
| 8/16/91 | 01:00 | -31.06 | -45.58 | 353.60 | 317.66 | 19.34 | -0.19 | 36.20 | 1033.8 | 313.2 | -38.2 |
| 8/16/91 | 02:00 | -30.97 | -45.34 | 353.62 | 322.91 | 19.72 | -0.39 | | 1033.8 | 315.4 | -35.8 |
| 8/16/91 | 03:00 | -30.87 | -45.10 | 353.54 | 322.37 | 19.75 | -0.32 | 36.37 | 1033.8 | 315.8 | -35.3 |
| 8/16/91 | 04:00 | -30.77 | -44.87 | 353.61 | 322.10 | 19.52 | -0.38 | 36.24 | 1033.8 | 314.7 | -36.6 |
| 8/16/91 | 05:00 | -30.68 | -44.62 | 353.59 | 322.75 | 19.54 | -0.37 | | 1033.8 | 315.5 | -35.7 |
| 8/16/91 | 06:00 | -30.58 | -44.37 | 353.62 | 323.15 | 19.57 | -0.48 | 36.26 | 1033.8 | 314.4 | -36.8 |
| 8/16/91 | 07:00 | -30.50 | -44.11 | 353.57 | 323.06 | 19.58 | -0.33 | 36.27 | 1033.8 | 316.3 | -34.9 |
| 8/16/91 | 08:00 | -30.39 | -43.87 | 353.59 | 322.28 | 19.54 | -0.37 | | 1033.8 | 315.1 | -36.1 |
| 8/16/91 | 09:00 | -30.27 | -43.64 | 353.64 | 321.40 | 19.79 | -0.55 | 36.20 | 1033.8 | 311.5 | -39.6 |
| 8/16/91 | 10:00 | -30.14 | -43.42 | 353.61 | 318.82 | 19.33 | -0.25 | 36.07 | 1033.8 | 313.5 | -38.0 |
| 8/16/91 | 11:00 | -30.01 | -43.20 | 353.57 | 320.27 | 19.71 | -0.37 | | 1038.1 | 314.4 | -38.2 |
| 8/16/91 | 12:00 | -29.88 | -42.98 | 353.58 | 322.79 | 19.99 | -0.46 | 36.24 | 1038.1 | 315.4 | -37.1 |

NOAA South Atlantic 1991 Underway Values

Leg 2 Carbon and Related Parameters

| Date | Time | Lat [degrees] | Long [degrees] | XCO _{2,a} [ppm] | XCO _{2,w} [ppm] | SST [deg. C] | SST-Eq.T [deg. C] | Sal(TSG) | Pressure [mb] | fCO _{2, w} [uatm] | fCO _{2,w-a} [uatm] |
|---------|-------|------------------|-------------------|-----------------------------|-----------------------------|-----------------|----------------------|----------|------------------|-------------------------------|--------------------------------|
| 8/16/91 | 13:00 | -29.84 | -42.92 | 353.52 | 322.76 | 20.78 | -0.44 | 36.48 | 1038.1 | 315.3 | -36.7 |
| 8/16/91 | 14:00 | -29.81 | -42.89 | 353.47 | 323.94 | 20.81 | -0.39 | | 1038.7 | 317.4 | -34.9 |
| 8/16/91 | 15:00 | -29.68 | -42.67 | 353.29 | 323.76 | 20.64 | -0.61 | 36.43 | 1038.7 | 314.2 | -37.8 |
| 8/16/91 | 16:00 | -29.55 | -42.46 | 353.49 | 322.54 | 20.51 | -0.51 | 36.43 | 1038.7 | 314.4 | -37.9 |
| 8/16/91 | 17:00 | -29.43 | -42.25 | 353.44 | 323.73 | 20.37 | -0.31 | | 1037.2 | 318.0 | -33.9 |
| 8/16/91 | 18:00 | -29.31 | -42.03 | 353.54 | 322.64 | 20.86 | -0.31 | 36.35 | 1037.2 | 316.7 | -35.1 |
| 8/16/91 | 19:00 | -29.18 | -41.80 | 353.55 | 325.11 | 21.44 | -0.50 | | 1037.2 | 316.2 | -35.2 |
| 8/16/91 | 20:00 | -29.05 | -41.58 | 353.59 | 323.80 | 21.28 | -0.30 | | 1036.9 | 317.8 | -33.7 |
| 8/16/91 | 21:00 | -28.91 | -41.36 | 353.63 | 320.99 | 20.23 | 0.00 | 36.26 | 1036.9 | 319.8 | -32.5 |
| 8/16/91 | 22:00 | -28.77 | -41.14 | 353.59 | 318.71 | 19.82 | -0.17 | 36.06 | 1036.9 | 315.2 | -37.1 |
| 8/16/91 | 23:00 | -28.64 | -40.92 | 353.59 | 317.53 | 19.65 | -0.82 | | 1037.6 | 305.2 | -47.1 |
| 8/17/91 | 00:00 | -28.51 | -40.70 | 353.54 | 320.47 | 20.01 | -0.05 | 36.06 | 1037.6 | 318.8 | -33.7 |
| 8/17/91 | 01:00 | -28.38 | -40.47 | 353.61 | 323.07 | 21.01 | -0.61 | 36.60 | 1037.6 | 313.0 | -38.8 |
| 8/17/91 | 02:00 | -28.26 | -40.25 | 353.67 | 325.66 | 21.10 | -0.37 | 36.58 | 1037.6 | 318.9 | -33.0 |
| 8/17/91 | 03:00 | -28.14 | -40.03 | 353.71 | 324.56 | 20.89 | -0.43 | 36.49 | 1037.6 | 317.0 | -35.0 |
| 8/17/91 | 04:00 | -28.02 | -39.81 | 353.73 | 327.03 | 20.90 | -0.37 | 36.47 | 1037.6 | 320.3 | -31.8 |
| 8/17/91 | 05:00 | -27.90 | -39.59 | 353.49 | 325.76 | 20.94 | -0.40 | 36.47 | 1037.6 | 318.6 | -33.2 |
| 8/17/91 | 06:00 | -27.78 | -39.37 | 353.47 | 326.55 | 20.85 | -0.41 | 36.45 | 1037.6 | 319.2 | -32.6 |
| 8/17/91 | 07:00 | -27.66 | -39.16 | 353.50 | 325.71 | 21.04 | -0.33 | 36.48 | 1037.6 | 319.5 | -32.3 |
| 8/17/91 | 08:00 | -27.54 | -38.94 | 353.52 | 324.29 | 21.04 | -0.37 | 36.45 | 1037.6 | 317.6 | -34.2 |
| 8/17/91 | 09:00 | -27.42 | -38.72 | 353.54 | 324.61 | 21.10 | -0.30 | 36.47 | 1037.6 | 318.9 | -32.9 |
| 8/17/91 | 10:00 | -27.29 | -38.51 | 353.60 | 323.72 | 21.23 | -0.42 | 36.50 | 1037.6 | 316.2 | -35.5 |
