Bermuda Biological Station for Research, Inc.
U.S. Joint Global Ocean Flux Study
Bermuda Atlantic Time-series Study

Data Report for BATS 1—BATS 12
October, 1988—September, 1989

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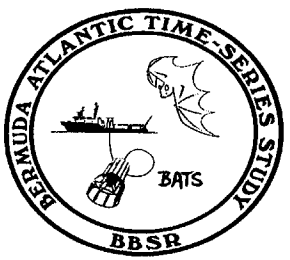

Introduction

The Joint Global Ocean Flux Study (JGOFS) is an international and multi-disciplinary study with the goal of understanding the role of the oceans in global carbon and nutrient cycles. The Scientific Council on Ocean Research describes this goal for the international program: "To determine and understand the time-varying fluxes of carbon and associated biogenic elements in the ocean, and to evaluate the related exchanges with the atmosphere, sea floor and continental boundaries." As part of this effort in the United States, the National Science Foundation has funded two time-series stations, one in Bermuda and the second in Hawaii. The Bermuda Atlantic Time-series Study (BATS) is being administered by the Bermuda Biological Station for Research, Inc. (BBSR) with Dr. Anthony H. Knap as the principle investigator.

The objectives of the JGOFS time-series study at Bermuda are: (1) to observe and interpret the annual and interannual variability in the biology and chemistry of the mixed layer and euphotic zone; (2) to observe and interpret the annual and interannual variability in the rates of particle flux and the apparent rates of particle remineralization over the entire water column; (3) to understand the interrelationships between the biological and chemical processes involved in (1) and (2) above and the physical characteristics of the water column and (4) to provide data on global trends of selected oceanic properties over decadal time scales.

Data collection for the Bermuda Atlantic Time-series Study began in October, 1988, with a gradual phase-in of the current set of measurements over a two to three month period. This report presents the results from the first 12 cruises, BATS 1 to BATS 12, conducted between October, 1988 and September, 1989. It is the first in a series of reports that will be one mechanism for the dispersal of the time-series data. In December 1990, a data report was issued for the first six months of BATS data. The U.S. JGOFS Time-series Oversight Committee then decided that all data should be reported in units of weight (e.g., μmole/kg). Therefore, the first six months are re-reported here after conversion to the new units. This report supercedes that previous report. These data reports will also include any updates on methods as they are altered or as new measurements are added. A detailed report on the BATS methods is being published and regularly updated by the Bermuda Biological Station for Research (Ferry Reach, GE 01, Bermuda). A summary of the BATS methods is presented below. The data are available in digital form through NODC (Woods Hole Oceanographic Institution) or on request from BBSR.

The time-series program is the joint effort of a number of people from different institutions. Dr. Anthony H. Knap, the director of BBSR, is the principal investigator. In the BBSR group, Rachael L. Dow, the head technician, and Rodney J. Johnson have been a part of the program since the beginning. They were joined by Kjell Gundersen in the first year, Jens Sorensen in April 1990 and Ann Close in May 1990. Dr. Paul Wassmann, provided scientific assistance in the first months. Dr. Anthony F. Michaels, an Assistant Research Scientist at BBSR, joined the program in September, 1989. The primary

production and sinking flux measurements are carried out under a subcontract to Drs. George A. Knauer, Steve E. Lohrenz and Vernon A. Asper at the Center for Marine Science at the University of Southern Mississippi. Merritt Tuel (USM) participated on nearly every cruise to perform these measurements. Samples are also collected and dispersed to Dr. Hugh Ducklow (Horn Point Ecological Laboratories) for enumeration of bacteria by Helen Quinby and to Dr. Peter Brewer for measurement of total CO_2.

In this report we present the results of the first 12 cruises: October, 1988 to September, 1989. Four of these cruises (BATS 3-7) were conducted on the R.V. Henlopen. The other 8 cruises were conducted on the original R.V. Weatherbird. This document begins with a summary of the BATS methods. A more detailed description of these methods is available from the BBSR Library as a special report. The data are divided by cruise. Each cruise section begins with a cruise report that describes the sampling on the cruise and some details of the subsequent analysis. Any qualifiers on data quality and calibration are included here. A map shows the locations of each cast and the trap deployment and recovery. The CTD data are presented next as a table of the 2 db averaged values on regular depth intervals. The CTD tables are followed by a series of figures of the CTD data at the 2 db resolution. The discrete data from the Niskin bottle casts are then presented in four sections, physical data, gases, nutrients and particulates. Finally, the primary production and sediment trap results are presented. After the reports from each of the cruises, we include a separate section on meteorological data from the BBSR weather station on St. David's Head, Bermuda.

Methods Summary

The U.S.JGOFS Bermuda Atlantic Time-series Study (BATS) cruises consist of a single four-five day cruise at monthly intervals. The core set of samples is collected from 5 hydrocasts, one measurement of integrated primary production and one, three day duration sediment trap deployment. These cruises usually follow a regular schedule for the sequence and timing of events. This schedule is described below. This report presents the first twelve cruises in this series, and the shipboard methods evolved considerably over this time period. Weather, equipment problems and other activities occasionally cause this schedule to be interrupted or rearranged. Therefore, in the data report for each cruise, the exact schedule actually used is reported, including the timing and nature of other activities. The schedule described below represents a summary of all the core activities on each cruise in the order that they would be performed barring any other factors.

The transit time to the BATS station is approximately 6 hours. On this transit, the ship makes one stop to collect surface-seawater for the sediment trap density gradient. Immediately after arrival at the nominal station location (31°50' N, 64°10' W), the sediment traps are deployed. This trap array has Multi-traps at 150, 200, 300 and 400 m depths. The trap is free-floating and equipped with a strobe, radio beacon and an Argos satellite transmitter. The ship remains near the trap for the rest of the sampling period resulting in a quasi-Lagrangian sampling plan. The locations of each cast are reported with the data reports. The maximum deviation from the station location is 100 km. Each data section has a simple graph of the locations of each cast and the trap deployments as a visual reference guide.

Hydrocasts

The core measurements require 5 hydrocasts using the CTD-rosette system. These hydrocasts are usually done in order by depth, beginning with the deepest cast. Twelve discrete water samples are taken on the upcast of each cast with the 12 l Niskin bottles. The five casts are:

Cast 1: 0-4200 m. Bottle samples (12) are collected at 200 m intervals from 4200 m to 2000 m.

Cast 2: 0-1800 m. Bottle samples (12) are collected at depths of 1800, 1600, 1400, 1200, 140, 120, 100, 80, 60, 40, 20 m and the surface. The shallow depths are identical to the ones used for the primary production cast.

Cast 3: 0-1000 m. Bottle samples (12) are collected at depths of 1000 (2), 900, 800, 750 (2), 600, 500 (2), 400, 300 (2). Duplicate bottles are taken at the noted depths (2).

Cast 4: 0-250 m. Bottle samples (12) are collected at depths of 250, 200, and 10 other depths between 0 and 200 m. These depths are chosen to complement the shallow bottles in cast 2 and to sample features that are seen in the continuous profiles of temperature (mixed layer, upper thermocline), fluorescence (fluorescence maximum, other maxima and minima) and beam attenuation (particle maxima). The depth coverage in the upper 200 m is kept at finer than 30 m spacing to ensure adequate coverage.

Cast 5: Same depths as Cast 4. The additional measurements made from the surface samples require extra water collected on this replicate cast.

Water Sampling

Sampling begins immediately after the rosette is brought on board and secured. Oxygen samples are drawn first. Two 115 ml BOD bottles are filled from each Niskin and the order of the two samples is recorded. One set of BOD bottles is for the first oxygen sample, termed O_2-1 and a different and distinct set is for the second oxygen sample which is termed the replicate oxygen sample or O_2-2 in all data records. After the oxygens, a single sample for total CO_2 (for P. Brewer, only taken on cast 4) is drawn, followed by a single salinity sample. This sampling order is common to all the bottles in the first four casts. The remainder of the sampling differs depending on the depth.

For the samples below 1000 m (Cast 1 and part of Cast 2), the next step in the sampling is drawing silicate and nutrient samples in that order. Samples for bacteria enumeration are drawn at 3000 and 4000 m. For samples above 1000 m, the silicate and nutrient samples are drawn in conjunction with the particulate silicate (not reported here) and particulate organic carbon and nitrogen samples. The replicate depths in cast 5 are used for chlorophyll *a* determination, bacteria enumeration and samples for HPLC determination of pigments (delivered to N. Welschmeyer, but never analyzed).

Deckboard water-processing activities are usually divided into specific tasks. Two or three people draw the water, while one person preserves the oxygens and keeps track of the sampling operation. Bottle numbers for each sample at each depth are determined before the cast. All of the sampling people are informed of the sampling scheme and the oversight person ensures that it is being accurately carried out.

The primary production cast is performed on either the first or second day, depending on the weather, time of arrival at station, etc. The dawn to dusk *in situ* production measurement involves the pre-dawn collection of water samples at 8 depths using trace-metal clean sampling techniques. A length of Kevlar hydrowire has been mounted on one of the winches. The bottles are 12 liter Go-Flos with Viton O-rings. These Go-Flos are periodically acid cleaned. The bottles are mounted on the Kevlar line and depths are measured with a metered block, or premeasured before the cast, and marked with tape. These samples are brought back on deck, transferred in the dark to 250 ml production bottles, ^{14}C added and the production bottles attached to a length of polypropylene line at the depth of collection. This array is deployed with surface flotation which includes a radio beacon and a flasher. The ship follows this production array during the 12-15 hour period that it is deployed, occasionally shuttling back to the trap location. At sunset this array is recovered and processed.

The sediment trap array is allowed to drift free for a 72 hour period. Its location is monitored with Argos and radio transponders and by regular relocation by the ship. The rate of drift can be considerable, as much as 100 km in three days.

Shipboard Sample Processing

Most of the actual sample analysis is done ashore at the Bermuda Biological Station for Research, Inc. Oxygen samples are usually analyzed at sea because of concerns regarding the storage of these samples for periods of 2-3 days. Oxygens collected on the last day are often returned to shore for analysis. All of the other measurements have preservation techniques that enable the analysis to be postponed.

CTD and Related Measurements

Equipment

A Sea-Bird CTD with additional sensors is used to measure continuous profiles of temperature, salinity, dissolved oxygen, downwelling irradiance, beam attenuation and *in vivo* fluorescence. This instrument package is mounted on a 12 position General Oceanics Model 1015 rosette that is typically equipped with 12, 12 l Niskin bottles. The package is deployed on a single conductor hydrowire. The system described below is owned and operated by the BBSR. Occasionally, the BATS cruises have used other vessels (specifically the R.V. Henlopen from December, 1988 - April, 1989, and the Cape Hatteras in June, 1991) and other instruments have been used. The R.V. Henlopen system is a Neil Brown MK-3B CTD. Data reduction and standardisation procedures are similar for all cruises. After each cast, a CTD log sheet is completely filled out. The ship's position is recorded directly from the Loran TD values rather than the Loran unit's calculated position, which is not usually current. SatNav positions are also recorded. Relevant information, such as weather conditions, is added in the notes section.

Sea-Bird CTD: The CTD system consists of an SBE 9 underwater CTD unit and an SBE 11 deck unit. There are four principle components: A pressure sensor, a temperature sensor, a flow-through conductivity sensor and a pump for the conductivity cell and oxygen electrode.

Pressure: Digiquartz with temperature compensation. Range: 0-7000 dbar. Depth resolution: 0.004% full scale. Response time: 0.001 s.

Temperature: SBE 3-02/F. Range: -5 to 35°C. Accuracy ±0.003°C over a 6 month period. Resolution: 0.0003°C. Response time: 0.082 s at a drop rate of 0.5 m/sec.

Conductivity (flow-through cell): SBE 4-02/0. Range 0-7 Siemens/meter. Accuracy ±0.003 S/m per year. Resolution: 5 x 10^{-5} S/m. Response time: 0.084 s at a 0.5 m/s drop rate with the pump.

Pump: SBE 5-02. Typical flow rate for the BBSR system is approx. 15 ml/s. The pump is used to control the flow through the conductivity cell to match the response time to the temperature sensor. It is also used to pull water through the dissolved oxygen sensor.

Dissolved Oxygen (Flow-through cell): SBE 13-02 (Beckman polargraphic type). Range: 0-15 ml/l. Resolution: 0.01 ml/l. Response time: 2 seconds.

Beam Transmission: Sea-Tech, 25 cm path-length. Light source wavelength = 670 nm. Depth range 0-6000 m.

Downwelling Irradiance (PAR): Biospherical QSP-200L, logarithmic output, irradiance profiling sensor. Uses a spherical irradiance receiver (no cosine collector in use). Spectral response - equal quantum response from 400-700 nm wavelengths. Depth range: 0-1000 m. Used in conjunction with a Biospherical QSP-170 deckboard unit for measuring surface irradiance (PAR).

Fluorescence: Sea Tech SN/83 (plastic housing). Three sensitivity settings: 0-3 mg/m^3 (used in BATS), 0-10 mg/m^3, and 0-30 mg/m^3. Excitation: 425 nm peak, 200 nm FWHM. Emission: 685 nm peak, 30 nm FWHM. The fluorescence unit is rated to 500 m depth and is only used on one or two shallow casts. Connecting the fluorescence unit requires disconnecting and rearranging some of the other instruments. The oxygen meter is disconnected. The transmissometer is plugged in to the dissolved oxygen sensor socket, and the fluorometer plugged in to the transmissometer socket. (This unit was not purchased until after BATS 6, therefore, *in vivo* fluorescence data are not reported earlier.)

Data Collection

The CTD package is operated as per Sea-Bird's suggested methods. The data from the package pass through a Sea-Bird deck unit and a General Oceanics deck unit before being stored on the hard disk of a Compaq portable computer. The data acquisition rate is 24 samples per second (Hz). The Sea-Bird deck unit averages these data to 1 Hz in real time. Averaging in the time-domain helps reduce salinity spiking. The 1 Hz time-stream data are subsequently stored on the PC.

Data Processing

Data processing is done back at BBSR on an AST, 80286 AT or Dell, 80386, IBM compatible microcomputer using the Sea-Bird software and MATLAB by MathWorks, Inc. (21 Elliot Street, South Natick, MA 01760 USA). Each profile is first plotted and visually examined for bad data and spikes. The data file is then pressure sorted and a 7 point median filter applied to eliminate spikes. Oxygen data are further smoothed by

application of a 17 point running mean. The data are then bin averaged to 2 decibar resolution and saved in ASCII format.

Salt Corrections

The salinity calculated from the conductivity sensor is calibrated to the discrete salinity measurements collected from the Niskin bottles on the rosette. There are 48 salinity samples from 0 to 4200 m. The difference between these salinities and the CTD recorded salinities at the collection depth is regressed against pressure, temperature and CTD salinity using the polynomial relationship:

$$DS = R_0 + \sum_{i=1}^{l} A_i (P/4300)^i + \sum_{i=1}^{m} B_i (T/30)^i + \sum_{i=1}^{n} C_i (SC/37)^i$$

Where:

DS = model (Wet Salinity - CTD Salinity)
R_0 = linear offset
P = pressure (dbar)
T = temperature (°C)
SC = uncorrected CTD salinity
A_i, B_i, C_i = regression coefficients
l, m, n = order of the polynomial functions (usually = 4)

The order of each polynomial is modified for each cast to provide the best fit for the lowest order polynomial. The best fit is determined from the r^2 value and a graphical examination of the residuals. The subsequent regression relationship is used to modify the CTD salinity values from the downcast profile and the regression relationship is reported with the CTD data. For BATS 3-7, the data were provided by the resident technician on the R.V. Cape Henlopen using first and second order polynomials described in the cruise reports.

Oxygen Corrections

The oxygen sensor is calibrated before each cruise. Saturated water is made by bubbling air from a SCUBA tank through tap water for 5-10 hours. Oxygen devoid water is made by adding 3% sodium sulfate. The current (μamps), temperature and barometric pressure are recorded for both solutions and entered into the Sea-Bird program OXFIT to calculate the calibration factors for the oxygen sensor. Despite this activity, the oxygen sensor gives a very poor fit to the bottle data, probably because of both pressure and temperature hysteresis effects. There are 48 replicate discrete oxygen samples from 0 - 4200 m which are used to calibrate this sensor. The deviation between the downcast sensor data and the bottle oxygen data is regressed against pressure using the model equation:

$$\text{Model CTD Oxygen} = R_0 + \sum_{i=1}^{l} A_i (P/4300)^i + \sum_{i=1}^{m} B_i (T/30)^i$$

$$+ \sum_{i=1}^{n} C_i (\text{OC})^i + \sum_{i=1}^{o} D_i (\text{OT}/30)^i + \sum_{i=1}^{p} E_i (\text{OS}/7)^i$$

Where:

R_0 = linear offset
P = pressure (dbar)
T = temperature (°C)
OC = oxygen sensor current (μamps)
OT = oxygen sensor temperature from internal thermistor
OS(t,p,s) = oxygen saturation value at measured temperature, salinity and pressure (μmole/kg)
A_i, B_i, C_i, D_i, E_i = regression coefficients
l, m, n, o, p = order of the polynomial functions (l = 4, rest usually = 2)

The order of each polynomial is determined by comparing successive fits until the correlation coefficients stabilize, and the residuals are randomly distributed. This regression relationship directly predicts the CTD oxygen values from the described parameters.

Transmissometer Calibration

The transmissometer is calibrated before each cruise. The voltage output is measured with the window blocked (zero transmission) and with newly cleaned and dry windows in the open air (approximately 92-93% transmission). These values are entered into the SEACON program, which modifies the Sea-Tech determined calibration coefficients for this sensor:

$$M = 20\ (A\text{-}Y) / (B\text{-}Z)$$
$$B^* = -M \cdot Z$$

Where:

A = Air voltage calculated by Sea-Tech
Y = Blocked voltage calculated by Sea-Tech
B = Measured air voltage
Z = Measured blocked voltage

M and B* are entered into the program SEACON to modify the calibration coefficients. The transmissometer shows frequent offsets in deep water which indicate variations in its

performance. Consequently, we normalize all profiles by assuming that the deep values are 0.364, the theoretical minimum (Bishop, 1986). An offset is calculated for the depth of 3000-3400m when the attenuation is minimal. The constant offset is then applied to the entire profile. There is no offset correction for the R.V. Henlopen cruises, BATS 3-7.

The SeaTech transmissometers used on these cruises have had a series of problems, some of them associated with component failures on the deeper casts. Other problems are associated with the temperature compensation unit in the transmissometer. These temperature related problems give rise to a variety of suspect behaviors: 1) high surface values (well beyond normal) that correlate with the time of day (highest at noon), 2) exponential decay within and below the mixed layer, 3) linear or exponential decays in the permament thermocline, and 4) high cast to cast variability, even in deep water. The ability to distinguish between genuine patterns and instrument problems can be difficult.

Fluorometer

The fluorometer returns a voltage signal that is processed by the Seasoft software to a chlorophyll concentration. There is a standard instrument offset which is determined from the voltage reading on deck with the liht sensor blocked off. There is a "scale factor" which is determined for each chlorophyll range. The BATS fluorometer is scaled to read chlorophyll from 0 - 1.5 μg/l.

In addition to the standard offset, there is a post cruise offset that is applied considering the measured chlorophyll concentration in the water column. This "field offset" is determined using the data from 250 m depth:

Field Offset = Extracted Chlorophyll (@ 250 m) - *in situ* Fluorometer Chlorophyll (@ 250 m)

This offset procedure is applied to all of the CTD casts on that cruise.

Dissolved Oxygen by the Winkler Procedure

Shipboard Sampling

In all cases, the oxygen sample is the first sample removed from the bottle and a replicate oxygen sample is the second sample removed from the bottle. These samples are taken as soon as possible after the bottle is returned to the surface, typically within 5-15 minutes of recovery. The oxygen samples are drawn into individually numbered, 115 ml BOD bottles. One set of BOD bottles is for the first oxygen sample, a different and distinct set is for the second oxygen sample which is termed the replicate oxygen sample in all data records. These samples are kept distinct to check for problems due to the introduction of air into the Niskin bottles when the first samples are taken. These BOD bottles are rinsed twice with the sample being collected. In obtaining the water sample, great care is taken to avoid bubbles of air from being present in the sample. A 30-50 cm length of tygon tubing is connected to the Niskin bottle spout. The end of the tube is elevated before the spout is opened to prevent the trapping of bubbles in the tube. With the water flowing, the tube is placed in the bottom of the BOD bottle. The bottle is slowly rotated and the side of the bottle tapped with the stopper to ensure that no air bubbles adhere to the bottle walls.

Two to three volumes of water are allowed to overflow from the bottle. The tube is slowly withdrawn from the bottle while the water is still flowing. 1 ml of manganous chloride followed by 1 ml of sodium iodide-sodium hydroxide solution is added to the bottle. The stopper is carefully placed in the bottle to ensure that no bubbles are trapped inside. The bottle is vigorously shaken, then reshaken a few minutes later when the precipitate has settled to the bottom of the bottle. These samples are analyzed within 24 hours, either back at BBSR or on the ship for longer cruises.

The analysis technique is the standard Winkler titration, performed in one of two ways. Whenever possible, the samples are titrated with an automated titrator. The instrument is a MetrOhm 655 Dosimat, Oxygen Auto-Titrator. It consists of a thiosulphate delivery system, an instrument that measures the light transmission through the sample in a BOD bottle, a data converter and a Hewlett Packard 85 computer. The system delivers thiosulphate to the acidified oxygen sample and reads the change in light transmission through the sample. As the endpoint is approached, it delivers progressively smaller aliquots of thiosulphate until it is delivering 0.1 µl near the endpoint. When it records 7 consecutive additions without a change in transmission, it stops and records the total volume delivered. The machine is precise to approximately 1 µl. On occasion, this machine fails to perform properly (generally in bad weather at sea) and titrations are performed by hand. In this case, a 50 ml aliquot is removed from the oxygen bottle and titrated to the endpoint using a starch indicator to aid in endpoint detection. Further details of the methods are available in the BATS Methods Manual.

Salinity

Salinity samples are collected into individually numbered, 250 and 125 ml borosilicate glass bottles. The remaining sample from the previous use is left in the bottles between uses to prevent salt crystal buildup from evaporation. When taking a new sample, the old water is discarded and the bottle is rinsed twice with water from the new sample. On some of the early cruises, the salinity bottles were only rinsed once in normal use. As the same bottle is always used for the same depth, this should not routinely introduce major errors into the salinity determination, however, two rinses is a more standard practice. After rinsing, the bottle is then filled to the shoulder with sample. The cap is replaced and firmly tightened. These samples are stored for analysis in the lab. Salinity samples are always analyzed within one week of collection and usually within four days. Every two to three months the bottles are acid washed (1 N HCl), then rinsed with deionized and Milli-Q water. After this cleaning they are rinsed three times with copious amounts of sample before use on the next cruise.

The samples are analyzed on a Guildline AutoSal 8400A laboratory salinometer using the manufacturer's recommended techniques. The samples are standardized to Wormley water. Two standards are run before running the samples. If those two standards agree, the samples are run. A standard from the already opened vials is run every 12 samples to check for instrument drift (rare). A new standard is run every 36 samples and again at the end of the run. Precision of this instrument is ± 0.001-0.002 ppt.

Nutrients

Three nutrients are routinely measured at all depths: Nitrate+nitrite, phosphate and silicate. Samples were initially collected for ammonia, however as the results were always near or at the detection limits of the method and contamination problems were present, this measurement was discontinued.

Contamination is a major problem with nutrient samples, especially in the upper ocean where the ambient concentrations are low. All the nutrient bottles are rigorously cleaned before use. The cleaning begins by a wash with a detergent (Aquet) followed by a rinse with 10% HCl, three rinses with deionized water and a final rinse with Milli-Q water.

Samples for nutrient determination are collected at 48 depths between the surface and 4200 m. The nutrient samples are collected after the oxygen, CO_2 and salinity samples have been drawn. Nutrient samples are drawn in conjunction with the particulate silicate, carbon and nitrogen samples. First, an inline filter apparatus (polycarbonate) with a 0.4 µm Nuclepore membrane filter is attached to the Niskin bottle spigot. The silicate samples are drawn from the water that passes this filter by gravity flow. Each silicate bottle is rinsed three times and then filled to the shoulder. One 60 ml amber polyethylene bottle is used. These bottles are transferred to a refrigerator (4°C) and kept cold until analyzed. A second inline filter apparatus is connected to the Niskin spigot for collecting the POC/PON samples. The spigot is opened and the nutrient samples are collected from the water that passes through the filter. The filtration is aided by the use of a peristaltic pump. C-flex tubing (claimed by the manufacturers to be inert) is used. Each nutrient bottle is rinsed three times and then filled to the shoulder. Two 250 ml polyethylene bottles are used and approximately 200 mls are collected into each. These bottles are transferred to a freezer (-20°C) and kept frozen until analyzed.

Nutrients are analyzed with the standard colorimetric techniques described by Grasshof (1985) and Strickland and Parsons (1972). These methods are described in detail in the BATS Methods Manual. Nitrate is measured as nitrite following cadmium reduction. Nitrite is not measured and the results are reported as nitrate+nitrite. Phosphate is measured following complexation to phosphomolybdate. Silicate is also measured by complexation with molybdate. The detection limits of these analyses is 0.05 µM/l (silicate to 0.1 µM/l) and values below the detection limit are reported as zero.