| 8/17/91 | 11:00 | -27.17 | -38.30 | 353.53 | 324.90 | 21.36 | -0.44 | 36.51 | 1036.6 | 316.7 | -34.6 |
| 8/17/91 | 12:00 | -27.03 | -38.08 | 353.54 | 325.37 | 21.40 | -0.38 | 36.52 | 1036.6 | 318.0 | -33.2 |
| 8/17/91 | 13:00 | -26.90 | -37.87 | 353.52 | 325.13 | 21.28 | -0.40 | 36.49 | 1036.6 | 317.5 | -33.8 |
| 8/17/91 | 14:00 | -26.77 | -37.65 | 353.49 | 324.58 | 21.22 | -0.39 | 36.51 | 1037.0 | 317.3 | -34.1 |
| 8/17/91 | 15:00 | -26.64 | -37.43 | 353.49 | 325.57 | 21.34 | -0.36 | 36.49 | 1037.0 | 318.7 | -32.7 |
| 8/17/91 | 16:00 | -26.51 | -37.21 | 353.47 | 326.06 | 21.40 | -0.65 | 36.52 | 1037.0 | 314.9 | -36.3 |
| 8/17/91 | 17:00 | -26.38 | -36.99 | 353.45 | 330.42 | 22.08 | -0.14 | 36.70 | 1037.0 | 326.2 | -24.8 |
| 8/17/91 | 18:00 | -26.25 | -36.78 | 353.42 | 327.50 | 21.60 | -0.66 | 36.62 | 1037.0 | 316.0 | -35.0 |
| 8/17/91 | 19:00 | -26.12 | -36.57 | 353.46 | 333.80 | 22.04 | -0.34 | 36.74 | 1037.0 | 326.7 | -24.3 |
| 8/17/91 | 20:00 | -26.01 | -36.38 | 353.48 | 335.80 | 21.93 | -0.50 | 36.76 | 1034.5 | 325.5 | -24.6 |
| 8/17/91 | 21:00 | -25.88 | -36.17 | 353.47 | 335.06 | 21.93 | -0.45 | 36.73 | 1034.5 | 325.5 | -24.6 |
| 8/17/91 | 22:00 | -25.75 | -35.96 | 353.51 | 335.18 | 22.01 | -0.39 | 36.76 | 1034.5 | 326.4 | -23.7 |
| 8/17/91 | 23:00 | -25.62 | -35.75 | 353.45 | 335.05 | 21.95 | -0.40 | 36.75 | 1034.5 | 326.2 | -23.9 |
| 8/18/91 | 00:00 | -25.48 | -35.55 | 353.41 | 334.58 | 21.90 | -0.33 | 36.72 | 1034.5 | 326.7 | -23.4 |
| 8/18/91 | 01:00 | -25.35 | -35.35 | 353.45 | 333.50 | 21.81 | -0.38 | 36.72 | 1034.5 | 325.0 | -25.2 |
| 8/18/91 | 02:00 | -25.22 | -35.15 | 353.47 | 330.34 | 21.55 | -0.40 | 36.61 | 1034.5 | 321.8 | -28.6 |
| 8/18/91 | 03:00 | -25.10 | -34.94 | 353.47 | 336.47 | 22.00 | -0.51 | 36.75 | 1034.5 | 325.9 | -24.2 |
| 8/18/91 | 04:00 | -24.98 | -34.73 | 353.50 | 340.88 | 22.22 | -0.20 | 36.74 | 1034.5 | 334.7 | -15.4 |
| 8/18/91 | 05:00 | -24.87 | -34.52 | 353.50 | 340.32 | 21.95 | -0.28 | 36.68 | 1034.5 | 333.2 | -17.1 |
| 8/18/91 | 06:00 | -24.75 | -34.31 | 353.49 | 340.58 | 21.68 | -0.41 | 36.63 | 1034.5 | 331.5 | -18.8 |
| 8/18/91 | 07:00 | -24.63 | -34.10 | 353.47 | 340.28 | 21.67 | -0.41 | 36.62 | 1034.5 | 331.3 | -19.0 |
| 8/18/91 | 08:00 | -24.51 | -33.89 | 353.48 | 339.19 | 21.67 | -0.32 | 36.63 | 1034.5 | 331.6 | -18.7 |
| 8/18/91 | 09:00 | -24.38 | -33.69 | 353.51 | 340.58 | 22.19 | -0.33 | 36.84 | 1034.5 | 332.5 | -17.6 |
| 8/18/91 | 10:00 | -24.25 | -33.49 | 353.50 | 340.69 | 21.82 | -0.78 | 36.81 | 1032.1 | 325.3 | -23.9 |
| 8/18/91 | 11:00 | -24.15 | -33.34 | 353.54 | 340.48 | 22.03 | -0.56 | 36.83 | 1032.1 | 328.2 | -21.0 |
| 8/18/91 | 12:00 | -24.14 | -33.35 | 353.58 | 340.59 | 22.09 | -0.47 | 36.80 | 1032.1 | 329.7 | -19.6 |
| 8/18/91 | 13:00 | -24.13 | -33.37 | | 340.81 | 21.93 | -0.44 | 36.72 | 1032.1 | 330.3 | -20.0 |
| 8/18/91 | 14:00 | -24.13 | -33.37 | | 341.66 | 21.84 | -0.49 | 36.69 | 1033.4 | 330.9 | -19.1 |
| 8/18/91 | 15:00 | -24.13 | -33.38 | | 342.19 | 21.79 | -0.51 | 36.67 | 1032.5 | 330.8 | -19.2 |
| 8/18/91 | 16:00 | -24.11 | -33.37 | | 342.48 | 21.84 | -0.59 | 36.66 | 1032.5 | 329.9 | -20.1 |
| 8/18/91 | 17:00 | -23.99 | -33.17 | 353.39 | 341.13 | 22.02 | -0.45 | 36.76 | 1032.5 | 330.7 | -18.6 |
| 8/18/91 | 18:00 | -23.86 | -32.97 | 353.48 | 338.55 | 21.85 | -0.40 | 36.73 | 1032.5 | 329.0 | -20.6 |
| 8/18/91 | 19:00 | -23.74 | -32.77 | 353.51 | 333.59 | 21.58 | -0.55 | 36.66 | 1031.3 | 321.7 | -27.5 |
| 8/18/91 | 20:00 | -23.65 | -32.61 | 353.86 | 331.56 | 21.62 | -0.18 | 36.58 | 1031.5 | 325.2 | -24.5 |
| 8/18/91 | 21:00 | -23.55 | -32.43 | 354.12 | 337.34 | 21.62 | -0.57 | 36.71 | 1031.4 | 325.0 | -24.8 |
| 8/18/91 | 22:00 | -23.45 | -32.23 | 354.16 | 340.41 | 21.62 | -0.57 | 36.81 | 1031.4 | 328.0 | -21.9 |
| 8/18/91 | 23:00 | -23.34 | -32.02 | 354.07 | 344.80 | 22.22 | -0.53 | 36.85 | 1031.8 | 332.7 | -16.9 |
| 8/19/91 | 00:00 | -23.23 | -31.81 | 354.11 | 347.46 | 22.45 | -0.32 | | 1031.8 | 338.3 | -11.3 |
| 8/19/91 | 01:00 | -23.11 | -31.61 | 354.16 | 347.07 | 22.22 | -0.36 | 36.78 | 1031.6 | 337.3 | -12.4 |