Particulate Organic Carbon and Nitrogen

Shipboard Processing

Water for the measurement of suspended POC and PON is collected from depths between 1000 m and the surface. This water is collected on three casts (see above): Cast 2, at the eight depths in the upper 140 m. Cast 3 at the four depths that are duplicated, 300, 500, 750, 1000. Duplicate POC/PON samples are also taken. Cast 4 (0-250) at all depths. The POC/PON samples are taken after oxygen, CO_2, salinity and nutrients samples have been removed, approximately 30-60 minutes after the CTD/rosette reaches the surface. The samples are filtered onto precombusted Whatman 47mm GF/F filters (nominal pore size of 0.7 µm). The filtration is "in-line", with the filter mounted on a polycarbonate in-line filter apparatus and connected to the Niskin spigot on one end and a volume calibrated

receptacle on the other. The entire system is connected to a vacuum pump and the vacuum pressure maintained at less than 200 mm mercury. The entire volume that is remaining in the Niskin bottle is filtered, typically 5-7 liters for each sample. This can take as long as 0.5 - 1 hour. Because the filtration time is long, the actual vacuum pressure at the filter is probably less than the 200 mm measured at the vacuum pump. After the Niskin bottle is empty, the remaining water in the filter apparatus is drawn through the filter, making sure that the filter dries. The filter is removed, wrapped in precombusted aluminium foil and stored frozen in a deep freezer (-20° C) until processed.

Sample Analysis

Prior to analysis the filters are thawed, allowed to dry overnight at 65°C and then placed in a desiccator with concentrated HCl and fumed for another 24 hours. Thereafter, the filters are dried again at 65°C and packed in precombusted (850°C, 1hour) Nickel sleeves. Only 1/3 of each filter will fit in a sleeve so the filter is divided into approximately equal thirds and each is packed into a separate sleeve. All three parts of the filter are analyzed.

The samples are analyzed on a Control Equipment Corporation (CEC) 240-XA Elemental Analyser following the guidelines given by the manufacturer. 64 samples are run at a time on the auto-sampler, of which one is a standard (see below) and approximately nine are Ni sleeve blanks. The machine operator checks on the machine regularly to ensure that problems haven't developed. Data are collected and stored onto a micro-computer automatically.

Acetanilide standard and blanks (empty Ni-sleeves) are measured prior to each batch run of samples. Three empty filters soaked in filtered seawater and processed as an ordinary are analyzed for each cruise as a filter blank. The acetanilide standard is weighed in precombusted tin capsules on a Perkin-Elmer Electrobalance. Standard weights are usually between 0 and 2.0 mg. The tin capsule with standard is then put in a Ni sleeve and run on the Elemental Analyzer. Acetanilide has 0.7109 g C and 0.1036 g N per g total mass.

Chlorophyll *a*

The fifth CTD cast on each cruise is used to sample chlorophyll *a* at 12 depths from the surface down to 250 meters. The depths are selected to correspond with the major features in an *in vivo* fluorescence profile collected on a previous cast with the *in situ* fluorometer on the CTD. A 2.75 liter sample is drawn from each Niskin bottle into a 2.5 liter, Nalgene bottle (true volume 2.75 liters). Sample bottles are held in a light-proof box at room temperature until filtered (never more than 2 hours). The 2.75 liter aliquot is filtered onto Whatman 25mm GF/F filters. The vacuum pressure is kept below 100 mm mercury. The filter is folded in half, placed in combusted aluminum foil and frozen in liquid nitrogen for transport back to BBSR. Immediately after returning from each cruise, the filters are transferred to a -20° C deep-freezer. The samples are analyzed within 3 weeks of collection, usually within 2 days.

For analysis, the filters are placed in 15 mls of 90% acetone (with milli-Q water) and allowed to extract in the dark for approximately 12 hrs (overnight) at 4° C. The next

morning, the samples are brought to room temperature in the dark prior to analysis. They are centrifuged for 10 minutes at 3500 rpm (1800 g) on a clinical centrifuge. The supernatant is transferred to a 1 cm cuvette. The fluorescence of the extracted chlorophyll *a* is read on a Perkin Elmer 650-10S Fluorescence Spectrophotometer with an excitation wavelength of 443nm (slit 10) and the fluorescence emission read at a wavelength of 669nm (slit 5). The fluorescence spectrophotometer is calibrated with a commercially available chlorophyll *a* standard (Anacystis nidulans, Sigma Chemical Company). The standard is extracted in 90% acetone for at least two hours and a series of dilutions are read on the Fluorescence Spectrophotometer. At this time, no attempt was made to measure phaeophytin by acidification. This technique is more specific to chlorophyll *a* than the multi-wavelength Turner fluorometer. In subsequent cruises we switched to the Turner fluorometer method to allow for intercomparibility with the large dataset collected by that technique.

Bacterioplankton Abundance

Samples for bacteria enumeration are collected at 18 depths between the surface and 4000 m (all 12 depths on Cast 5, 400, 600, 900 m on Cast 3 and 3000 and 4000 m on Cast 1). The samples are drawn after the other samples have been removed, generally within 60 minutes of the recovery of the rosette. The samples (90 ml) are measured into a graduated cylinder, then transferred into 125 ml high-density polyethylene bottles. Immediately following collection, the samples are preserved in 10 mls of 20% particle-free (0.2 µm filtered) glutaraldehyde, and stored in the dark at 4° C. Samples are shipped on ice in styrofoam icechests from the BBSR to Horn Point Ecological Laboratory by express mail.

A sample volume necessary to yield approximately 100 cells per field of view (total volume >2 ml) is combined with 0.05% acridine orange (Sigma, 80% dye content) to a final concentration of 0.005% and filtered at <100mm Hg onto a 0.2 µm pore size, irgalan-black stained, Nuclepore polycarbonate filter (Hobbie *et al.*, 1977). Uniform cell distribution is obtained by prewetting the ground glass base of the filtration apparatus prior to placement of the wet polycarbonate membrane. After filtration, the Nuclepore filter is immediately mounted while still damp on a slide using Cargille type A immersion oil. The stained bacteria cells are counted within 24 hours of preparation. Slides are stored frozen in sealed boxes. For enumeration, we use a Nikon Optiphot microscope equipped with a 100 W mercury lamp for epifluorescence, a CF plan apocromat 100x objective with a 1.40 numerical aperture, CFW 15x eyepieces and a B2 filter combination including an excitation filter at 460-485nm (a main excitation wavelength at 495nm), a dichroic mirror at 510 nm and an absorption filter at 520-560 nm. The total magnification used is 1875x. Ten fields are counted and the numbers of stained bacteria recorded (to verify even distribution). Bacteria are distinguished by distinct morphologies which brightly fluoresce and fluorescing images less than 0.2 µm in diameter are disregarded.

We have subsequently determined that there is a significant loss in the number of bacteria in these samples as they are stored. Due to this storage problem and the variable length of time between collection and analysis, these data should be treated with caution.

Primary Production

The primary production measurement is a modification of the trace-metal clean techniques suggested by Fitzwater *et al.*(1982). Rigorous efforts are made to prevent contamination of the samples. Although various efforts were made to develop a deckboard incubation method with the appropriate corrections for temperature and spectral quality of the light, the *in situ* incubation methods actually turned out to be simpler and are used throughout. The results of the deck incubation experiments will be reported separately.

Polycarbonate 0.25 l bottles are used for productivity incubations. New bottles are soaked for 72 hours in a 5% solution of Micro detergent. Bottles are then rinsed thoroughly with tap water, and subsequently soaked for 72 hours in 0.5 N HCl (Baker Instra-Analyzed, prepared using Milli-Q water). The acid is discarded and the bottles rinsed 3 times with Milli-Q water and then soaked in Milli-Q for at least 48 hours. Once a new bottle has been cleaned as described above, then cleaning between cruises consists of soaking for 24 to 48 hours in the acid cleaning solution and rinsing 3 times with Milli-Q.

The ^{14}C sodium bicarbonate (aqueous, specific activity 1 mCi/ml, 5 mCi lots) is purchased from Research Products International. A sodium carbonate (anhydrous, Aldrich 20,442-0) solution is prepared by dissolving 0.15 g in 500 ml Milli-Q water. The teflon bottle is rinsed with the carbonate solution. The ^{14}C stock is diluted (5.0 ml stock diluted to 67 ml with carbonate solution, final specific activity = 80 μCi/ml) in the teflon bottle. The working solution is stored refrigerated (5°C) until use.

Sampling and ^{14}C Inoculation

A CTD/irradiance/*in vivo* fluorescence vertical profile is performed during midday the day previous to the productivity incubation. Sampling depths are chosen based on light levels available in the NORDA/USM deck incubation system and features of the vertical *in vivo* fluorescence profile. More recently (after these cruises), a set of standard depths on 20 m intervals from 0 to 140 m have been used. Generally, six to eight light depths are sampled (approximate light levels include 95% - 0.6%). Three hours before dawn, seawater samples are obtained using 12 l Go-Flo bottles deployed on a Kevlar line. The bottom weight on the line is wrapped in plastic. The line is lowered over a plastic-wrapped sheave, and bottles are triggered with brass messengers. Polyethylene gloves are worn during handling of samples. Productivity bottles are filled directly from Go-Flos under low light conditions. Bottles are rinsed 3 times before filling. Five bottles are filled for each productivity measurement. Under low light conditions, 0.25 ml of the ^{14}C working solution (20 μCi) is added to each bottle using a cleaned polypropylene pipet tip. One bottle is immediately filtered for a time zero. A dark bottle is made by wrapping one of the five inoculated bottles in aluminum foil and placing it in a cloth bag with a velcro closure. A 0.25 ml aliquot for counting total added ^{14}C activity is removed from the time zero bottle and placed in a 20 ml glass scintillation vial containing 0.25 ml ethanolamine (Aldrich). The mixture is held at room temperature until subsequent liquid scintillation analysis on shore. This procedure is repeated for an additional aliquot drawn randomly from one of the 3 light bottles at the end of the incubation period.

The dark bottle and 3 light bottles are hooked together with a combination of plastic electrical tie wraps and a length of bungi cord. These are kept in labeled dark plastic bags

until deployment. Approximately 1hour before sunrise, the productivity array is deployed. The bottom weight, attached to a premeasured polypropylene line, is lowered first. The bungi cord is then secured to hooks attached to the line. The entire productivity line is suspended from an orange plastic float, which is attached to a spar equipped with strobe flash and VHF radio beacon (Novatech). Time and position of deployment are recorded. Approximately 0.5 hours after sunset, the productivity array is recovered. Sample bottles are detached from the line and placed in labeled dark plastic bags until filtration.

Sample Processing

Maintaining low light conditions, a 50 ml aliquot is withdrawn from each productivity bottle using a 50 ml plastic syringe. This aliquot is filtered onto a 25 mm Whatman GF/F glass fiber filter maintaining vacuum levels of 70 mm Hg or less. The filter is not rinsed. The filter is placed in a 20 ml glass scintillation vial, covered with 0.25 ml 0.5 N HCl, and held at room temperature until subsequent processing on shore. At a shore laboratory (USM), the productivity sample vials are uncapped in a fume hood and allowed to dry overnight. This procedure insures complete removal of unfixed inorganic ^{14}C. 10 ml of liquid scintillation cocktail (Aquasol, New England Nuclear) is added to the dried filters. The filters are allowed to clear in the cocktail (usually 24 hours) before liquid scintillation counting. During this period there is generally an increase in total counts, which stabilizes once the filter has completely cleared. For measuring total activity, 10 ml of liquid scintillation cocktail plus 2.5 ml Milli-Q water are added to the vials containing the 0.25 ml sample and 0.25 ml ethanolamine (see above). The mixture is shaken vigorously and the vials kept in darkness overnight to allow clearing of the solution and subsidence of chemiluminescence before liquid scintillation counting.

Samples in liquid scintillation cocktail are counted for 4 minutes in a Packard Tri-Carb 2000CA Liquid Scintillation Analyzer. An external gamma source is used to assess quenching of individual filter samples for conversion of counts per minute (CPMs) to disintegrations per minute (DPMs). The Packard analyzer uses a proprietary method to mathematically transform the raw Compton spectrum generated in the scintillation cocktail by the external source. This procedure minimizes distortions due to wall and volume dependent effects which can vary from sample to sample. Quenching of the total radioactivity vials is determined by internal standard.

$$\text{Production}\ (\text{mgC}\,m^{-3}d^{-1}) = \text{SDPM}/V \bullet W \bullet 0.25\times10^{-3}/\text{TDPM} \bullet 1.05$$

SDPM = DPMs of sample
TDPM = Total ^{14}C DPMs (in 0.25 ml)
V = volume of filtered sample in liters (usually 0.05 l)
W = 25000 mg C m^{-3} (Estimated mass of carbon in seawater)

This calculation is made for each light, dark and time-zero bottle. The dark bottle rate is subtracted from the light bottles to correct for non-photoautotrophic carbon fixation or adsorption.

Trap-Collected Particle Flux

The particle collection device central to the MULTITRAPs is a polycarbonate cylinder (cross-sectional collection area = 0.0039 m^2). The cylinder is equipped with a base which holds a 90 mm Nuclepore polycarbonate membrane filter. A PVC drain valve is mounted under the base of the filter holder. At the surface of the cylinder, plastic baffling consisting of circular openings 1.2 cm in diameter provide turbulence reduction at the trap opening. The cylinder also possesses two rings around its center which allow for mounting of the cylinder onto the PVC cross described below. A PVC cross with cutouts to fit the PITs allows for mounting of up to 12 PITs at each depth. Crosses with PITs are attached at 4 depths: 150, 200, 300 and 400 m.

At the surface the polypropylene line is attached to a stainless swivel, which is attached to stainless steel chain with two 50 cm diameter hardhat glass core floats that provide the majority of flotation. The floats are then attached to a 10 m length of 0.5 inch bungi cord connected to 8 orange polypropylene floats. The entire flotation array is then secured to the surface spar. The surface spar consists of a styrofoam core float with a central mast on which is mounted a VHF radio beacon (Novatech), strobelight (Novatech), and Argos transmitter.

Cleaning and Preparation

Nuclepore filters (90 mm diameter, 0.8 µm pore size) are soaked overnight in 5N HCl (Baker Instra-Analyzed), rinsed with 5N HCl, rinsed three times with Milli-Q water, and then put in individual plastic petri dishes. The cleaned filters are oven dried (60° C overnight), allowed to cool in a desiccator, and tared to constant weight on an analytical balance (Mettler). The porous polyethylene filter frit on each trap is rinsed in Milli-Q, soaked for 24 hours in 0.5N HCl, and rinsed with Milli-Q three times. All other trap parts are soaked overnight in a 5% dilution of the detergent Micro, rinsed thoroughly in tapwater to remove the detergent, soaked 24 hours in 0.5N HCl, and then rinsed in Milli-Q. The prepared Nuclepore filters are inserted into the cleaned filter holders and the holders attached to the base of the polycarbonate cylinders. Polyethylene tape is used to provide a leaktight fit of the filter holder to the cylinder. Polyethylene gloves are taped with polyethylene tape over each end of the assembled PITs to minimize contamination. The assembled PITs are stored in plastic bags until used.

A density gradient solution is used to reduce advective-diffusive exchange of trap contents with ambient seawater during deployment. At the halfway point enroute to the time series site, 50 l of seawater from 5m is collected using the rosette Niskin bottles. A density gradient solution is prepared by adding 1 liter formalin and 2.5 kg NaCl to the seawater yielding a 2% formalin and 50g/l NaCl solution. The solution is gravity filtered through a 0.5µm cartridge membrane filter (Millipore). A 1 l portion of this gradient is saved for subsequent processing steps (see below). The PITs are filled with the density

gradient solution and covered with a small square of clear plastic wrap held on with a soluble time-release Lifesaver lollipop and rubber band.

Deployment and Recovery

The trap array is deployed for a 72 hour period. Triplicate PITs are deployed at each of four depths (150, 200, 300, 400 m). A non-functioning fourth PIT serves as a counterweight to balance the cross. On recovery, the traps are covered with polyethylene gloves before they are removed from the cross. The raw seawater at the top of the trap is siphoned off to the level of the visible density interface using acid-rinsed (0.5N HCl, Baker Instra-Analyzed) Teflon tubing, and the density gradient solution is drained through the bottom of the trap and discarded. The Nuclepore filter is removed, returned to its petri dish, which is sealed with Parafilm and labeled. These filters are then hand carried back to the Center for Marine Science at the University of Southern Mississippi for analysis.

Sample Analysis

The "swimmers" (recognizable zooplankton) are removed using forceps under a dissecting microscope (10-40 power magnification). The filters are kept wet during this period by adding small volumes of the saved density gradient solution. The material on the filter is scraped into a bolus at the center of the filter with a scalpel and salts are removed by rinsing with Milli-Q water adjusted to pH 9 with ammonium hydroxide. The filter with the sample bolus is dried in a vacuum desiccator and weighed daily until weight is constant for 2 consecutive weighings. This weight minus the tare weight of the filter, divided by the number of days deployed (3) and by the trap cross-sectional area ($0.0039 m^2$) equals the mass flux (mg m^{-2} d^{-1}).

Carbon and nitrogen analyses are performed using a Carlo-Erba NA 1500 calibrated with sulfanilamide (between 30 and 150 µg per calibration) provided with the machine. The bolus is scraped off the filter with a scalpel and ground in an agate mortar and pestle. A subsample (100 to 200 µg) of this material is transferred to a tin boat which is then analyzed for total nitrogen and total carbon. A second subsample is transferred to a silver boat. The silver boats are put in wells drilled in a Teflon block, and fumed with concentrated HCl for 36 hours to volatilize inorganic carbon. The fumed boats are desiccated for 1 hour and then analyzed for total nitrogen and organic carbon. If there is insufficient sample, the material from two or three traps is pooled. The results from the C/N analysis yield %C and %N. Particulate flux (mg N or mg C m^{-2} d^{-1}) is calculated by multiplying the % times mass flux.

Units Conversions

Most of the analytical methods yield values in volumetric units (e.g. µmoles/liter, µg/liter). These data are converted to mass units (e.g. µmoles/kg) using the appropriate density of seawater. For oxygen and particulate sampling, the sampled density is calculated from an estimate of the sample temperature at the time it was collected (see below). For nutrients the density is calculated using the laboratory temperature at the time of analysis.

Oxygen Conversions

The Winkler titration calculations currently in use provide the oxygen concentration in ml/l. These data are converted to units of µmoles/kg using the relationship:

$$O_2\ (\mu moles/kg) = \text{Winkler } O_2\ (ml/l) * (C/\rho)$$

Where:

C = 44.589 µmoles/ml O_2 (provided by Andrew Dickson, SIO)
ρ = density of sample at the fixation temperature.

We use the temperature at the time of sample fixation for the calculation of the density of seawater for the measured sample volume rather than the lab temperature at the time of analysis. Soon after the addition of the Winkler reagents to the cold sample, the precipitate settles to the bottom of the oxygen bottle. As the sample warms to room temperature, the small expansion of the seawater will push a little water past the ground glass stopper. The precipitate is left behind and reflects the oxygen in the slightly larger amount of cold water.

For BATS 1-31, the actual sample temperature at the time of adding the Winkler reagents (sample fixation) was not measured. We use a simple model to estimate this temperature based on empirical measurements on BATS 32 and subsequent cruises. On BATS 32 (May 1991), the temperature at the time of fixation was measured using a rapid response digital thermometer (Thomas Scientific, accuracy = 0.1°C). This dataset was then used to obtain a regression model for the warming of samples from their *in situ* temperature. We assume the warming to be a function of the air temperature on deck, the *in situ* pressure and temperature:

$$\Delta T = R_0 AT + \sum_{i=1}^{3} A_i (T/30)^i + \sum_{i=1}^{2} B_i (P/4300)^i$$

Where:

ΔT = (Sample temp (°C) - *in situ* temp (°C))/5.0
AT = Air temperature on deck (°C)
T = *in situ* temperature (°C)
P = *in situ* pressure (db)

For BATS 32 the best-fit solution to this model is:

$R_0 = 0.0113$
$A_1 = 4.0270$
$A_2 = -14.7569$
$A_3 = 12.1906$
$B_1 = 0.5954$
$B_2 = -0.3899$

The estimated sample temperature for each oxygen bottle is determined:

$$\text{Sample temp (°C)} = 5.0 * \Delta T + T$$

The mass of each oxygen sample is calculated using a density calculated from the measured salinity in the same Niskin bottle and the estimated sample temperature.

Sensitivity Analysis for Estimated Density and Oxygen Concentration

For the BATS 32 cruise data used above, the standard deviation of the model residuals (i.e. measured sample temperature on deck - modelled sample temperature on deck) is 0.3°C. We performed some simple sensitivity analyses to determine the uncertainty in the oxygen accuracy with a given uncertainty in the estimated temperature of the drawn sample on deck. For example: Assume a sample temperature of 25°C, salinity of 36.00 ppt and an oxygen concentration of 5.0 ml/l (=217.69 µmoles/kg). A one degree difference in the estimated sample temperature translates into 0.001 ml/l (0.06 µmole/kg) difference in the calculated oxygen concentration. The desired precision for oxygen is 0.1% precision and better than 1% accuracy (WOCE Report # 67/91). For the example above, the desired accuracy would be 0.05 ml/l (2.18 µmoles/kg) and the desired precision would be 0.005 ml/l (0.22 µmoles/kg). A 1°C uncertainty in the estimated sampling temperature yields an uncertainty in the oxygen concentration that is 27% of the precision and 3% of the accuracy requirements. It is unlikely that the estimated sample temperature is more than a few degrees from the true value, thus these uncertainties seem reasonable.

Particle Conversions

The concentrations of chlorophyll *a* and other pigments and particulate organic carbon and nitrogen are converted to mass units using the collection temperature as described for oxygen. These samples are filtered immediately after collection. The accuracy of the volume measurement is probably only a few percent and the natural variability of replicate samples is on the order of 10-20%. Thus any inaccuracies from the model temperature are insignificant.

Nutrient Conversions

Nutrient samples are converted from volumetric to mass units using:

$$Cm\ (\mu moles/kg) = Cv\ (\mu moles/l) / \rho$$

Where:

Cm = concentration in mass units
Cv = Concentration in volume units
$\rho(T_L,s)$ = density of sample at the lab temperature (T_L) and *in situ* salinity (s).

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Acknowledgments

The cover page lists the people directly responsible for data collection, analysis and quality control. The participants on each cruise are listed in the appropriate cruise report. In addition, there are a number of people who either helped make the data collection possible, or were involved with the production of this report. We extend heartfelt thanks to the crew on the R.V. Weatherbird, particularly, Mike Rhodes (captain) and Tony Sherriff (chief engineer). We also thank Maren Tracey (deckhand) and Butch Stovell, Peter Beckett and Fred Riley (extra crew) for their assistance at sea. We thank Cecelia Hackett and Rachel Parsons for help in the lab, and Scot Close for computer assistance. We thank the captain and crew of the R.V. Cape Henlopen for their help on BATS 3-7. We thank Kandy Binkley for her help on many facets of the operation. Jens Sorensen and Ann Close, who joined us after these cruises, helped with data analysis, quality control and production of the report.

Cruise Report, BATS 1

Cruise dates: October 20, 1988 - October 21, 1988
Personnel: A.H. Knap, R.L. Sherriff-Dow, P. Wassmann, R. Johnson.
R.V. Weatherbird

October 20, 1988

Depart BBSR at 1600 hrs.

Arrive BATS Station at 2130

Start **Cast 1**, 4200m cast at 2230 using CTD/Rosette.

October 21, 1988

Cast 1 on deck at 0200.
Wire kinked. Decide not to put CTD back down.
Lat: 31.160 N; Long: 64.500 W
Nominal depths: 2000,2200,2400,2600,2800,3000,3200,3400,3600,3800,4000, 4200 m.

Samples:

dissolved O_2 -duplicates	12 depths
salinity	12 depths
NO_3, PO_4, SiO_4,	12 depths

Make 1 cast of 12, 12 l Go Flos each, using 2nd winch with 500m stainless hydrowire. All depths estimated from meter wheel only.
Lat: 31.160 N; Long: 64.500 W
Meter wheel depths: 1,10, 25, 50, 100, 150, 200, 225, 250, 300, 400, 500

Samples:

dissolved O_2 -duplicates	12 depths
salinity	12 depths
NO_3, PO_4, SiO_4,	12 depths
CO_2 - Brewer	11 depths, 1 surface replicate
PON/POC - BBSR	12 depths
Chlor. a - BBSR	12 depths

Return to BBSR at 1800 hrs.

CTD Sensor Corrections to Bottle Data for BATS 1:

Salinity:

$$DS = \sum_{i=0}^{n} R_i P^i$$

Where:

DS = Wet Salinity - CTD Salinity
R_i = regression coefficients
P = pressure (dbar)
n = order of the polynomial function

$R_\emptyset$ = 3.66715E-02
R_1 = -6.06719E-06

r^2 = 0.933

Oxygen:

$$DO = R_0 + \sum_{i=1}^{l} A_i \frac{P^i}{4300} + \sum_{i=1}^{m} B_i \frac{OC^i}{300}$$

$\therefore$ MO=OC+300 x dO

Where:

DO = (wet oxygens-CTD oxygen)/300
OC = uncorrected CTD oxygen (µmole/kg)
P = pressure (dbar)
MO = modified CTD oxygen
A_i, B_i = regression coefficients
l = 4; m = 2

$R_\emptyset$ =-1.3241357E+00
A_1 = 6.5723237E-01
A_2 =-2.4523143E+00
A_3 = 3.6429721E+00
A_4 =-1.7085542E+00
B_1 = 4.5874012E+00
B_2 =-3.6559498E+00

model correlation coefficient = 9.997E-01
standard deviation of model residuals = 6.598E-01 µmole/kg

Beam Attenuation Coefficient:

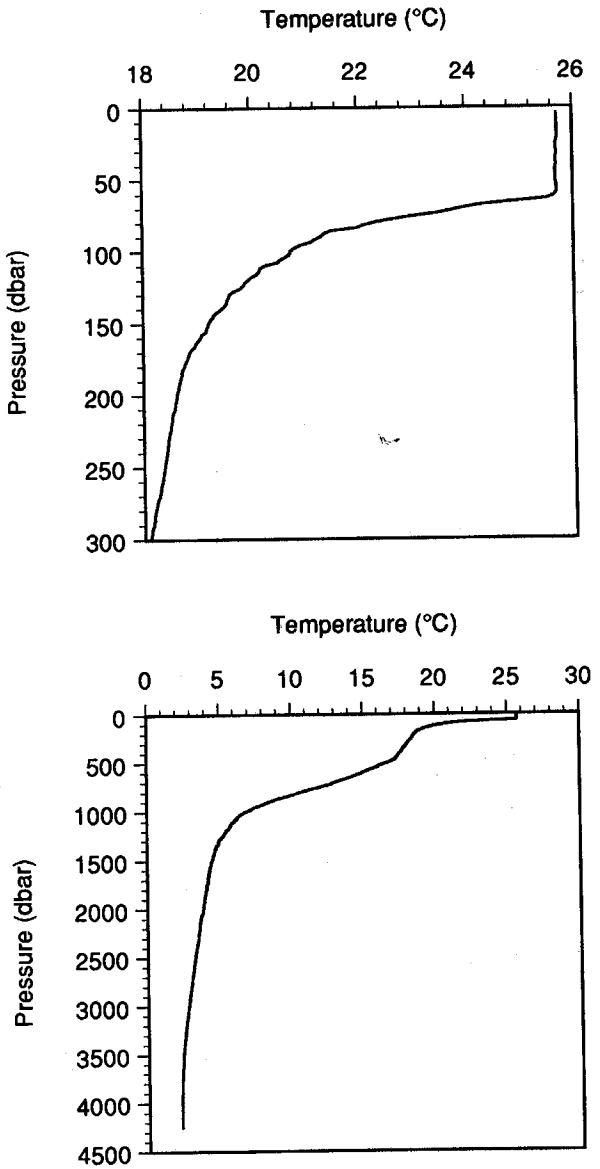
BAC offset = 0.364 - 0.338 = 0.026 m^{-1}

BATS 1, CTD Cast 1
20 October, 1988; Start 22:30; End 02:00
Lat: 31.160 N; Long: 64.500 W

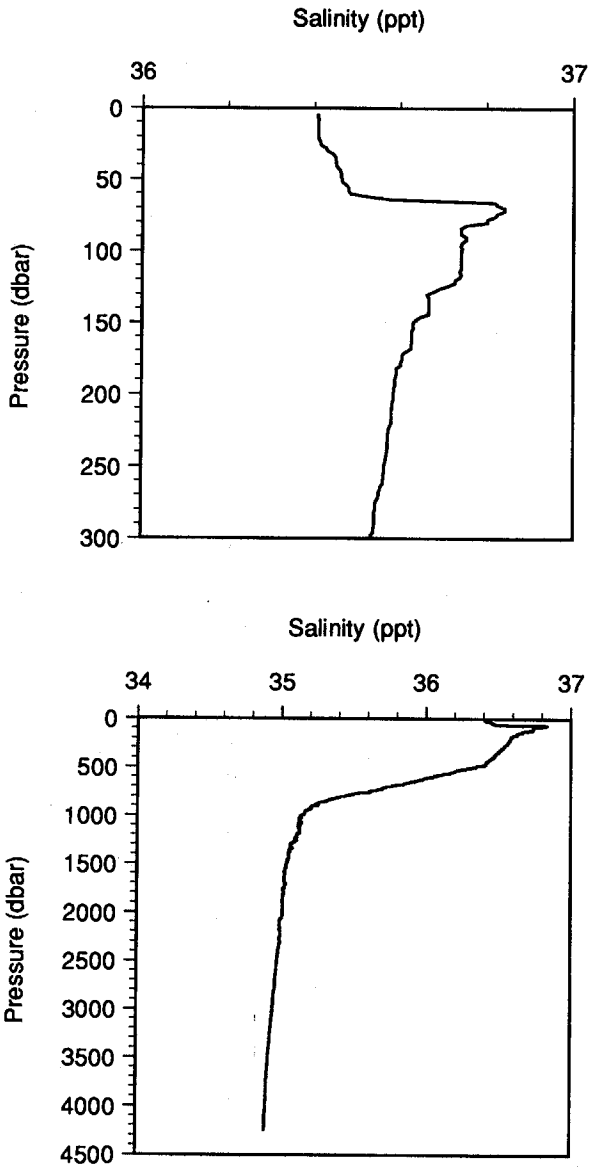
Depth (m)	Pres (db)	Temp (°C)	Pot.T (°C)	CTD Sal (ppt)	Sigma-t (kg/m^3)	CTD 0_2 (µmole/kg)	0_2 Anom (µmole/kg)	BAC (m^{-1})	PAR ($\mu E/m^2/s$)	Fluor (rfu)
4.0	4.0	25.711	25.710	36.407	24.188	210.28	8.55	0.438		
10.0	10.1	25.718	25.716	36.408	24.187	212.08	10.37	0.438		
20.0	20.1	25.716	25.712	36.408	24.188	212.82	11.11	0.441		
30.0	30.2	25.701	25.695	36.430	24.210	212.45	10.71	0.439		
40.0	40.3	25.694	25.685	36.451	24.229	210.50	8.76	0.438		
50.0	50.4	25.686	25.675	36.464	24.242	208.87	7.13	0.438		
60.0	60.4	25.688	25.675	36.493	24.263	209.99	8.29	0.438		
70.0	70.5	23.919	23.904	36.842	25.067	214.66	7.36	0.446		
80.0	80.6	22.275	22.259	36.787	25.505	219.45	6.11	0.438		
90.0	90.6	21.286	21.268	36.753	25.757	214.16	-2.97	0.434		
100.0	100.7	20.751	20.732	36.742	25.895	207.93	-11.30	0.428		
110.0	110.8	20.247	20.226	36.742	26.032	206.44	-14.78	0.416		
120.0	120.9	19.938	19.915	36.727	26.104	207.72	-14.77	0.416		
130.0	131.0	19.601	19.576	36.664	26.145	213.23	-10.73	0.411		
140.0	141.0	19.421	19.395	36.666	26.194	214.53	-10.15	0.408		
150.0	151.1	19.209	19.181	36.630	26.222	212.13	-13.48	0.407		
160.0	161.2	19.041	19.012	36.627	26.263	212.06	-14.26	0.407		
170.0	171.3	18.850	18.819	36.610	26.300	213.04	-14.11	0.407		
180.0	181.3	18.737	18.705	36.595	26.318	212.22	-15.43	0.407		
190.0	191.4	18.672	18.638	36.588	26.330	210.98	-16.95	0.406		
200.0	201.5	18.619	18.583	36.585	26.341	211.59	-16.57	0.406		
210.0	211.6	18.560	18.522	36.580	26.353	213.09	-15.32	0.403		
220.0	221.7	18.501	18.462	36.578	26.366	214.42	-14.25	0.403		
230.0	231.7	18.459	18.418	36.573	26.374	215.16	-13.70	0.403		
240.0	241.8	18.415	18.372	36.569	26.382	215.89	-13.16	0.403		
250.0	251.9	18.378	18.334	36.564	26.388	216.01	-13.21	0.403		
275.0	277.1	18.227	18.179	36.544	26.412	214.05	-15.85	0.401		
300.0	302.3	18.089	18.036	36.531	26.437	210.60	-19.91	0.398		
325.0	327.5	17.957	17.899	36.509	26.454	207.31	-23.81	0.398		
350.0	352.7	17.812	17.750	36.493	26.479	206.12	-25.66	0.398		
375.0	378.0	17.708	17.642	36.476	26.493	205.05	-27.21	0.398		
400.0	403.2	17.546	17.477	36.458	26.519	204.65	-28.35	0.394		
425.0	428.4	17.419	17.345	36.435	26.534	203.53	-30.07	0.394		
450.0	453.6	17.291	17.213	36.414	26.550	203.10	-31.10	0.393		
475.0	478.9	17.000	16.918	36.406	26.615	201.61	-33.90	0.393		
500.0	504.1	16.610	16.526	36.320	26.642	190.89	-46.54	0.392		
550.0	554.6	15.765	15.675	36.174	26.726	181.39	-60.21	0.390		
600.0	605.1	14.890	14.794	36.017	26.802	174.74	-71.33	0.390		
650.0	655.6	13.944	13.845	35.888	26.907	167.59	-83.41	0.385		
700.0	706.1	12.905	12.803	35.729	26.998	155.72	-100.94	0.385		
750.0	756.6	11.774	11.670	35.612	27.128	142.80	-120.20	0.385		
800.0	807.2	10.432	10.328	35.406	27.213	129.19	-141.85	0.387		
850.0	857.7	9.288	9.184	35.298	27.322	126.05	-152.07	0.385		
900.0	908.3	8.259	8.155	35.206	27.413	143.05	-141.71	0.385		
950.0	958.9	7.402	7.298	35.164	27.506	170.40	-120.04	0.385		
1000.0	1009.4	6.684	6.579	35.130	27.579	196.00	-99.36	0.383		
1050.0	1060.0	6.242	6.134	35.123	27.633	213.83	-84.61	0.381		
1100.0	1110.7	5.902	5.791	35.127	27.680	225.66	-75.17	0.382		
1150.0	1161.3	5.697	5.582	35.127	27.706	234.52	-67.76	0.377		
1200.0	1211.9	5.412	5.293	35.107	27.725	241.83	-62.55	0.377		
1300.0	1313.2	4.933	4.807	35.062	27.747	252.17	-55.82	0.376		

Depth (m)	Pres (db)	Temp (°C)	Pot.T (°C)	CTD Sal (ppt)	Sigma-t (kg/m^3)	CTD 0_2 (μmole/kg)	0_2 Anom (μmole/kg)	BAC (m^{-1})	PAR ($\mu E/m^2/s$)	Fluor (rfu)
1400.0	1414.6	4.659	4.524	35.051	27.770	256.46	-53.59	0.373		
1500.0	1516.0	4.432	4.287	35.036	27.784	258.89	-52.91	0.373		
1600.0	1617.4	4.273	4.118	35.026	27.795	260.21	-52.82	0.368		
1700.0	1718.9	4.183	4.017	35.025	27.804	260.67	-53.05	0.368		
1800.0	1820.5	4.032	3.855	35.012	27.811	261.08	-53.83	0.368		
1900.0	1922.1	3.934	3.745	35.011	27.821	261.48	-54.19	0.368		
2000.0	2023.7	3.832	3.632	35.010	27.832	261.80	-54.66	0.367		
2100.0	2125.4	3.650	3.439	34.991	27.836	261.98	-55.95	0.368		
2200.0	2227.2	3.562	3.340	34.993	27.847	261.84	-56.77	0.368		
2300.0	2328.9	3.479	3.244	34.990	27.854	261.93	-57.34	0.366		
2400.0	2430.8	3.345	3.099	34.979	27.859	262.24	-58.12	0.366		
2500.0	2532.7	3.238	2.979	34.971	27.864	263.52	-57.71	0.365		
2600.0	2634.6	3.143	2.872	34.967	27.871	264.65	-57.35	0.366		
2700.0	2736.6	3.049	2.765	34.962	27.876	265.10	-57.67	0.364		
2800.0	2838.6	2.935	2.638	34.952	27.880	265.44	-58.28	0.367		
2900.0	2940.7	2.847	2.537	34.949	27.886	266.99	-57.45	0.365		
3000.0	3042.8	2.744	2.421	34.940	27.889	268.59	-56.71	0.364		
3100.0	3144.9	2.660	2.322	34.937	27.894	268.57	-57.43	0.364		
3200.0	3247.2	2.574	2.223	34.929	27.897	268.78	-57.93	0.364		
3300.0	3349.4	2.496	2.131	34.923	27.900	269.00	-58.37	0.364		
3400.0	3451.7	2.419	2.039	34.917	27.902	268.81	-59.21	0.364		
3500.0	3554.1	2.382	1.986	34.913	27.903	268.02	-60.32	0.364		
3600.0	3656.5	2.334	1.923	34.908	27.904	268.55	-60.20	0.366		
3700.0	3758.9	2.302	1.874	34.905	27.906	268.55	-60.48	0.365		
3800.0	3861.4	2.278	1.834	34.902	27.906	267.23	-62.01	0.368		
3900.0	3964.0	2.263	1.802	34.899	27.906	266.97	-62.39	0.369		
4000.0	4066.5	2.254	1.775	34.896	27.906	266.57	-62.88	0.373		
4100.0	4169.2	2.244	1.747	34.894	27.907	266.18	-63.36	0.377		