NOAA South Atlantic 1991 Underway Values

Leg 2 Carbon and Related Parameters

| Date | Time | Lat [degrees] | Long [degrees] | XCO2,a [ppm] | XCO2,w [ppm] | SST [deg. C] | SST-EqT [deg. C] | Sal(TSG) | Pressure [mb] | fCO2, w [uatm] | fCO2,w-a [uatm] |
|---------|-------|------------------|-------------------|-----------------|-----------------|-----------------|---------------------|----------|------------------|-------------------|--------------------|
| 8/19/91 | 02:00 | -22.99 | -31.41 | 353.93 | 345.90 | 22.64 | -0.41 | 36.97 | 1031.4 | 335.3 | -13.9 |
| 8/19/91 | 03:00 | -22.87 | -31.21 | 353.89 | 347.51 | 22.56 | -0.51 | 36.96 | 1031.8 | 335.4 | -13.8 |
| 8/19/91 | 04:00 | -22.75 | -31.01 | 353.89 | 347.96 | 22.31 | -0.32 | 36.79 | 1030.3 | 338.4 | -10.6 |
| 8/19/91 | 05:00 | -22.62 | -30.81 | 354.11 | 347.90 | 22.36 | -0.48 | 36.86 | 1030.3 | 335.8 | -13.2 |
| 8/19/91 | 06:00 | -22.49 | -30.61 | 353.92 | 349.08 | 22.48 | -0.25 | 36.85 | 1029.7 | 340.2 | -8.5 |
| 8/19/91 | 07:00 | -22.36 | -30.41 | 353.87 | 348.31 | 22.39 | -0.29 | 36.82 | 1029.5 | 338.8 | -9.8 |
| 8/19/91 | 08:00 | -22.23 | -30.21 | 353.83 | 347.99 | 22.26 | -0.45 | 36.79 | 1029.8 | 336.2 | -12.4 |
| 8/19/91 | 09:00 | -22.13 | -30.06 | 353.98 | 347.26 | 22.33 | -0.39 | 36.89 | 1030.4 | 336.6 | -12.4 |
| 8/19/91 | 10:00 | -22.01 | -29.86 | 353.92 | 348.73 | 22.29 | -0.40 | 36.87 | 1029.8 | 337.8 | -11.0 |
| 8/19/91 | 11:00 | -21.89 | -29.66 | 353.90 | 347.17 | 22.21 | -0.37 | 36.88 | 1029.8 | 336.7 | -12.1 |
| 8/19/91 | 12:00 | -21.76 | -29.46 | 353.97 | 346.45 | 22.22 | -0.40 | 36.85 | 1030.5 | 335.9 | -13.2 |
| 8/19/91 | 13:00 | -21.64 | -29.26 | 354.07 | 347.57 | 22.33 | -0.42 | 36.85 | 1030.5 | 336.5 | -12.6 |
| 8/19/91 | 14:00 | -21.52 | -29.06 | 353.95 | 347.63 | 22.04 | -0.46 | 36.77 | 1030.5 | 336.1 | -13.0 |
| 8/19/91 | 15:00 | -21.40 | -28.86 | 353.95 | 348.81 | 22.12 | -0.42 | 36.74 | 1030.5 | 337.9 | -11.3 |
| 8/19/91 | 16:00 | -21.28 | -28.65 | 353.54 | 347.38 | 22.11 | -0.51 | 36.76 | 1028.2 | 334.3 | -13.6 |
| 8/19/91 | 17:00 | -21.16 | -28.46 | 353.58 | 350.16 | 22.21 | -0.40 | 36.75 | 1028.2 | 338.6 | -9.3 |
| 8/19/91 | 18:00 | -21.05 | -28.26 | 353.65 | 351.01 | 22.42 | -0.77 | 36.77 | 1027.7 | 333.5 | -14.0 |
| 8/19/91 | 19:00 | -20.93 | -28.06 | 353.63 | 352.79 | 22.71 | -0.49 | 36.98 | 1027.9 | 339.4 | -8.2 |
| 8/19/91 | 20:00 | -20.83 | -27.91 | 353.69 | 353.22 | 22.76 | -0.37 | 36.97 | 1027.9 | 341.7 | -5.9 |
| 8/19/91 | 21:00 | -20.71 | -27.72 | 353.66 | 351.72 | 22.47 | -0.30 | 36.86 | 1027.9 | 341.5 | -6.3 |
| 8/19/91 | 22:00 | -20.58 | -27.52 | 353.70 | 351.53 | 22.38 | -0.45 | 36.82 | 1027.9 | 339.0 | -8.8 |
| 8/19/91 | 23:00 | -20.45 | -27.33 | 353.68 | 352.13 | 22.38 | -0.42 | 36.83 | 1027.9 | 340.0 | -7.8 |
| 8/20/91 | 00:00 | -20.33 | -27.14 | 353.69 | 356.80 | 22.46 | -0.39 | | 1028.6 | 345.2 | -2.9 |
| 8/20/91 | 01:00 | -20.20 | -26.94 | 353.69 | 356.44 | 22.39 | -0.39 | 36.83 | 1028.0 | 344.7 | -3.2 |
| 8/20/91 | 02:00 | -20.08 | -26.74 | 353.66 | 355.95 | 22.18 | -0.42 | 36.76 | 1028.6 | 344.0 | -4.1 |
| 8/20/91 | 03:00 | -19.95 | -26.55 | 353.70 | 354.06 | 22.10 | -0.43 | 36.73 | 1028.6 | 342.2 | -6.1 |
| 8/20/91 | 04:00 | -19.83 | -26.36 | 353.71 | 354.43 | 22.07 | -0.41 | 36.69 | 1026.2 | 342.0 | -5.5 |
| 8/20/91 | 05:00 | -19.71 | -26.16 | 353.71 | 355.53 | 22.21 | -0.51 | 36.77 | 1026.2 | 341.4 | -5.9 |
| 8/20/91 | 06:00 | -19.60 | -25.97 | 353.72 | 358.33 | 22.43 | -0.44 | 36.84 | 1026.2 | 345.2 | -2.1 |
| 8/20/91 | 07:00 | -19.49 | -25.77 | 353.72 | 359.19 | 22.47 | -0.42 | 36.84 | 1026.2 | 346.2 | -1.0 |
| 8/20/91 | 08:00 | -19.40 | -25.60 | 353.77 | 358.87 | 22.56 | -0.44 | 36.85 | 1026.1 | 345.5 | -1.7 |
| 8/20/91 | 09:00 | -19.31 | -25.43 | 353.72 | 360.85 | 22.59 | -0.41 | 36.83 | 1026.1 | 347.9 | 0.8 |
| 8/20/91 | 10:00 | -19.18 | -25.24 | 353.80 | 361.16 | 22.62 | -0.46 | 36.86 | 1026.6 | 347.6 | 0.2 |
| 8/20/91 | 11:00 | -19.06 | -25.05 | 353.73 | 361.04 | 22.60 | -0.42 | 36.83 | 1026.1 | 347.8 | 0.8 |
| 8/20/91 | 12:00 | -19.00 | -24.99 | 353.75 | 361.09 | 22.69 | -0.47 | 36.88 | 1026.1 | 347.1 | 0.0 |
| 8/20/91 | 13:00 | -19.01 | -25.00 | 354.07 | 361.79 | 22.71 | -0.50 | | 1026.1 | 347.2 | -0.1 |
| 8/20/91 | 14:00 | -19.01 | -25.01 | | 362.39 | 22.73 | -0.53 | 36.88 | 1025.8 | 347.2 | 0.2 |
| 8/20/91 | 15:00 | -18.99 | -24.99 | | 362.64 | 22.72 | -0.46 | 36.88 | 1026.1 | 348.7 | 1.7 |
| 8/20/91 | 16:00 | -18.84 | -24.82 | 353.60 | 361.92 | 22.66 | -0.54 | | 1024.0 | 346.0 | -0.1 |
| 8/20/91 | 17:00 | -18.70 | -24.64 | 353.72 | 362.22 | 22.46 | -0.45 | 36.77 | 1024.0 | 347.9 | 1.5 |
| 8/20/91 | 18:00 | -18.56 | -24.46 | 353.64 | 362.08 | 22.72 | -0.39 | 36.86 | 1024.0 | 348.6 | 2.4 |
| 8/20/91 | 19:00 | -18.43 | -24.27 | 353.64 | 361.05 | 22.89 | -0.46 | | 1024.0 | 346.3 | 0.2 |
| 8/20/91 | 20:00 | -18.30 | -24.10 | 353.67 | 362.05 | 22.72 | -0.42 | 36.88 | 1024.2 | 348.2 | 1.8 |
| 8/20/91 | 21:00 | -18.16 | -23.92 | 353.65 | 361.82 | 22.70 | -0.44 | 36.89 | 1024.1 | 347.5 | 1.3 |
| 8/20/91 | 22:00 | -18.02 | -23.74 | 353.65 | 361.83 | 22.90 | -0.43 | | 1024.1 | 347.6 | 1.4 |
| 8/20/91 | 23:00 | -17.88 | -23.55 | 353.63 | 362.76 | 22.82 | -0.42 | 36.91 | 1024.1 | 348.7 | 2.5 |
| 8/21/91 | 00:00 | -17.73 | -23.38 | 353.63 | 362.85 | 22.82 | -0.45 | | 1024.8 | 348.6 | 2.2 |
| 8/21/91 | 01:00 | -17.58 | -23.20 | 353.42 | 362.85 | 22.74 | -0.45 | | 1024.7 | 348.6 | 2.4 |
| 8/21/91 | 02:00 | -17.43 | -23.03 | 353.65 | 363.63 | 22.73 | -0.37 | 36.86 | 1024.7 | 350.5 | 4.0 |
| 8/21/91 | 03:00 | -17.28 | -22.86 | 353.80 | 363.99 | 22.68 | -0.39 | 36.86 | 1024.7 | 350.6 | 3.9 |
| 8/21/91 | 04:00 | -17.13 | -22.68 | 353.85 | 364.50 | 22.63 | -0.27 | | 1022.3 | 352.3 | 6.3 |
| 8/21/91 | 05:00 | -16.98 | -22.51 | 353.84 | 365.69 | 22.43 | -0.45 | 36.73 | 1022.3 | 350.7 | 4.7 |
| 8/21/91 | 06:00 | -16.83 | -22.33 | 353.87 | 365.52 | 22.74 | -0.46 | | 1022.3 | 350.1 | 4.3 |
| 8/21/91 | 07:00 | -16.68 | -22.16 | 353.99 | 365.77 | 22.81 | -0.41 | | 1022.3 | 351.2 | 5.3 |
| 8/21/91 | 08:00 | -16.60 | -22.03 | 353.97 | 366.12 | 22.82 | -0.43 | 36.84 | 1022.2 | 351.1 | 5.3 |
| 8/21/91 | 09:00 | -16.46 | -21.86 | 353.93 | 366.28 | 22.82 | -0.44 | | 1022.2 | 351.0 | 5.3 |
| 8/21/91 | 10:00 | -16.31 | -21.68 | 353.89 | 362.31 | 22.96 | -0.47 | | 1022.2 | 346.6 | 1.0 |
| 8/21/91 | 11:00 | -16.16 | -21.51 | 353.93 | 363.72 | 22.89 | -0.37 | 36.84 | 1022.2 | 349.7 | 3.9 |
| 8/21/91 | 12:00 | -16.01 | -21.33 | 353.90 | 361.74 | 22.86 | -0.44 | | 1023.3 | 347.1 | 0.9 |
| 8/21/91 | 13:00 | -15.86 | -21.15 | 353.91 | 360.64 | 22.86 | -0.44 | | 1022.7 | 345.8 | -0.1 |
| 8/21/91 | 14:00 | -15.71 | -20.98 | 353.84 | 360.67 | 22.85 | -0.42 | 36.85 | 1023.2 | 346.4 | 0.3 |