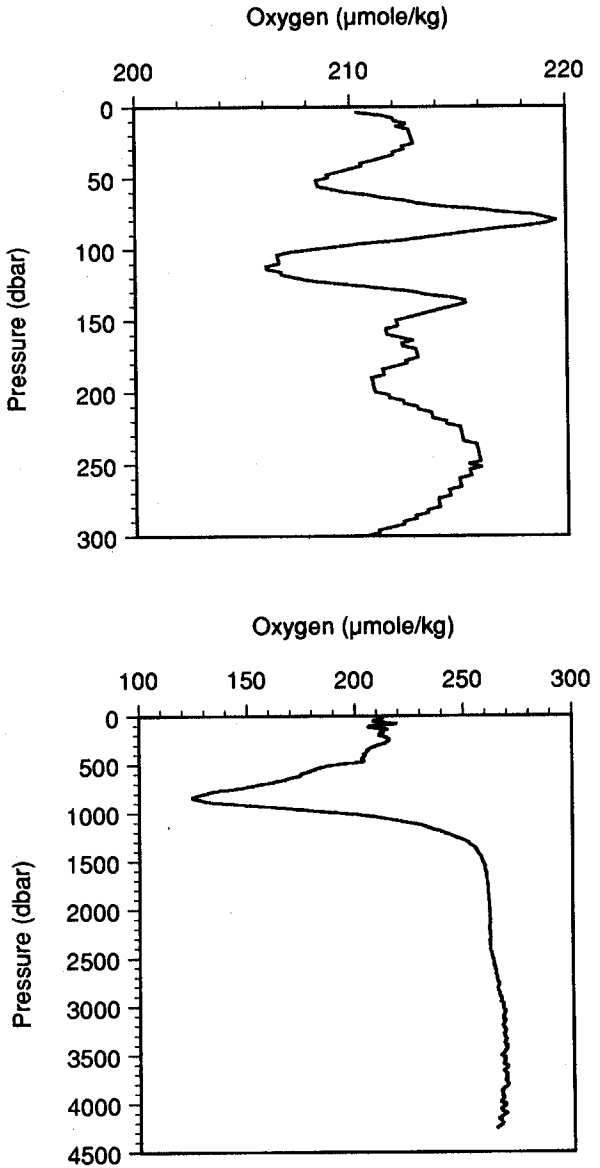
BATS 1—CTD Temperature Profile



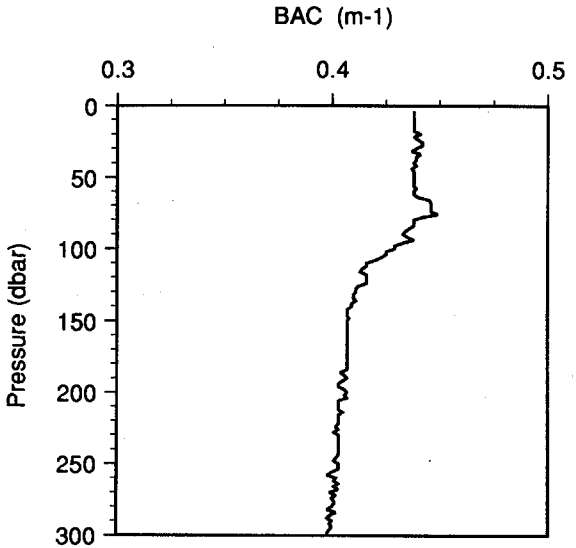
BATS 1—CTD Salinity Profile



BATS 1—CTD Oxygen Profile



BATS 1—CTD BAC Profile



BATS 1—Bottle Data
October 20-21, 1988
Physical Parameters

Bottle ID	Depth (m)	Pressure (db)	Temp (°C)	Pot. Temp (°C)	Salinity (ppt)	Sigma-t (kg/m^3)
G0102G12	1.0				36.389	
G0102G11	10.0				36.390	
G0102G10	25.0				36.454	
G0102G09	50.0				36.499	
G0102G08	100.0				36.670	
G0102G07	150.0				36.569	
G0102G06	200.0				36.548	
G0102G05	225.0				36.552	
G0102G04	250.0				36.544	
G0102G03	300.0				36.512	
G0102G02	400.0				36.445	
G0102G01	500.0				36.303	
G0101G12	2000.5	2024.8	3.820	3.620	34.993	27.820
G0101G11	2200.3	2227.3	3.580	3.357	34.982	27.837
G0101G10	2398.9	2429.8	3.320			
G0101G09	2600.0	2634.7	3.130	2.859	34.957	27.864
G0101G08	2801.7	2840.8	2.930	2.633	34.944	27.874
G0101G07	3000.9	3043.0	2.740	2.416	34.943	27.892
G0101G06	3200.6	3248.4	2.560	2.209	34.927	27.896
G0101G05	3400.3	3451.9	2.410			
G0101G04	3600.4	3656.7	2.330	1.919	34.917	27.912
G0101G03	3803.5	3865.7	2.280	1.835	34.901	27.905
G0101G02	4001.5	4068.8	2.250	1.771	34.893	27.904
G0101G01	4202.4	4272.0	2.240	1.725	34.888	27.903

BATS 1—Bottle Data
October 20-21, 1988
Gases

Bottle ID	Depth (m)	O_2(1) (µmole/kg)	O_2(2) (µmole/kg)	O_2(1) anomaly (µmole/kg)	O_2(2) anomaly (µmole/kg)	TCO_2 (1) (µmole/kg)	TCO_2 (2) (µmole/kg)
G0102G12	1.0	211.34	210.04			2008.9	2009.8
G0102G11	10.0	211.34	210.91			2020.1	2008.1
G0102G10	25.0	211.77	211.33			2013.4	2010.7
G0102G09	50.0	213.94				2013.1	2010.7
G0102G08	100.0	208.22				2066.3	2076.5
G0102G07	150.0	211.19	209.88			2074.4	
G0102G06	200.0	213.33	212.46			2079.9	2070.9
G0102G05	225.0	215.50					2070.3
G0102G04	250.0	215.93					
G0102G03	300.0	210.27	210.71			2068.1	2072.3
G0102G02	400.0	204.18	202.01			2084.5	2081.2
G0102G01	500.0	189.83	190.27			2092.0	2108.8

Bottle ID	Depth (m)	O_2(1) (µmole/kg)	O_2(2) (µmole/kg)	O_2(1) anomaly (µmole/kg)	O_2(2) anomaly (µmole/kg)	TCO_2 (1) (µmole/kg)	TCO_2 (2) (µmole/kg)
G0101G12	2000.5	260.85		-28.01			
G0101G11	2200.3	262.15		-28.24			
G0101G10	2398.9						
G0101G09	2600.0	264.74		-28.83			
G0101G08	2801.7	266.47		-28.65			
G0101G07	3000.9	268.64		-28.04			
G0101G06	3200.6	268.63		-29.64			
G0101G05	3400.3						
G0101G04	3600.4	267.75		-32.76			
G0101G03	3803.5						
G0101G02	4001.5	266.45		-35.23			
G0101G01	4202.4	264.72		-37.34			

BATS 1—Bottle Data
October 20-21, 1988
Nutrients

Bottle ID	Depth (m)	Nitrate+Nitrite (µmole/kg)	Phosphate (µmole/kg)	Silicate (µmole/kg)
G0102G12	1.0	0.00	0.00	1.04
G0102G11	10.0	0.00	0.00	1.18
G0102G10	25.0	0.00	0.00	1.08
G0102G09	50.0	0.00	0.00	1.02
G0102G08	100.0	2.20	0.04	1.14
G0102G07	150.0	1.31	0.00	0.96
G0102G06	200.0	2.55	0.05	1.13
G0102G05	225.0	2.74	0.00	1.22
G0102G04	250.0	2.51	0.06	1.34
G0102G03	300.0	3.92	0.07	1.43
G0102G02	400.0	5.23	0.19	1.91
G0102G01	500.0			

BATS 1—Bottle Data
October 20-21, 1988
Particulates

Bottle ID	Depth (m)	Chl *a* (µg/kg)	POC (µg/kg)	PON (µg/kg)	Bacteria (#x10^8/kg)
G0102G12	1.0	0.048			1.23
G0102G11	10.0	0.048			1.58
G0102G10	25.0	0.059			1.55
G0102G09	50.0	0.062			1.93
G0102G08	100.0	0.134			0.93
G0102G07	150.0	0.047			0.32
G0102G06	200.0	0.012			0.35
G0102G05	225.0	0.008			0.34
G0102G04	250.0	0.007			0.28
G0102G03	300.0	0.007			
G0102G02	400.0	0.007			
G0102G01	500.0				

Cruise Report, BATS 2

Cruise dates: November 23-28, 1988
Personnel: R.L. Sherriff-Dow, P. Wassmann, R. Johnson, M. Tuel.
R.V. Weatherbird

November 23, 1988

Depart BBSR: 0730

Arrive at BATS Station: 1230

Deploy sediment trap at 1340 at 31°49N 64°11W.

CTD **Cast 1**: 1400—1630 at 31.817 N; 64.183W
Nominal depths: 1, 10, 25, 50, 100, 150, 200, 250, 1200, 1400, 1600, 1800 m

Samples:

dissolved O_2	12 depths
salinity	12 depths
NO_3, PO_4, SiO_4,	12 depths
PON/POC - BBSR	8 depths 1-250m
Chlor. a - BBSR	8 depths 1-250m

CTD **Cast 2**: 2045- 0230 at 31.825 N; 64.208 W
Nominal depths: 300, 300, 400, 500, 500, 600, 750, 750, 800, 900, 1000, 1000 m

Samples:

dissolved O_2 -duplicates	12 depths
salinity	12 depths
NO_3, PO_4, SiO_4,	12 depths
PON/POC - BBSR	12 depths

November 24, 1988

CTD **Cast 3**: Start at 0230, at 31.882 N; 64.262 W
Nominal depths: 1, 10, 25, 50, 75, 100, 125, 150, 175, 200, 225, 250 m

Samples:

dissolved O_2 -duplicates	12 depths
salinity	12 depths
NO_3, PO_4, SiO_4,	12 depths
CO_2 - Brewer	11 depths, 1 surface replicate
PON/POC - BBSR	
Picoplankton - Ducklow	

Cruise went pretty well considering the weather. Sediment traps were deployed on arrival at OFP site. Didn't do primary production or deep cast due to approach of Tropical Storm "Keith". Start running for home around 1000 24 Nov. 88. Arrive at BBSR at 1400.

Trap Recovery Trip, November 27-29, 88

Personnel: P.Wassmann, M. Tuel.

Unable to find the sediment traps. Argos transmitter stopped working and the ship left 10 hrs or so later to search. Steamed approx. 400 miles looking for the trap over about two days. No luck. Deep cast done on this trip.

November 28, 1988

CTD **Cast 4** —CTD in water at 1500 hours
Lat: 31.833 N; Long: 64.167 W
Nominal depths: 2000,2200,2400,2600,2800,3000,3200,3400,3600,3800,4000 m.

Samples:

dissolved O_2 -duplicates	11 depths
salinity	11 depths
NO_3, PO_4, SiO_4,	11 depths

CTD Sensor Corrections to Bottle Data for BATS 2:

Salinity:

Casts 1, 2 and 3:

$$DS = R_{\varnothing} + \sum_{i=1}^{l} A_i \left(\frac{P}{4300}\right)^i + \sum_{i=1}^{m} B_i \left(\frac{T}{30}\right)^i + \sum_{i=1}^{n} C_i \left(\frac{SC}{37}\right)^i$$

MS = SC + DS

Cast 4:

$$DS = R_{\varnothing} + \sum_{i=1}^{l} A_i \left(\frac{P}{4300}\right)^i$$

MS = SC + DS

Where:

DS = wet Salinity - CTD Salinity
T = temperature (°C)
P = pressure (dbar)
SC = uncorrected CTD salinity
$R_{\varnothing}$, A_i, B_i, C_i = regression coefficients
l = 4; m = 3; n = 2 (Casts 1,2, and 3)
l = 3 (Cast 4 only)
MS = modified CTD salinity

Casts 2,3,4:

standard deviation of model residuals = 3.3473954E-03 ppt
model correlation coefficient = 9.9208224E-01

Casts 1,2,3:

$R_{\varnothing}$ = 3.6873457E+01
A_1 = 2.2574142E+00
A_2 =-1.3968145E+01
A_3 = 3.8178375E+01
A_4 =-3.6621157E+01
B_1 = 8.6440459E-01
B_2 =-1.1994727E+00
B_3 = 8.0069123E-01
C_1 =-7.6412767E+01
C_2 = 3.9130847E+01

Cast 4:

standard deviation of model residuals = 9.828E-04 ppt
model correlation coefficient = 9.99E-01

R_{ϕ} = -1.4199099E-01
A_1 = -8.2728922E-01
A_2 = 1.5682493E+00
A_3 = -7.9984986E-01

Oxygen:

$$DO = R_0 + \sum_{i=1}^{l} A_i \frac{P^i}{4300} + \sum_{i=1}^{m} B_i \frac{OC^i}{300}$$

MO=OC+300 x DO

Where:

DO = (wet oxygens-CTD oxygen)/300
OC = uncorrected CTD oxygen (µmole/kg)
P = pressure (dbar)
MO = modified CTD oxygen (µmole/kg)
l = 4; m = 2
R_{ϕ},A_i, B_i = regression coefficients

R_{ϕ} = 3.1594700e-01
A_1 = -9.0368726e-01
A_2 = 2.1387601e+00
A_3 = -3.4736112e+00
A_4 = 1.7283364e+00
B_1 = -4.5390647e-01
B_2 = 3.2839727e-01

model correlation coefficient = 9.971e-01
standard deviation of model residuals = 2.361e+00 µmole/kg

Beam Attenuation Coefficient:

BAC offset = 0.047 m^{-1}

General Comments on Data:

The passage of tropical storm Keith broke the cruise into two parts. The offsets in the surface values for CTD measurements on cast 4 are probably due to the effects of the storm. Please see the narrative for the timing of the casts.