NOAA South Atlantic 1991 Underway Values

Leg 2 Carbon and Related Parameters

| Date | Time | Lat [degrees] | Long [degrees] | XCO2,a [ppm] | XCO2,w [ppm] | SST [deg. C] | SST-Eq.T [deg. C] | Sal(TSG) | Pressure [mb] | fCO2, w [uatm] | fCO2,w-a [uatm] |
|---------|-------|------------------|-------------------|-----------------|-----------------|-----------------|----------------------|----------|------------------|-------------------|--------------------|
| 8/21/91 | 15:00 | -15.57 | -20.81 | 353.76 | 364.10 | 22.74 | -0.44 | | 1023.2 | 349.5 | 3.5 |
| 8/21/91 | 16:00 | -15.43 | -20.62 | 353.81 | 363.29 | 22.78 | -0.46 | | 1019.7 | 347.1 | 2.3 |
| 8/21/91 | 17:00 | -15.29 | -20.44 | 353.88 | 362.33 | 22.80 | -0.44 | 36.85 | 1020.0 | 346.6 | 1.6 |
| 8/21/91 | 18:00 | -15.15 | -20.26 | 353.83 | 356.88 | 22.99 | -0.47 | | 1019.7 | 340.7 | -4.0 |
| 8/21/91 | 19:00 | -15.02 | -20.09 | 353.75 | 357.56 | 22.94 | -0.46 | | 1019.7 | 341.6 | -3.1 |
| 8/21/91 | 20:00 | -14.89 | -19.92 | 353.78 | 357.75 | 22.89 | -0.46 | 36.87 | 1020.7 | 342.0 | -3.0 |
| 8/21/91 | 21:00 | -14.75 | -19.74 | 353.76 | 357.07 | 22.97 | -0.41 | | 1021.1 | 342.3 | -2.9 |
| 8/21/91 | 22:00 | -14.60 | -19.56 | 353.75 | 357.31 | 22.94 | -0.43 | | 1020.7 | 342.0 | -3.0 |
| 8/21/91 | 23:00 | -14.46 | -19.38 | 353.77 | 358.33 | 22.80 | -0.41 | 36.81 | 1020.7 | 343.5 | -1.7 |
| 8/22/91 | 00:00 | -14.31 | -19.19 | 353.65 | 358.21 | 22.79 | -0.47 | | 1021.4 | 342.6 | -2.6 |
| 8/22/91 | 01:00 | -14.16 | -19.01 | 353.67 | 357.50 | 22.77 | -0.44 | | 1021.4 | 342.5 | -2.8 |
| 8/22/91 | 02:00 | -14.02 | -18.83 | 353.73 | 355.15 | 22.81 | -0.41 | 36.80 | 1021.4 | 340.6 | -4.8 |
| 8/22/91 | 03:00 | -13.87 | -18.65 | 353.70 | 355.52 | 22.76 | -0.41 | | 1021.4 | 341.0 | -4.4 |
| 8/22/91 | 04:00 | -13.71 | -18.48 | 353.61 | 357.27 | 22.68 | -0.42 | | 1018.9 | 341.7 | -2.8 |
| 8/22/91 | 05:00 | -13.55 | -18.31 | 353.71 | 357.87 | 22.60 | -0.46 | | 1018.9 | 341.7 | -2.9 |
| 8/22/91 | 06:00 | -13.40 | -18.14 | 353.71 | 352.52 | 22.94 | -0.47 | 36.80 | 1018.9 | 336.3 | -8.1 |
| 8/22/91 | 07:00 | -13.24 | -17.96 | 353.70 | 352.68 | 23.01 | -0.47 | 36.83 | 1018.9 | 336.4 | -7.9 |
| 8/22/91 | 08:00 | -13.09 | -17.79 | 353.67 | 353.25 | 22.76 | -0.44 | | 1019.6 | 337.8 | -6.9 |
| 8/22/91 | 09:00 | -12.95 | -17.61 | 353.69 | 350.42 | 22.96 | -0.56 | 36.79 | 1019.6 | 333.1 | -11.4 |
| 8/22/91 | 10:00 | -12.82 | -17.45 | 353.67 | 349.86 | 23.33 | -0.47 | 36.77 | 1019.6 | 333.7 | -10.6 |
| 8/22/91 | 11:00 | -12.82 | -17.46 | 353.84 | 351.04 | 23.37 | -0.49 | | 1019.6 | 334.5 | -10.0 |
| 8/22/91 | 12:00 | -12.71 | -17.33 | 353.58 | 351.93 | 23.39 | -0.44 | 36.81 | 1019.6 | 336.1 | -8.1 |
| 8/22/91 | 13:00 | -12.57 | -17.16 | 353.64 | 353.36 | 23.26 | -0.48 | 36.76 | 1019.6 | 337.0 | -7.3 |
| 8/22/91 | 14:00 | -12.47 | -17.01 | 353.55 | 354.64 | 23.24 | -0.44 | | 1019.6 | 338.8 | -5.5 |
| 8/22/91 | 15:00 | -12.32 | -16.83 | 353.58 | 351.65 | 23.25 | -0.45 | 36.73 | 1019.6 | 335.9 | -8.5 |
| 8/22/91 | 16:00 | -12.18 | -16.65 | | | 23.30 | -0.45 | 36.77 | 1017.2 | | |
| 8/22/91 | 17:00 | -12.03 | -16.47 | 353.67 | 348.37 | 23.39 | -0.44 | 36.72 | 1017.2 | 331.9 | -11.6 |
| 8/22/91 | 18:00 | -11.88 | -16.30 | 353.71 | 349.91 | 23.40 | -0.42 | 36.75 | 1017.2 | 333.6 | -9.9 |
| 8/22/91 | 19:00 | -11.74 | -16.13 | 353.75 | 352.63 | 23.33 | -0.44 | 36.75 | 1017.2 | 336.1 | -7.5 |
| 8/22/91 | 20:00 | -11.59 | -15.95 | 353.72 | 351.06 | 23.32 | -0.44 | 36.74 | 1018.2 | 334.9 | -9.0 |
| 8/22/91 | 21:00 | -11.44 | -15.77 | 353.74 | 352.98 | 22.98 | -0.34 | 36.78 | 1018.2 | 338.4 | -5.8 |
| 8/22/91 | 22:00 | -11.29 | -15.59 | 353.70 | 348.03 | 23.22 | -0.45 | 36.75 | 1018.2 | 331.9 | -12.0 |
| 8/22/91 | 23:00 | -11.14 | -15.41 | 353.74 | 350.60 | 23.21 | -0.36 | 36.78 | 1018.2 | 335.7 | -8.4 |
| 8/23/91 | 00:00 | -10.99 | -15.24 | 353.75 | 352.32 | 23.06 | -0.41 | 36.76 | 1019.0 | 336.9 | -7.5 |
| 8/23/91 | 01:00 | -10.84 | -15.06 | 353.63 | 351.27 | 23.13 | -0.46 | 36.78 | 1019.0 | 335.2 | -9.0 |
| 8/23/91 | 02:00 | -10.72 | -14.92 | 353.65 | 348.16 | 23.14 | -0.45 | 36.69 | 1019.0 | 332.4 | -11.9 |
| 8/23/91 | 03:00 | -10.55 | -14.70 | 353.59 | 344.05 | 23.36 | -0.47 | 36.55 | 1019.0 | 328.0 | -16.1 |
| 8/23/91 | 04:00 | -10.41 | -14.52 | 353.60 | 344.18 | 23.54 | -0.49 | 36.48 | 1017.0 | 327.1 | -16.2 |
| 8/23/91 | 05:00 | -10.27 | -14.34 | 353.62 | 344.15 | 23.94 | -0.47 | 36.33 | 1017.0 | 327.1 | -16.0 |
| 8/23/91 | 06:00 | -10.14 | -14.15 | 353.65 | 345.02 | 24.10 | -0.42 | 36.24 | 1017.0 | 328.5 | -14.4 |
| 8/23/91 | 07:00 | -9.99 | -13.97 | 353.70 | 345.78 | 24.11 | -0.42 | 36.20 | 1017.0 | 329.3 | -13.7 |
| 8/23/91 | 08:00 | -9.85 | -13.79 | 353.67 | 346.01 | 24.09 | -0.42 | 36.15 | 1019.3 | 330.3 | -13.5 |
| 8/23/91 | 09:00 | -9.70 | -13.61 | 353.70 | 342.42 | 24.09 | -0.40 | 36.26 | 1019.3 | 327.1 | -16.7 |
| 8/23/91 | 10:00 | -9.56 | -13.43 | 353.61 | 343.69 | 24.03 | -0.45 | 36.28 | 1019.3 | 327.7 | -16.1 |
| 8/23/91 | 11:00 | -9.42 | -13.26 | 353.59 | 344.54 | 24.02 | -0.44 | 36.30 | 1019.3 | 328.6 | -15.2 |
| 8/23/91 | 12:00 | -9.27 | -13.08 | 353.53 | 343.09 | 24.04 | -0.51 | 36.10 | 1019.5 | 326.3 | -17.4 |
| 8/23/91 | 13:00 | -9.12 | -12.91 | 353.56 | 351.80 | 24.25 | -0.46 | 35.91 | 1019.5 | 335.2 | -8.4 |
| 8/23/91 | 14:00 | -8.97 | -12.74 | 353.54 | 368.80 | 24.27 | -0.53 | 35.72 | 1019.5 | 350.2 | 6.7 |
| 8/23/91 | 15:00 | -8.82 | -12.57 | 353.55 | 368.70 | 24.53 | -0.44 | 35.77 | 1019.5 | 351.4 | 7.9 |
| 8/23/91 | 16:00 | -8.67 | -12.40 | 353.64 | 370.05 | 24.67 | -0.52 | 35.78 | 1017.0 | 350.4 | 7.8 |
| 8/23/91 | 17:00 | -8.53 | -12.24 | 353.63 | 373.21 | 24.54 | -0.43 | 35.71 | 1017.0 | 354.9 | 12.3 |
| 8/23/91 | 18:00 | -8.39 | -12.06 | 353.76 | 366.57 | 24.84 | -0.28 | 35.79 | 1017.0 | 350.8 | 8.1 |
| 8/23/91 | 19:00 | -8.24 | -11.88 | 353.85 | 373.73 | 24.60 | -0.27 | 35.67 | 1017.0 | 358.0 | 15.1 |
| 8/23/91 | 20:00 | -8.09 | -11.71 | 353.87 | 374.67 | 24.38 | -0.41 | 35.62 | 1018.8 | 357.5 | 13.8 |
| 8/23/91 | 21:00 | -7.92 | -11.53 | 353.88 | 373.17 | 24.37 | -0.40 | 35.65 | 1018.8 | 356.2 | 12.5 |
| 8/23/91 | 22:00 | -7.76 | -11.36 | 353.80 | 373.35 | 24.29 | -0.35 | 35.68 | 1018.8 | 357.2 | 13.5 |
| 8/23/91 | 23:00 | -7.61 | -11.20 | 353.75 | 362.76 | 24.33 | -0.52 | 35.87 | 1018.8 | 344.3 | 0.8 |
| 8/24/91 | 00:00 | -7.44 | -11.02 | 353.75 | 370.80 | 24.22 | -0.49 | 35.69 | 1019.4 | 352.7 | 9.0 |
| 8/24/91 | 01:00 | -7.28 | -10.84 | 353.83 | 362.03 | 24.48 | -0.36 | 35.79 | 1019.4 | 346.3 | 2.5 |
| 8/24/91 | 02:00 | -7.15 | -10.66 | 354.01 | 360.06 | 24.53 | -0.35 | 35.91 | 1019.4 | 344.5 | 0.5 |
| 8/24/91 | 03:00 | -7.01 | -10.47 | 354.08 | 353.58 | 24.40 | -0.45 | 35.91 | 1017.4 | 336.3 | -7.1 |