CTD Sensor Corrections to Bottle Data for BATS 2:

Salinity:

Casts 1, 2 and 3:

$$DS = R_{\varnothing} + \sum_{i=1}^{l} A_i \left(\frac{P}{4300}\right)^i + \sum_{i=1}^{m} B_i \left(\frac{T}{30}\right)^i + \sum_{i=1}^{n} C_i \left(\frac{SC}{37}\right)^i$$

MS = SC + DS

Cast 4:

$$DS = R_{\varnothing} + \sum_{i=1}^{l} A_i \left(\frac{P}{4300}\right)^i$$

MS = SC + DS

Where:

DS = wet Salinity - CTD Salinity
T = temperature (°C)
P = pressure (dbar)
SC = uncorrected CTD salinity
$R_{\varnothing}$, A_i, B_i, C_i = regression coefficients
l = 4; m = 3; n = 2 (Casts 1,2, and 3)
l = 3 (Cast 4 only)
MS = modified CTD salinity

Casts 2,3,4:

standard deviation of model residuals = 3.3473954E-03 ppt
model correlation coefficient = 9.9208224E-01

Casts 1,2,3:

$R_{\varnothing}$ = 3.6873457E+01
A_1 = 2.2574142E+00
A_2 =-1.3968145E+01
A_3 = 3.8178375E+01
A_4 =-3.6621157E+01
B_1 = 8.6440459E-01
B_2 =-1.1994727E+00
B_3 = 8.0069123E-01
C_1 =-7.6412767E+01
C_2 = 3.9130847E+01

Cast 4:

standard deviation of model residuals = 9.828E-04 ppt
model correlation coefficient = 9.99E-01

R_{ϕ} = -1.4199099E-01
A_1 = -8.2728922E-01
A_2 = 1.5682493E+00
A_3 = -7.9984986E-01

Oxygen:

$$DO = R_0 + \sum_{i=1}^{l} A_i \frac{P^i}{4300} + \sum_{i=1}^{m} B_i \frac{OC^i}{300}$$

MO=OC+300 x DO

Where:

DO = (wet oxygens-CTD oxygen)/300
OC = uncorrected CTD oxygen (µmole/kg)
P = pressure (dbar)
MO = modified CTD oxygen (µmole/kg)
l = 4; m = 2
R_{ϕ},A_i, B_i = regression coefficients

R_{ϕ} = 3.1594700e-01
A_1 = -9.0368726e-01
A_2 = 2.1387601e+00
A_3 = -3.4736112e+00
A_4 = 1.7283364e+00
B_1 = -4.5390647e-01
B_2 = 3.2839727e-01

model correlation coefficient = 9.971e-01
standard deviation of model residuals = 2.361e+00 µmole/kg

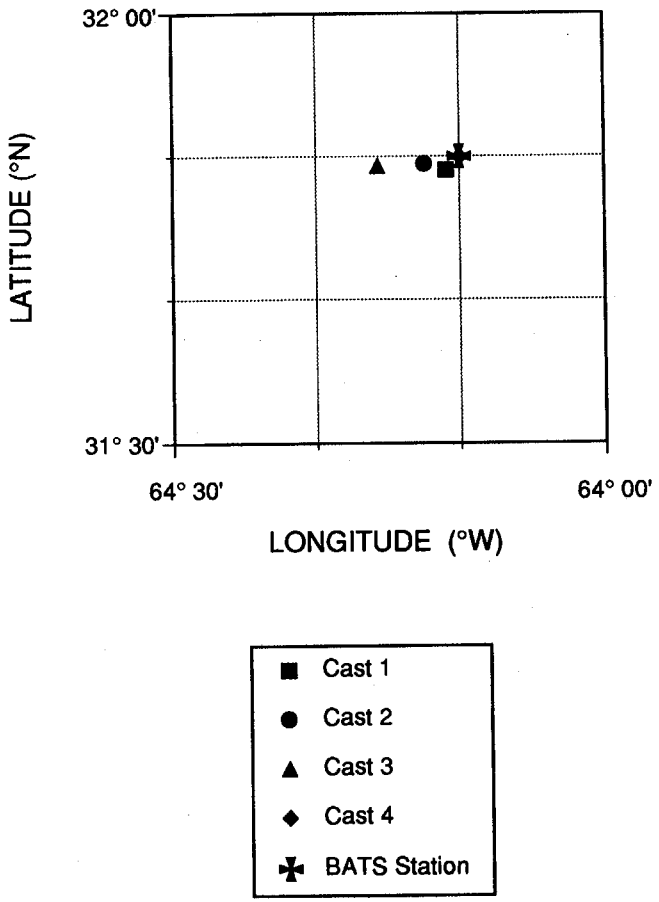
Beam Attenuation Coefficient:

BAC offset = 0.047 m^{-1}

General Comments on Data:

The passage of tropical storm Keith broke the cruise into two parts. The offsets in the surface values for CTD measurements on cast 4 are probably due to the effects of the storm. Please see the narrative for the timing of the casts.

BATS 2—Cast Positions:



BATS 2, CTD Cast 1
23 November, 1988; Start 14:00
Lat: 31.817 N; Long: 64.183 W

Depth (m)	Pres (db)	Temp (°C)	Pot.T (°C)	CTD Sal (ppt)	Sigma-t (kg/m^3)	CTD O_2 (μmole/kg)	O_2 Anom (μmole/kg)	BAC (m^{-1})	PAR ($\mu E/m^2/s$)	Fluor (rfu)
4.0	4.0	24.160	24.159	36.453	24.696	220.42	13.44	0.440		
10.0	10.1	24.168	24.166	36.455	24.696	221.24	14.29	0.445		
20.0	20.1	24.164	24.160	36.457	24.699	221.70	14.74	0.441		
30.0	30.2	24.149	24.142	36.455	24.703	222.51	15.50	0.443		
40.0	40.3	24.134	24.126	36.456	24.708	222.94	15.88	0.441		
50.0	50.4	24.110	24.099	36.456	24.716	222.97	15.82	0.441		
60.0	60.4	23.377	23.364	36.652	25.083	230.99	21.50	0.448		
70.0	70.5	22.135	22.121	36.740	25.508	243.68	29.76	0.437		
80.0	80.6	21.584	21.568	36.722	25.650	241.68	25.65	0.433		
90.0	90.6	21.035	21.017	36.698	25.784	237.19	19.01	0.431		
100.0	100.7	20.504	20.485	36.667	25.905	232.83	12.52	0.425		
110.0	110.8	20.185	20.164	36.612	25.949	228.81	7.14	0.424		
120.0	120.9	19.902	19.879	36.588	26.007	224.84	2.00	0.422		
130.0	131.0	19.584	19.560	36.572	26.079	219.95	-4.21	0.417		
140.0	141.0	19.376	19.350	36.579	26.139	216.27	-8.73	0.415		
150.0	151.1	19.167	19.139	36.590	26.202	212.19	-13.66	0.411		
160.0	161.2	18.956	18.927	36.582	26.251	208.63	-18.11	0.408		
170.0	171.3	18.832	18.802	36.581	26.283	208.72	-18.54	0.407		
180.0	181.3	18.731	18.698	36.580	26.308	212.21	-15.48	0.403		
190.0	191.4	18.652	18.618	36.578	26.327	214.39	-13.64	0.402		
200.0	201.5	18.594	18.558	36.577	26.341	216.05	-12.22	0.402		
210.0	211.6	18.541	18.504	36.577	26.355	218.13	-10.37	0.402		
220.0	221.7	18.506	18.466	36.578	26.365	220.29	-8.36	0.402		
230.0	231.7	18.466	18.425	36.575	26.374	220.73	-8.09	0.402		
240.0	241.8	18.426	18.383	36.574	26.383	220.34	-8.66	0.402		
250.0	251.9	18.404	18.359	36.574	26.389	219.95	-9.14	0.402		
275.0	277.1	18.197	18.148	36.544	26.419	215.83	-14.20	0.402		
300.0	302.3	18.097	18.044	36.534	26.438	213.44	-17.04	0.402		
325.0	327.5	17.980	17.922	36.518	26.456	211.93	-19.08	0.399		
350.0	352.7	17.858	17.796	36.507	26.478	211.86	-19.69	0.398		
375.0	378.0	17.680	17.614	36.483	26.505	209.01	-23.36	0.398		
400.0	403.2	17.537	17.467	36.462	26.525	210.08	-22.95	0.398		
425.0	428.4	17.448	17.374	36.451	26.539	212.33	-21.11	0.398		
450.0	453.6	17.185	17.108	36.394	26.560	202.58	-32.12	0.396		
475.0	478.9	16.966	16.885	36.353	26.582	199.10	-36.66	0.394		
500.0	504.1	16.576	16.492	36.284	26.622	195.24	-42.40	0.394		
550.0	554.6	15.731	15.641	36.136	26.705	194.94	-46.88	0.393		
600.0	605.1	14.911	14.816	35.998	26.783	194.12	-51.88	0.390		
650.0	655.6	13.976	13.877	35.855	26.875	194.47	-56.43	0.389		
700.0	706.1	12.915	12.813	35.693	26.968	184.48	-72.20	0.389		
750.0	756.6	11.841	11.737	35.535	27.056	171.54	-91.24	0.389		
800.0	807.2	10.688	10.583	35.396	27.160	167.72	-101.84	0.390		
850.0	857.7	9.493	9.388	35.278	27.273	172.41	-104.49	0.389		
900.0	908.3	8.369	8.265	35.188	27.381	178.53	-105.56	0.385		
950.0	958.9	7.702	7.595	35.155	27.456	188.80	-99.68	0.385		
1000.0	1009.4	7.157	7.048	35.141	27.523	197.62	-94.51	0.382		
1050.0	1060.0	6.376	6.266	35.084	27.585	214.05	-83.55	0.384		
1100.0	1110.7	5.985	5.873	35.093	27.643	222.01	-78.30	0.381		
1150.0	1161.3	5.669	5.553	35.087	27.678	229.11	-73.47	0.380		
1200.0	1211.9	5.369	5.250	35.075	27.705	235.23	-69.54	0.376		
1300.0	1313.2	4.963	4.836	35.049	27.733	243.94	-63.86	0.376		

Depth (m)	Pres (db)	Temp (°C)	Pot.T (°C)	CTD Sal (ppt)	Sigma-t (kg/m^3)	CTD 0_2 (µmole/kg)	0_2 Anom (µmole/kg)	BAC (m^{-1})	PAR (µE/m^2/s)	Fluor (rfu)
1400.0	1414.6	4.704	4.568	35.037	27.754	247.13	-62.62	0.372		
1500.0	1516.0	4.448	4.303	35.018	27.768	251.80	-59.92	0.372		
1600.0	1617.4	4.323	4.168	35.014	27.780	253.49	-59.18	0.372		
1700.0	1718.9	4.182	4.015	35.006	27.790	255.97	-57.81	0.371		
1800.0	1820.5	4.076	3.898	34.998	27.795	257.35	-57.26	0.368		

BATS 2, CTD Cast 2
23 November, 1988; Start 20:45
Lat: 31.825 N; Long: 64.208 W

Depth (m)	Pres (db)	Temp (°C)	Pot.T (°C)	CTD Sal (ppt)	Sigma-t (kg/m^3)	CTD 0_2 (µmole/kg)	0_2 Anom (µmole/kg)	BAC (m^{-1})	PAR (µE/m^2/s)	Fluor (rfu)
3.0	3.0	24.148	24.147	36.444	24.693	217.23	10.20	0.437		
10.0	10.1	24.161	24.159	36.446	24.690	221.06	14.08	0.436		
20.0	20.1	24.158	24.154	36.456	24.700	221.44	14.46	0.435		
30.0	30.2	24.157	24.151	36.464	24.707	221.70	14.72	0.437		
40.0	40.3	24.161	24.152	36.468	24.709	222.54	15.58	0.437		
50.0	50.4	24.164	24.153	36.472	24.712	222.97	16.03	0.436		
60.0	60.4	24.098	24.085	36.485	24.742	226.50	19.35	0.437		
70.0	70.5	22.376	22.361	36.715	25.420	240.40	27.34	0.434		
80.0	80.6	21.824	21.808	36.722	25.582	242.21	27.09	0.432		
90.0	90.6	21.169	21.151	36.700	25.749	237.97	20.32	0.428		
100.0	100.7	20.649	20.629	36.677	25.874	232.74	13.02	0.425		
110.0	110.8	20.177	20.156	36.658	25.986	227.10	5.47	0.420		
120.0	120.9	19.930	19.908	36.626	26.028	219.29	-3.38	0.420		
130.0	131.0	19.667	19.643	36.615	26.090	214.06	-9.69	0.418		
140.0	141.0	19.366	19.340	36.591	26.151	211.24	-13.78	0.411		
150.0	151.1	19.030	19.002	36.561	26.215	207.29	-19.18	0.408		
160.0	161.2	18.897	18.868	36.555	26.245	208.11	-18.93	0.402		
170.0	171.3	18.788	18.758	36.552	26.271	210.57	-16.92	0.402		
180.0	181.3	18.704	18.672	36.548	26.290	213.03	-14.83	0.400		
190.0	191.4	18.643	18.609	36.547	26.305	215.09	-13.03	0.402		
200.0	201.5	18.605	18.569	36.546	26.315	216.67	-11.61	0.403		
210.0	211.6	18.564	18.526	36.545	26.325	218.34	-10.12	0.401		
220.0	221.7	18.531	18.492	36.545	26.333	219.34	-9.26	0.401		
230.0	231.7	18.481	18.440	36.543	26.345	219.64	-9.17	0.400		
240.0	241.8	18.457	18.414	36.542	26.351	219.93	-8.98	0.399		
250.0	251.9	18.377	18.332	36.531	26.363	218.30	-10.97	0.402		
275.0	277.1	18.258	18.209	36.519	26.385	215.09	-14.71	0.403		
300.0	302.3	18.124	18.071	36.503	26.407	214.41	-15.99	0.399		
325.0	327.5	17.989	17.932	36.489	26.431	216.36	-14.65	0.398		
350.0	352.7	17.902	17.840	36.479	26.446	214.75	-16.66	0.396		
375.0	378.0	17.838	17.771	36.470	26.456	212.51	-19.19	0.397		
400.0	403.2	17.615	17.545	36.440	26.489	207.39	-25.33	0.396		
425.0	428.4	17.444	17.370	36.409	26.508	203.45	-30.08	0.394		
450.0	453.6	17.224	17.146	36.373	26.534	199.97	-34.59	0.394		
475.0	478.9	16.911	16.830	36.322	26.571	196.10	-39.96	0.394		
500.0	504.1	16.503	16.419	36.253	26.615	193.69	-44.34	0.389		
550.0	554.6	15.552	15.463	36.093	26.712	189.28	-53.45	0.393		
600.0	605.1	14.774	14.680	35.971	26.792	190.32	-56.39	0.388		
650.0	655.6	13.767	13.668	35.812	26.886	185.71	-66.32	0.389		
700.0	706.1	12.654	12.553	35.643	26.981	174.38	-83.78	0.389		
750.0	756.6	11.682	11.578	35.521	27.075	171.58	-92.10	0.385		