NOAA South Atlantic 1991 Underway Values

Leg 2 Carbon and Related Parameters

| Date | Time | Lat [degrees] | Long [degrees] | XCO2,a [ppm] | XCO2,w [ppm] | SST [deg. C] | SST-Eq.T [deg. C] | Sal(TSG) | Pressure [mb] | fCO2, w [uatm] | fCO2,w-a [uatm] |
|---------|-------|------------------|-------------------|-----------------|-----------------|-----------------|----------------------|----------|------------------|-------------------|--------------------|
| 8/24/91 | 04:00 | -6.87 | -10.28 | 354.18 | 357.95 | 24.54 | -0.43 | 35.82 | 1017.3 | 340.6 | -2.7 |
| 8/24/91 | 05:00 | -6.75 | -10.12 | 354.20 | 366.85 | 24.37 | -0.38 | 35.72 | 1017.3 | 349.8 | 6.4 |
| 8/24/91 | 06:00 | -6.61 | -9.93 | 354.26 | 391.98 | 23.99 | -0.42 | 35.75 | 1017.3 | 373.4 | 29.7 |
| 8/24/91 | 07:00 | -6.46 | -9.75 | 354.35 | 396.19 | 23.84 | -0.41 | 35.65 | 1017.3 | 377.7 | 33.8 |
| 8/24/91 | 08:00 | -6.32 | -9.57 | 354.47 | 393.28 | 23.74 | -0.43 | 35.58 | 1019.2 | 375.4 | 30.6 |
| 8/24/91 | 09:00 | -6.18 | -9.39 | 354.48 | 393.72 | 23.75 | -0.42 | 35.59 | 1019.2 | 376.1 | 31.3 |
| 8/24/91 | 10:00 | -6.03 | -9.21 | 354.54 | 393.69 | 23.71 | -0.44 | 35.61 | 1019.2 | 375.6 | 30.8 |
| 8/24/91 | 11:00 | -5.98 | -9.16 | 354.63 | 394.36 | 23.72 | -0.50 | 35.61 | 1019.2 | 375.3 | 30.4 |
| 8/24/91 | 12:00 | -5.93 | -9.11 | 354.58 | 393.39 | 23.75 | -0.47 | 35.61 | 1018.7 | 374.6 | 30.0 |
| 8/24/91 | 13:00 | -5.78 | -8.93 | 354.38 | 394.16 | 23.66 | -0.46 | 35.53 | 1018.7 | 375.6 | 31.1 |
| 8/24/91 | 14:00 | -5.62 | -8.76 | 354.45 | 388.28 | 23.78 | -0.51 | 35.42 | 1018.7 | 369.1 | 24.6 |
| 8/24/91 | 15:00 | -5.46 | -8.60 | 354.57 | 389.93 | 23.97 | -0.47 | 35.40 | 1018.7 | 371.1 | 26.7 |
| 8/24/91 | 16:00 | -5.31 | -8.43 | 354.71 | 395.03 | 24.00 | -0.42 | 35.41 | 1015.9 | 375.9 | 32.2 |
| 8/24/91 | 18:00 | -5.00 | -8.08 | 354.81 | 397.00 | 23.95 | -0.42 | 35.51 | 1015.9 | 377.8 | 34.0 |
| 8/24/91 | 19:00 | -4.87 | -7.93 | 354.86 | 398.07 | 23.90 | -0.42 | 35.55 | 1015.9 | 378.8 | 34.9 |
| 8/24/91 | 20:00 | -4.73 | -7.76 | 354.70 | 400.22 | 23.78 | -0.34 | 35.56 | 1015.9 | 382.3 | 38.4 |
| 8/24/91 | 21:00 | -4.59 | -7.58 | 354.68 | 397.41 | 23.54 | -0.42 | 35.56 | 1017.7 | 379.2 | 34.6 |
| 8/24/91 | 22:00 | -4.45 | -7.40 | 354.72 | 395.68 | 23.44 | -0.44 | 35.56 | 1017.7 | 377.2 | 32.6 |
| 8/24/91 | 23:00 | -4.30 | -7.23 | 354.75 | 396.69 | 23.35 | -0.42 | 35.59 | 1017.7 | 378.5 | 33.8 |
| 8/25/91 | 00:00 | -4.15 | -7.06 | 354.68 | 410.32 | 23.06 | -0.40 | | 1017.7 | 392.2 | 47.3 |
| 8/25/91 | 01:00 | -4.02 | -6.89 | 354.76 | 406.95 | 23.02 | -0.45 | 35.69 | 1017.6 | 388.0 | 43.2 |
| 8/25/91 | 02:00 | -3.87 | -6.71 | 354.78 | 410.41 | 22.94 | -0.43 | 35.70 | 1017.6 | 391.7 | 46.7 |
| 8/25/91 | 03:00 | -3.72 | -6.53 | 354.73 | 395.63 | 22.75 | -0.40 | 35.49 | 1017.6 | 378.1 | 33.1 |
| 8/25/91 | 04:00 | -3.57 | -6.35 | 354.81 | 394.03 | 22.66 | -0.39 | 35.41 | 1015.1 | 375.9 | 31.6 |
| 8/25/91 | 05:00 | -3.42 | -6.17 | 354.87 | 391.71 | 22.55 | -0.45 | 35.38 | 1015.1 | 372.9 | 28.5 |
| 8/25/91 | 06:00 | -3.26 | -5.98 | 354.87 | 395.76 | 22.38 | -0.45 | 35.40 | 1015.1 | 376.8 | 32.3 |
| 8/25/91 | 07:00 | -3.11 | -5.80 | 354.77 | 403.43 | 22.23 | -0.34 | 35.49 | 1016.8 | 386.7 | 41.6 |
| 8/25/91 | 08:00 | -2.95 | -5.61 | 354.77 | 400.38 | 22.16 | -0.47 | 35.58 | 1017.4 | 381.9 | 36.6 |
| 8/25/91 | 09:00 | -2.80 | -5.43 | 354.71 | 396.01 | 22.03 | -0.41 | 35.58 | 1017.4 | 378.8 | 33.5 |
| 8/25/91 | 10:00 | -2.65 | -5.25 | 354.66 | 398.91 | 21.93 | -0.50 | 35.47 | 1017.4 | 380.1 | 34.8 |
| 8/25/91 | 11:00 | -2.51 | -5.07 | 354.69 | 396.42 | 21.86 | -0.48 | 35.52 | 1017.2 | 378.0 | 32.7 |
| 8/25/91 | 12:00 | -2.36 | -4.88 | 354.59 | 394.93 | 21.90 | -0.41 | 35.45 | 1016.0 | 377.3 | 32.4 |
| 8/25/91 | 13:00 | -2.20 | -4.71 | 354.60 | 397.42 | 21.95 | -0.45 | 35.49 | 1016.0 | 379.0 | 34.2 |
| 8/25/91 | 14:00 | -2.03 | -4.55 | 354.58 | 398.90 | 21.88 | -0.55 | 35.42 | 1016.0 | 378.6 | 33.9 |
| 8/25/91 | 15:00 | -2.01 | -4.50 | 354.44 | 399.32 | 22.23 | -0.41 | 35.40 | 1016.0 | 381.3 | 36.8 |
| 8/25/91 | 16:00 | -2.01 | -4.50 | 354.66 | 399.05 | 22.22 | -0.45 | 35.46 | 1013.8 | 379.5 | 35.6 |
| 8/25/91 | 17:00 | -2.01 | -4.50 | 354.68 | 397.22 | 22.24 | -0.40 | 35.36 | 1013.8 | 378.6 | 34.6 |
| 8/25/91 | 18:00 | -2.01 | -4.50 | 354.76 | 401.42 | 22.42 | -0.20 | 35.41 | 1013.8 | 386.0 | 42.0 |
| 8/25/91 | 19:00 | -2.04 | -4.50 | 354.79 | 400.24 | 22.25 | -0.29 | 35.50 | 1013.8 | 383.4 | 39.3 |
| 8/25/91 | 20:00 | -2.17 | -4.51 | 354.74 | 397.81 | 22.20 | -0.41 | 35.43 | 1015.4 | 379.6 | 35.0 |
| 8/25/91 | 21:00 | -2.27 | -4.47 | 354.71 | 397.85 | 22.12 | -0.35 | 35.51 | 1015.4 | 380.8 | 36.2 |
| 8/25/91 | 22:00 | -2.20 | -4.41 | 354.76 | 398.51 | 22.02 | -0.29 | 35.53 | 1015.4 | 382.5 | 37.8 |
| 8/25/91 | 23:00 | -2.04 | -4.48 | 354.74 | 396.83 | 22.01 | -0.54 | 35.39 | 1015.4 | 376.6 | 32.0 |
| 8/26/91 | 00:00 | -2.04 | -4.49 | 354.74 | 395.41 | 21.96 | -0.47 | | 1015.8 | 376.6 | 31.7 |
| 8/26/91 | 01:00 | -2.03 | -4.51 | 354.71 | 396.31 | 22.00 | -0.47 | 35.41 | 1015.2 | 377.2 | 32.6 |
| 8/26/91 | 02:00 | -2.02 | -4.53 | 354.71 | 395.72 | 21.91 | -0.48 | | 1015.8 | 376.8 | 32.0 |
| 8/26/91 | 03:00 | -2.00 | -4.55 | 354.71 | 395.26 | 21.86 | -0.45 | 35.40 | 1015.8 | 376.8 | 32.0 |
| 8/26/91 | 04:00 | -1.99 | -4.56 | 354.73 | 395.87 | 21.79 | -0.48 | 35.40 | 1014.5 | 376.5 | 32.0 |
| 8/26/91 | 05:00 | -1.99 | -4.57 | 354.70 | 396.70 | 21.76 | -0.46 | | 1014.8 | 377.8 | 33.2 |
| 8/26/91 | 06:00 | -1.98 | -4.57 | 354.71 | 397.31 | 21.73 | -0.48 | 35.36 | 1015.1 | 378.2 | 33.5 |
| 8/26/91 | 07:00 | -1.98 | -4.58 | 354.76 | 398.10 | 21.73 | -0.48 | 35.35 | 1014.5 | 378.7 | 34.2 |
| 8/26/91 | 08:00 | -1.97 | -4.58 | 354.82 | 398.06 | 21.76 | -0.48 | | 1016.5 | 379.3 | 34.0 |
| 8/26/91 | 09:00 | -1.98 | -4.56 | 354.85 | 397.76 | 21.82 | -0.55 | 35.36 | 1017.4 | 378.2 | 32.7 |
| 8/26/91 | 10:00 | -2.00 | -4.50 | 354.99 | 394.26 | 21.89 | -0.48 | 35.38 | 1017.6 | 376.1 | 30.4 |
| 8/26/91 | 11:00 | -2.01 | -4.50 | 355.05 | 395.04 | 21.97 | -0.49 | 35.36 | 1016.6 | 376.2 | 30.8 |
| 8/26/91 | 12:00 | -2.00 | -4.51 | 354.99 | 395.25 | 21.97 | -0.58 | 35.36 | 1016.5 | 374.8 | 29.6 |
| 8/26/91 | 13:00 | -1.99 | -4.52 | 354.94 | 397.10 | 22.03 | -0.48 | 35.40 | 1016.5 | 378.3 | 33.1 |
| 8/26/91 | 14:00 | -2.01 | -4.52 | 354.89 | 396.97 | 22.13 | -0.40 | 35.39 | 1014.6 | 378.8 | 34.3 |
| 8/26/91 | 15:00 | -2.01 | -4.53 | 354.90 | 397.17 | 22.12 | -0.48 | 35.36 | 1016.5 | 378.3 | 33.2 |
| 8/26/91 | 16:00 | -2.02 | -4.53 | 354.92 | 396.49 | 22.26 | -0.31 | 35.38 | 1013.8 | 379.5 | 35.3 |
| 8/26/91 | 17:00 | -1.90 | -4.73 | 354.94 | 401.50 | 22.12 | -0.35 | 35.43 | 1013.8 | 383.7 | 39.4 |

NOAA South Atlantic 1991 Underway Values

Leg 2 Carbon and Related Parameters

| Date | Time | Lat [degrees] | Long [degrees] | XCO _{2,a} [ppm] | XCO _{2,w} [ppm] | SST [deg. C] | SST-Eq.T [deg. C] | Sal(TSG) | Pressure [mb] | fCO _{2, w} [uatm] | fCO _{2,w-a} [uatm] |
|---------|-------|------------------|-------------------|-----------------------------|-----------------------------|-----------------|----------------------|----------|------------------|-------------------------------|--------------------------------|
| 8/26/91 | 19:00 | -1.62 | -5.15 | 354.97 | 395.65 | 22.12 | -0.53 | 35.29 | 1014.7 | 375.3 | 30.7 |
| 8/26/91 | 20:00 | -1.48 | -5.35 | 355.09 | 403.48 | 22.08 | -0.40 | 35.33 | 1015.4 | 385.3 | 40.3 |
| 8/26/91 | 21:00 | -1.34 | -5.56 | 355.16 | 400.08 | 22.06 | -0.44 | 35.31 | 1015.9 | 381.5 | 36.2 |
| 8/26/91 | 22:00 | -1.20 | -5.77 | 355.23 | 399.98 | 21.89 | -0.34 | 35.36 | 1016.7 | 383.5 | 37.8 |
| 8/26/91 | 23:00 | -1.07 | -5.98 | 355.26 | 400.07 | 21.70 | -0.60 | 35.31 | 1015.4 | 378.8 | 33.6 |
| 8/27/91 | 00:00 | -0.93 | -6.20 | 355.25 | 400.91 | 21.70 | -0.57 | 35.45 | 1016.4 | 380.5 | 34.9 |
| 8/27/91 | 01:00 | -0.80 | -6.41 | 355.12 | 404.89 | 21.74 | -0.48 | 35.41 | 1016.0 | 385.7 | 40.3 |
| 8/27/91 | 02:00 | -0.67 | -6.62 | 355.10 | 407.24 | 21.73 | -0.33 | 35.43 | 1015.8 | 390.5 | 45.1 |
| 8/27/91 | 03:00 | -0.54 | -6.84 | 355.13 | 410.69 | 21.73 | -0.44 | 35.46 | 1016.4 | 392.0 | 46.4 |
| 8/27/91 | 04:00 | -0.40 | -7.05 | 355.11 | 420.72 | 21.72 | -0.41 | 35.48 | 1015.5 | 401.9 | 56.6 |
| 8/27/91 | 05:00 | -0.27 | -7.27 | 355.21 | 416.57 | 21.81 | -0.41 | 35.51 | 1015.5 | 397.9 | 52.5 |
| 8/27/91 | 06:00 | -0.14 | -7.49 | 355.12 | 412.49 | 21.86 | -0.49 | 35.46 | 1015.5 | 392.5 | 47.3 |
| 8/27/91 | 07:00 | -0.01 | -7.70 | 355.14 | 411.09 | 21.99 | -0.43 | 35.50 | 1015.5 | 392.0 | 46.9 |
| 8/27/91 | 08:00 | 0.12 | -7.92 | 355.10 | 412.55 | 22.13 | -0.46 | 35.47 | 1017.7 | 393.8 | 48.0 |
| 8/27/91 | 09:00 | 0.26 | -8.13 | 355.04 | 408.48 | 22.23 | -0.48 | 35.48 | 1017.7 | 389.5 | 43.9 |
| 8/27/91 | 10:00 | 0.40 | -8.35 | 355.04 | 392.17 | 22.05 | -0.48 | 35.44 | 1018.6 | 374.3 | 28.3 |
| 8/27/91 | 11:00 | 0.54 | -8.57 | 355.04 | 399.09 | 22.41 | -0.51 | 35.36 | 1018.4 | 380.1 | 34.3 |
| 8/27/91 | 12:00 | 0.69 | -8.77 | 354.98 | 407.39 | 22.46 | -0.51 | 35.46 | 1017.6 | 387.7 | 42.3 |
| 8/27/91 | 13:00 | 0.83 | -8.98 | 354.98 | 410.93 | 22.58 | -0.51 | 35.49 | 1017.6 | 390.9 | 45.6 |
| 8/27/91 | 14:00 | 0.98 | -9.19 | 354.96 | 406.35 | 22.61 | -0.52 | 35.53 | 1017.6 | 386.4 | 41.2 |
| 8/27/91 | 15:00 | 1.13 | -9.40 | 354.94 | 429.40 | 22.65 | -0.49 | 35.56 | 1015.7 | 408.1 | 63.6 |
| 8/27/91 | 16:00 | 1.27 | -9.61 | 354.97 | 403.27 | 22.65 | -0.47 | 35.53 | 1014.8 | 383.3 | 39.0 |
| 8/27/91 | 17:00 | 1.41 | -9.82 | 354.82 | 407.38 | 22.85 | -0.50 | 35.48 | 1014.8 | 386.6 | 42.5 |
| 8/27/91 | 18:00 | 1.55 | -10.04 | 354.73 | 408.28 | 22.98 | -0.49 | 35.58 | 1014.8 | 387.4 | 43.5 |
| 8/27/91 | 19:00 | 1.70 | -10.25 | 354.69 | 417.17 | 23.15 | -0.40 | 35.62 | 1015.2 | 387.5 | 53.6 |
| 8/27/91 | 20:00 | 1.84 | -10.46 | 354.64 | 409.32 | 23.21 | -0.42 | 35.62 | 1015.3 | 389.7 | 45.9 |
| 8/27/91 | 21:00 | 1.96 | -10.67 | 354.65 | 396.82 | 23.10 | -0.45 | 35.32 | 1015.7 | 377.6 | 33.5 |
| 8/27/91 | 22:00 | 2.09 | -10.89 | 354.69 | 385.09 | 23.50 | -0.85 | 35.06 | 1015.7 | 359.5 | 15.9 |
| 8/27/91 | 23:00 | 2.21 | -11.11 | 354.56 | 338.94 | 25.34 | -0.48 | 35.18 | 1016.8 | 321.0 | -21.9 |
| 8/28/91 | 00:00 | 2.33 | -11.32 | 354.46 | 345.06 | 25.61 | -0.37 | 35.21 | 1016.3 | 328.2 | -14.4 |
| 8/28/91 | 01:00 | 2.46 | -11.52 | 354.45 | 345.12 | 25.72 | -0.30 | 35.19 | 1016.1 | 329.1 | -13.3 |
| 8/28/91 | 02:00 | 2.43 | -11.74 | 354.40 | 345.41 | 25.76 | -0.35 | 35.24 | 1016.3 | 328.8 | -13.6 |
| 8/28/91 | 03:00 | 2.34 | -11.97 | 354.39 | 345.61 | 25.72 | -0.34 | 35.23 | 1016.3 | 329.1 | -13.4 |
| 8/28/91 | 04:00 | 2.24 | -12.20 | 354.44 | 345.55 | 25.63 | -0.31 | 35.20 | 1015.7 | 329.4 | -13.0 |
| 8/28/91 | 05:00 | 2.14 | -12.43 | 354.47 | 345.36 | 25.50 | -0.37 | 35.15 | 1016.0 | 328.5 | -14.1 |
| 8/28/91 | 06:00 | 2.05 | -12.66 | 354.49 | 345.92 | 25.44 | -0.36 | 35.11 | 1016.2 | 329.2 | -13.5 |
| 8/28/91 | 07:00 | 1.95 | -12.89 | 354.53 | 346.04 | 25.40 | -0.37 | 35.12 | 1015.7 | 329.0 | -13.6 |
| 8/28/91 | 08:00 | 1.86 | -13.13 | 354.55 | 346.30 | 25.40 | -0.38 | 35.13 | 1016.8 | 329.6 | -13.4 |
| 8/28/91 | 09:00 | 1.76 | -13.37 | 354.54 | 346.19 | 25.44 | -0.38 | 35.15 | 1016.8 | 329.4 | -13.4 |
| 8/28/91 | 10:00 | 1.66 | -13.61 | 354.56 | 345.73 | 25.47 | -0.36 | 35.15 | 1016.8 | 329.2 | -13.8 |
| 8/28/91 | 11:00 | 1.64 | -13.67 | 354.44 | 347.22 | 25.49 | -0.44 | 35.15 | 1016.8 | 329.4 | -13.4 |
| 8/28/91 | 12:00 | 1.58 | -13.82 | 354.36 | 346.48 | 25.50 | -0.40 | 35.16 | 1017.9 | 329.7 | -13.4 |
| 8/28/91 | 13:00 | 1.48 | -14.06 | | 350.81 | 25.54 | -0.42 | 35.15 | 1017.9 | 333.5 | -9.5 |
| 8/28/91 | 14:00 | 1.37 | -14.30 | 354.40 | 350.72 | 25.56 | -0.39 | 35.15 | 1017.9 | 333.9 | -9.2 |
| 8/28/91 | 15:00 | 1.27 | -14.54 | 354.32 | 350.85 | 25.50 | -0.39 | 35.15 | 1017.9 | 334.0 | -9.1 |
| 8/28/91 | 16:00 | 1.17 | -14.79 | 354.18 | 351.18 | 25.50 | -0.40 | 35.14 | 1014.7 | 333.0 | -8.8 |
| 8/28/91 | 17:00 | 1.07 | -15.03 | 354.11 | 351.03 | 25.45 | -0.41 | 35.15 | 1014.7 | 332.7 | -9.0 |
| 8/28/91 | 18:00 | 0.97 | -15.28 | 353.93 | 352.87 | 25.47 | -0.39 | 35.17 | 1014.7 | 334.8 | -6.8 |
| 8/28/91 | 19:00 | 0.88 | -15.53 | 353.98 | 350.15 | 25.51 | -0.39 | 35.20 | 1014.7 | 332.2 | -9.4 |
| 8/28/91 | 20:00 | 0.79 | -15.78 | 354.02 | 347.00 | 25.44 | -0.35 | 35.24 | 1015.1 | 330.0 | -11.9 |
| 8/28/91 | 21:00 | 0.69 | -16.04 | 354.11 | 348.03 | 25.22 | -0.34 | 35.27 | 1015.5 | 331.4 | -10.8 |
| 8/28/91 | 22:00 | 0.59 | -16.29 | 354.15 | 357.57 | 24.64 | -0.39 | 35.20 | 1015.1 | 340.0 | -2.5 |
| 8/28/91 | 23:00 | 0.49 | -16.53 | 354.14 | 360.70 | 24.57 | -0.38 | 35.15 | 1015.1 | 343.2 | 0.7 |
| 8/29/91 | 00:00 | 0.39 | -16.77 | 354.13 | 368.36 | 24.36 | -0.37 | | 1017.1 | 351.4 | 8.1 |
| 8/29/91 | 01:00 | 0.28 | -17.01 | 354.10 | 374.51 | 24.21 | -0.38 | 35.20 | 1017.1 | 357.3 | 13.9 |
| 8/29/91 | 02:00 | 0.15 | -17.24 | 354.07 | 387.55 | 24.03 | -0.40 | 35.53 | 1017.1 | 369.4 | 26.0 |
| 8/29/91 | 03:00 | 0.02 | -17.46 | 354.11 | 388.93 | 24.00 | -0.46 | 35.57 | 1017.1 | 369.8 | 26.3 |
| 8/29/91 | 04:00 | -0.09 | -17.66 | 354.11 | 389.35 | 24.13 | -0.47 | 35.59 | 1017.1 | 369.8 | 26.5 |
| 8/29/91 | 05:00 | -0.09 | -17.65 | 354.07 | 390.57 | 24.15 | -0.46 | 35.61 | 1017.1 | 371.3 | 28.0 |
| 8/29/91 | 06:00 | -0.09 | -17.65 | 354.10 | 389.42 | 24.10 | -0.47 | 35.59 | 1017.1 | 370.0 | 26.6 |
| 8/29/91 | 07:00 | -0.10 | -17.65 | 354.10 | 390.16 | 24.09 | -0.47 | 35.60 | 1015.1 | 370.0 | 27.3 |

NOAA South Atlantic 1991 Underway Values

Leg 2 Carbon and Related Parameters

| Date | Time | Lat [degrees] | Long [degrees] | XCO _{2,a} [ppm] | XCO _{2,w} [ppm] | SST [deg. C] | SST-Eq.T [deg. C] | Sal(TSG) | Pressure [mb] | fCO _{2, w} [uatm] | fCO _{2,w-a} [uatm] |
|---------|-------|------------------|-------------------|-----------------------------|-----------------------------|-----------------|----------------------|----------|------------------|-------------------------------|--------------------------------|
| 8/29/91 | 08:00 | -0.10 | -17.65 | 354.13 | 390.17 | 24.10 | -0.47 | 35.60 | 1013.8 | 369.6 | 27.3 |
| 8/29/91 | 09:00 | -0.10 | -17.64 | 354.12 | 389.32 | 24.09 | -0.46 | 35.60 | 1017.1 | 370.1 | 26.7 |
| 8/29/91 | 10:00 | -0.10 | -17.66 | 354.12 | 389.08 | 24.10 | -0.48 | 35.60 | 1017.1 | 369.5 | 26.1 |
| 8/29/91 | 11:00 | -0.11 | -17.69 | 354.00 | 389.81 | 24.14 | -0.49 | 35.59 | 1017.1 | 370.1 | 27.5 |
| 8/29/91 | 12:00 | -0.21 | -17.93 | 354.06 | 392.81 | 24.18 | -0.45 | 35.64 | 1014.8 | 372.6 | 30.1 |
| 8/29/91 | 13:00 | -0.30 | -18.17 | 354.05 | 404.85 | 24.17 | -0.49 | 35.77 | 1014.2 | 383.1 | 40.8 |
| 8/29/91 | 14:00 | -0.37 | -18.41 | 353.99 | 404.31 | 24.39 | -0.48 | 35.78 | 1016.0 | 383.4 | 40.7 |
| 8/29/91 | 15:00 | -0.43 | -18.65 | 353.98 | 402.69 | 24.67 | -0.44 | 35.77 | 1016.0 | 382.4 | 39.8 |
| 8/29/91 | 16:00 | -0.48 | -18.89 | 353.91 | 395.92 | 24.76 | -0.44 | 35.77 | 1013.5 | 374.8 | 33.3 |
| 8/29/91 | 17:00 | -0.57 | -19.11 | 354.05 | 393.89 | 24.84 | -0.45 | 35.75 | 1012.8 | 372.4 | 31.0 |
| 8/29/91 | 18:00 | -0.66 | -19.33 | 354.25 | 387.61 | 24.91 | -0.45 | 35.71 | 1012.8 | 366.4 | 24.9 |
| 8/29/91 | 19:00 | -0.74 | -19.54 | 354.40 | 384.66 | 24.92 | -0.43 | 35.72 | 1012.9 | 364.1 | 22.4 |
| 8/29/91 | 20:00 | -0.83 | -19.76 | 354.52 | 384.15 | 24.89 | -0.42 | 35.71 | 1013.6 | 364.1 | 22.0 |
| 8/29/91 | 21:00 | -0.93 | -19.97 | 354.61 | 383.27 | 24.93 | -0.42 | 35.68 | 1014.1 | 363.4 | 21.0 |
| 8/29/91 | 22:00 | -1.02 | -20.18 | 354.44 | 380.07 | 24.98 | -0.36 | | 1014.7 | 361.5 | 19.1 |
| 8/29/91 | 23:00 | -1.11 | -20.40 | 354.69 | 381.57 | 24.98 | -0.44 | 35.68 | 1013.9 | 361.3 | 19.0 |
| 8/30/91 | 00:00 | -1.20 | -20.62 | 354.67 | 377.64 | 25.05 | -0.38 | | 1015.7 | 359.2 | 16.3 |
| 8/30/91 | 01:00 | -1.29 | -20.84 | 354.64 | 377.45 | 25.06 | -0.40 | | 1015.7 | 358.6 | 15.7 |
| 8/30/91 | 02:00 | -1.38 | -21.06 | 354.59 | 377.55 | 25.07 | -0.39 | 35.68 | 1014.5 | 358.4 | 16.0 |
| 8/30/91 | 03:00 | -1.47 | -21.28 | 354.44 | 377.00 | 25.06 | -0.40 | 35.68 | 1014.3 | 357.7 | 15.5 |
| 8/30/91 | 04:00 | -1.56 | -21.51 | 354.38 | 376.80 | 25.08 | -0.38 | | 1013.8 | 357.6 | 15.6 |
| 8/30/91 | 05:00 | -1.66 | -21.73 | 354.32 | 376.30 | 25.09 | -0.39 | 35.68 | 1013.0 | 356.8 | 15.2 |
| 8/30/91 | 06:00 | -1.75 | -21.95 | 354.21 | 378.67 | 25.03 | -0.36 | 35.68 | 1013.0 | 359.5 | 17.9 |
| 8/30/91 | 07:00 | -1.85 | -22.18 | 354.25 | 378.78 | 25.03 | -0.40 | | 1013.0 | 358.9 | 17.4 |
| 8/30/91 | 08:00 | -1.94 | -22.39 | 354.23 | 378.70 | 25.04 | -0.38 | 35.66 | 1013.9 | 359.6 | 17.7 |
| 8/30/91 | 09:00 | -2.03 | -22.62 | 354.31 | 377.24 | 25.03 | -0.39 | 35.65 | 1013.9 | 357.9 | 16.0 |
| 8/30/91 | 10:00 | -2.13 | -22.85 | 354.38 | 376.91 | 25.08 | -0.39 | | 1013.9 | 357.7 | 15.7 |
| 8/30/91 | 11:00 | -2.22 | -23.07 | 354.43 | 377.78 | 25.07 | -0.41 | 35.65 | 1013.9 | 358.2 | 16.1 |
| 8/30/91 | 12:00 | -2.31 | -23.30 | 354.77 | 379.37 | 25.10 | -0.43 | 35.66 | 1014.7 | 359.7 | 17.0 |
| 8/30/91 | 13:00 | -2.41 | -23.52 | 354.58 | 381.88 | 25.12 | -0.45 | | 1015.0 | 361.7 | 19.3 |
| 8/30/91 | 14:00 | -2.50 | -23.75 | 354.66 | 383.65 | 25.20 | -0.44 | 35.71 | 1014.3 | 363.2 | 21.0 |
| 8/30/91 | 15:00 | -2.59 | -23.97 | 354.77 | 384.35 | 25.25 | -0.45 | | 1014.7 | 363.9 | 21.4 |
| 8/30/91 | 16:00 | -2.68 | -24.20 | 354.83 | 386.25 | 25.30 | -0.46 | | 1013.0 | 364.9 | 22.9 |
| 8/30/91 | 17:00 | -2.76 | -24.43 | 354.79 | 387.91 | 25.35 | -0.39 | 35.78 | 1012.8 | 367.5 | 25.6 |
| 8/30/91 | 18:00 | -2.86 | -24.65 | 365.05 | 403.84 | 25.33 | -0.47 | | 1012.8 | 381.3 | 39.5 |
| 8/30/91 | 19:00 | -2.95 | -24.88 | 354.78 | 400.39 | 25.38 | -0.44 | | 1012.8 | 378.4 | 36.7 |
| 8/30/91 | 20:00 | -3.01 | -24.99 | 354.94 | 400.77 | 25.41 | -0.46 | 35.86 | 1013.7 | 378.7 | 36.5 |
| 8/30/91 | 21:00 | -3.01 | -24.99 | 354.90 | 400.02 | 25.40 | -0.44 | | 1012.8 | 378.0 | 36.1 |
| 8/30/91 | 22:00 | -3.01 | -24.99 | 354.95 | 399.41 | 25.40 | -0.44 | | 1012.8 | 377.5 | 35.5 |
| 8/30/91 | 23:00 | -3.01 | -24.98 | 354.95 | 398.80 | 25.39 | -0.43 | 35.86 | 1012.8 | 377.0 | 35.1 |
| 8/31/91 | 00:00 | -3.02 | -24.96 | 354.87 | 398.64 | 25.38 | -0.40 | | 1012.8 | 377.4 | 35.5 |
| 8/31/91 | 01:00 | -3.07 | -24.90 | 354.74 | 398.79 | 25.36 | -0.42 | | 1015.3 | 378.3 | 35.6 |
| 8/31/91 | 02:00 | -3.08 | -24.90 | 354.65 | 399.07 | 25.35 | -0.42 | | 1015.3 | 378.5 | 36.0 |
| 8/31/91 | 03:00 | -3.09 | -24.89 | 354.52 | 399.34 | 25.34 | -0.42 | | 1015.3 | 378.7 | 36.3 |
| 8/31/91 | 04:00 | -3.10 | -24.89 | 354.38 | 399.45 | 25.33 | -0.42 | | 1013.9 | 378.3 | 36.5 |
| 8/31/91 | 05:00 | -3.11 | -24.88 | 354.24 | 399.69 | 25.33 | -0.42 | | 1013.9 | 378.6 | 36.9 |
| 8/31/91 | 06:00 | -3.12 | -24.88 | 353.94 | 399.66 | 25.32 | -0.42 | | 1013.9 | 378.5 | 37.1 |
| 8/31/91 | 07:00 | -3.13 | -24.87 | 353.96 | 399.63 | 25.31 | -0.42 | | 1013.9 | 378.4 | 37.0 |
| 8/31/91 | 08:00 | -3.14 | -24.87 | 354.00 | 399.67 | 25.30 | -0.43 | | 1014.8 | 378.8 | 37.0 |
| 8/31/91 | 09:00 | -3.15 | -24.88 | 354.01 | 399.19 | 25.30 | -0.43 | | 1014.8 | 378.3 | 36.5 |
| 8/31/91 | 10:00 | -3.14 | -24.90 | 354.14 | 398.17 | 25.30 | -0.40 | | 1014.8 | 377.9 | 35.9 |
| 8/31/91 | 11:00 | -3.10 | -24.92 | 354.37 | 399.38 | 25.31 | -0.44 | | 1014.8 | 378.3 | 36.1 |
| 8/31/91 | 12:00 | -3.10 | -24.91 | 354.34 | 399.71 | 25.32 | -0.45 | | 1015.5 | 378.6 | 36.3 |
| 8/31/91 | 13:00 | -3.11 | -24.90 | 354.82 | 400.75 | 25.35 | -0.46 | | 1015.5 | 379.5 | 36.8 |
| 8/31/91 | 14:00 | -3.13 | -24.90 | 354.87 | 401.23 | 25.38 | -0.46 | | 1015.5 | 380.0 | 37.2 |
| 8/31/91 | 15:00 | | | 354.88 | 401.84 | 25.40 | -0.48 | | 1015.5 | 380.1 | 37.4 |
| 8/31/91 | 16:00 | -3.17 | -24.87 | 354.90 | 402.33 | 25.41 | -0.48 | | 1012.8 | 379.5 | 37.7 |
| 8/31/91 | 17:00 | -3.19 | -24.84 | 354.73 | 402.35 | 25.43 | -0.47 | | 1012.8 | 379.7 | 38.1 |
| 8/31/91 | 18:00 | -3.22 | -24.81 | 354.66 | 401.74 | 25.42 | -0.45 | | 1012.8 | 379.4 | 37.8 |
| 8/31/91 | 19:00 | -3.25 | -24.78 | 354.54 | 401.31 | 25.46 | -0.39 | | 1012.8 | 380.1 | 38.6 |
| 8/31/91 | 20:00 | -3.28 | -24.75 | 354.53 | 400.54 | 25.46 | -0.35 | | 1013.7 | 380.4 | 38.5 |

NOAA South Atlantic 1991 Underway Values

Leg 2 Carbon and Related Parameters

| Date | Time | Lat [degrees] | Long [degrees] | XCO _{2,a} [ppm] | XCO _{2,w} [ppm] | SST [deg. C] | SST-Eq.T [deg. C] | Sal(TSG) | Pressure [mb] | fCO _{2, w} [uatm] | fCO _{2,w-a} [uatm] |
|---------|-------|------------------|-------------------|-----------------------------|-----------------------------|-----------------|----------------------|----------|------------------|-------------------------------|--------------------------------|
| 8/31/91 | 21:00 | -3.31 | -24.97 | 354.55 | 397.91 | 25.36 | -0.38 | | 1013.7 | 377.4 | 35.5 |
| 8/31/91 | 22:00 | -3.31 | -25.22 | 354.58 | 398.75 | 25.33 | -0.41 | | 1013.7 | 377.7 | 35.8 |
| 8/31/91 | 23:00 | -3.31 | -25.47 | 354.65 | 394.82 | 25.30 | -0.30 | | 1013.7 | 376.0 | 33.9 |
| 9/1/91 | 00:00 | -3.32 | -25.72 | 354.61 | 395.54 | 25.20 | -0.38 | 35.66 | 1015.3 | 376.0 | 33.3 |
| 9/1/91 | 01:00 | -3.33 | -25.96 | 354.70 | 393.63 | 25.30 | -0.56 | 35.64 | 1015.3 | 370.9 | 28.4 |
| 9/1/91 | 02:00 | -3.35 | -26.21 | 354.61 | 381.59 | 25.70 | -0.39 | 35.84 | 1015.3 | 362.2 | 19.9 |
| 9/1/91 | 03:00 | -3.36 | -26.46 | 354.55 | 382.03 | 25.72 | -0.35 | 35.87 | 1015.3 | 363.2 | 21.0 |
| 9/1/91 | 04:00 | -3.38 | -26.71 | 354.56 | 384.49 | 25.70 | -0.37 | 35.83 | 1014.1 | 364.8 | 23.0 |
| 9/1/91 | 05:00 | -3.40 | -26.97 | 354.55 | 386.95 | 25.71 | -0.32 | 35.84 | 1014.1 | 368.0 | 26.1 |
| 9/1/91 | 06:00 | -3.42 | -27.22 | 354.66 | 388.75 | 25.65 | -0.36 | 35.77 | 1014.1 | 369.1 | 27.1 |
| 9/1/91 | 07:00 | -3.44 | -27.47 | 354.50 | 390.89 | 25.53 | -0.38 | 35.70 | 1014.2 | 370.9 | 29.0 |
| 9/1/91 | 08:00 | -3.46 | -27.73 | 354.48 | 389.76 | 25.54 | -0.38 | 35.69 | 1014.7 | 370.0 | 28.0 |
| 9/1/91 | 09:00 | -3.48 | -27.98 | 354.53 | 388.44 | 25.57 | -0.37 | 35.70 | 1014.7 | 368.8 | 26.7 |
| 9/1/91 | 10:00 | -3.50 | -28.24 | 354.37 | 388.31 | 25.61 | -0.39 | 35.72 | 1014.7 | 368.4 | 26.5 |
| 9/1/91 | 11:00 | -3.52 | -28.49 | 354.21 | 387.60 | 25.67 | -0.38 | 35.75 | 1014.7 | 367.7 | 26.0 |
| 9/1/91 | 12:00 | -3.54 | -28.75 | 354.23 | 387.62 | 25.72 | -0.38 | 35.76 | 1015.9 | 368.3 | 26.1 |
| 9/1/91 | 13:00 | -3.56 | -29.00 | 354.10 | 387.68 | 25.75 | -0.42 | 35.72 | 1015.9 | 367.6 | 25.6 |
| 9/1/91 | 14:00 | -3.57 | -29.26 | 353.89 | 388.40 | 25.78 | -0.40 | 35.73 | 1015.9 | 368.6 | 26.9 |
| 9/1/91 | 15:00 | -3.59 | -29.52 | 353.83 | 390.03 | 25.74 | -0.42 | 35.71 | 1015.9 | 369.9 | 28.2 |
| 9/1/91 | 16:00 | -3.61 | -29.77 | 353.86 | 393.71 | 25.72 | -0.41 | 35.70 | 1013.6 | 372.6 | 31.6 |
| 9/1/91 | 21:00 | -3.69 | -31.05 | 354.23 | 384.64 | 25.78 | -0.35 | 35.97 | 1014.7 | 365.5 | 23.8 |
| 9/1/91 | 22:00 | -3.71 | -31.30 | 354.40 | 384.56 | 25.79 | -0.36 | 35.97 | 1014.7 | 365.1 | 23.3 |
| 9/1/91 | 23:00 | -3.72 | -31.55 | 354.61 | 386.61 | 25.82 | -0.36 | 36.01 | 1014.7 | 367.2 | 25.2 |
| 9/2/91 | 00:00 | -3.69 | -31.79 | 354.70 | 386.44 | 25.89 | -0.34 | 36.03 | 1016.6 | 368.0 | 25.3 |
| 9/2/91 | 01:00 | -3.72 | -32.04 | 354.72 | 382.68 | 25.85 | -0.36 | 35.95 | 1016.6 | 364.1 | 21.4 |
| 9/2/91 | 02:00 | -3.74 | -32.29 | 354.73 | 383.74 | 25.88 | -0.35 | 35.99 | 1016.6 | 365.2 | 22.5 |
| 9/2/91 | 03:00 | -3.75 | -32.54 | 354.56 | 391.19 | 25.84 | -0.35 | 36.05 | 1015.7 | 372.0 | 29.7 |
| 9/2/91 | 04:00 | -3.73 | -32.79 | 354.52 | 393.34 | 25.86 | -0.34 | 36.07 | 1015.2 | 374.0 | 31.9 |
| 9/2/91 | 05:00 | -3.71 | -33.03 | 354.68 | 392.04 | 25.93 | -0.34 | 36.09 | 1015.2 | 372.8 | 30.5 |
| 9/2/91 | 06:00 | -3.69 | -33.28 | 354.79 | 393.01 | 25.92 | -0.34 | 36.08 | 1015.2 | 373.7 | 31.4 |
| 9/2/91 | 07:00 | -3.66 | -33.53 | 354.77 | 391.32 | 25.95 | -0.34 | 36.08 | 1015.2 | 372.0 | 29.7 |
| 9/2/91 | 08:00 | -3.63 | -33.78 | 354.81 | 391.24 | 25.96 | -0.35 | 36.07 | 1015.7 | 372.0 | 29.5 |
| 9/2/91 | 09:00 | -3.61 | -34.03 | 355.14 | 390.90 | 25.99 | -0.34 | 36.08 | 1015.7 | 371.7 | 29.0 |
| 9/2/91 | 10:00 | -3.58 | -34.29 | 354.92 | 390.20 | 25.96 | -0.33 | 36.08 | 1015.7 | 371.3 | 28.7 |
| 9/2/91 | 11:00 | -3.55 | -34.54 | 354.97 | 390.69 | 25.93 | -0.37 | 36.06 | 1017.6 | 371.9 | 28.5 |
| 9/2/91 | 12:00 | -3.52 | -34.79 | 354.94 | 391.43 | 25.92 | -0.38 | 36.05 | 1017.4 | 372.3 | 29.1 |
| 9/2/91 | 13:00 | -3.52 | -35.04 | 355.11 | 389.88 | 25.98 | -0.38 | 36.08 | 1017.4 | 370.8 | 27.4 |
| 9/2/91 | 14:00 | -3.48 | -35.03 | 355.11 | 390.03 | 26.00 | -0.38 | 36.07 | 1017.4 | 370.9 | 27.5 |
| 9/2/91 | 15:00 | -3.46 | -35.05 | 355.56 | 391.63 | 26.00 | -0.40 | 36.06 | 1017.4 | 372.0 | 28.3 |