Depth (m)	Pres (db)	Temp (°C)	Pot.T (°C)	CTD Sal (ppt)	Sigma-t (kg/m^3)	CTD 0_2 (µmole/kg)	0_2 Anom (µmole/kg)	BAC (m^{-1})	PAR ($\mu E/m^2/s$)	Fluor (rfu)
800.0	807.2	10.451	10.347	35.380	27.189	168.68	-102.30	0.385		
850.0	857.7	9.371	9.267	35.244	27.266	162.13	-115.58	0.385		
900.0	908.3	8.449	8.344	35.181	27.364	172.35	-111.24	0.384		
950.0	958.9	7.741	7.634	35.149	27.446	182.58	-105.66	0.381		
1000.0	1009.4	6.923	6.816	35.101	27.524	197.14	-96.66	0.381		

BATS 2, CTD Cast 3
24 November, 1988; Start 02:30
Lat: 31.882 N; Long: 64.262 W

Depth (m)	Pres (db)	Temp (°C)	Pot.T (°C)	CTD Sal (ppt)	Sigma-t (kg/m^3)	CTD 0_2 (µmole/kg)	0_2 Anom (µmole/kg)	BAC (m^{-1})	PAR ($\mu E/m^2/s$)	Fluor (rfu)
5.0	5.0	24.115	24.114	36.430	24.692	220.43	13.26	0.433		
10.0	10.1	24.127	24.125	36.432	24.690	220.84	13.72	0.433		
20.0	20.1	24.124	24.120	36.436	24.695	221.67	14.54	0.433		
30.0	30.2	24.127	24.120	36.440	24.698	221.30	14.18	0.433		
40.0	40.3	24.127	24.119	36.443	24.700	221.06	13.96	0.434		
50.0	50.4	24.129	24.118	36.445	24.702	221.35	14.25	0.433		
60.0	60.4	24.129	24.116	36.447	24.704	223.64	16.55	0.433		
70.0	70.5	22.466	22.452	36.681	25.369	237.02	24.25	0.433		
80.0	80.6	21.703	21.687	36.691	25.593	240.08	24.46	0.428		
90.0	90.6	21.119	21.102	36.666	25.737	236.01	18.11	0.426		
100.0	100.7	20.560	20.541	36.645	25.873	230.00	9.88	0.424		
110.0	110.8	20.195	20.175	36.630	25.960	226.36	4.77	0.424		
120.0	120.9	19.928	19.905	36.608	26.016	219.01	-3.69	0.421		
130.0	131.0	19.694	19.670	36.595	26.068	217.28	-6.39	0.415		
140.0	141.0	19.433	19.407	36.576	26.122	216.06	-8.71	0.413		
150.0	151.1	19.250	19.222	36.560	26.158	211.26	-14.29	0.411		
160.0	161.2	18.985	18.956	36.537	26.209	209.23	-17.46	0.407		
170.0	171.3	18.860	18.829	36.527	26.234	209.72	-17.51	0.402		
180.0	181.3	18.763	18.731	36.525	26.257	212.56	-15.08	0.402		
190.0	191.4	18.669	18.635	36.522	26.280	215.74	-12.30	0.402		
200.0	201.5	18.619	18.583	36.521	26.292	216.57	-11.69	0.401		
210.0	211.6	18.575	18.538	36.520	26.303	217.00	-11.44	0.402		
220.0	221.7	18.543	18.503	36.520	26.312	217.01	-11.57	0.402		
230.0	231.7	18.502	18.461	36.520	26.322	216.73	-12.02	0.402		
240.0	241.8	18.443	18.400	36.515	26.334	215.65	-13.36	0.398		

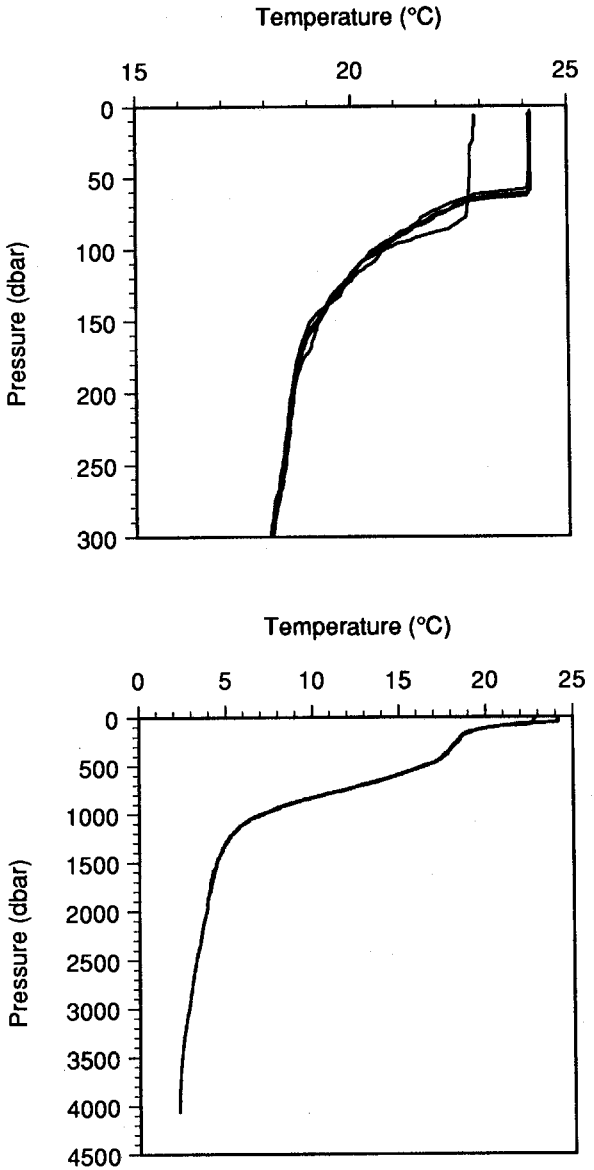
BATS 2, CTD Cast 4
28 November, 1988; Start 15:00
Lat: 31.833 N; Long: 64.167 W

Depth (m)	Pres (db)	Temp (°C)	Pot.T (°C)	CTD Sal (ppt)	Sigma-t (kg/m^3)	CTD 0_2 (µmole/kg)	0_2 Anom (µmole/kg)	BAC (m^{-1})	PAR ($\mu E/m^2/s$)	Fluor (rfu)
6.0	6.0	22.872				209.94		0.462		
10.0	10.1	22.874				212.00		0.455		
20.0	20.1	22.848				215.63		0.459		
30.0	30.2	22.770				215.62		0.459		
40.0	40.3	22.757				216.01		0.459		

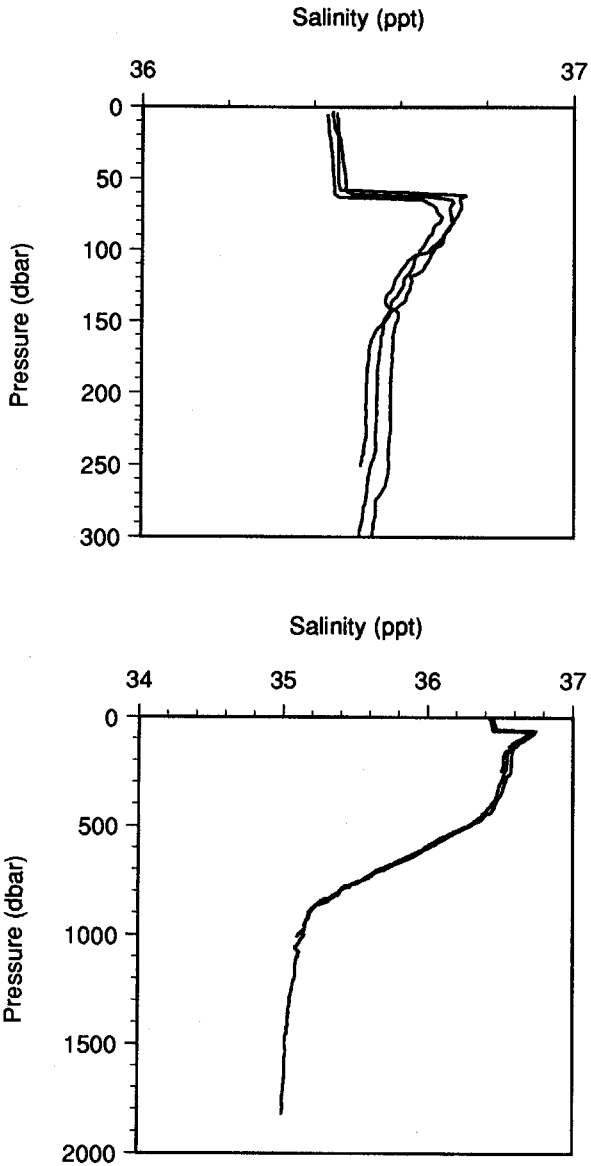
Depth (m)	Pres (db)	Temp (°C)	Pot.T (°C)	CTD Sal (ppt)	Sigma-t (kg/m^3)	CTD 0_2 (µmole/kg)	0_2 Anom (µmole/kg)	BAC (m^{-1})	PAR ($\mu E/m^2/s$)	Fluor (rfu)
50.0	50.4	22.755				215.92		0.457		
60.0	60.4	22.739				215.56		0.451		
70.0	70.5	22.699				215.13		0.450		
80.0	80.6	22.527				214.18		0.445		
90.0	90.6	21.672				210.23		0.431		
100.0	100.7	20.765				199.93		0.423		
110.0	110.8	20.428				195.83		0.419		
120.0	120.9	20.030				197.48		0.414		
130.0	131.0	19.765				199.53		0.411		
140.0	141.0	19.370				201.56		0.408		
150.0	151.1	19.216				202.60		0.407		
160.0	161.2	19.136				203.01		0.405		
170.0	171.3	19.014				204.08		0.407		
180.0	181.3	18.823				206.26		0.403		
190.0	191.4	18.711				210.27		0.402		
200.0	201.5	18.651				212.27		0.402		
210.0	211.6	18.622				213.46		0.403		
220.0	221.7	18.569				214.31		0.402		
230.0	231.7	18.538				214.64		0.402		
240.0	241.8	18.495				214.27		0.402		
250.0	251.9	18.459				213.46		0.402		
275.0	277.1	18.287				211.62		0.401		
300.0	302.3	18.151				209.42		0.402		
325.0	327.5	18.019				207.00		0.398		
350.0	352.7	17.868				206.02		0.400		
375.0	378.0	17.731				204.55		0.398		
400.0	403.2	17.545				202.94		0.398		
425.0	428.4	17.402				203.48		0.396		
450.0	453.6	17.160				205.74		0.395		
475.0	478.9	16.881				198.84		0.394		
500.0	504.1	16.362				192.49		0.394		
550.0	554.6	15.630				186.45		0.394		
600.0	605.1	14.911				186.10		0.389		
650.0	655.6	14.045				186.96		0.389		
700.0	706.1	12.933				181.33		0.389		
750.0	756.6	11.796				171.38		0.388		
800.0	807.2	10.507				164.24		0.388		
850.0	857.7	9.553				171.97		0.385		
900.0	908.3	8.538				182.64		0.385		
950.0	958.9	7.758				191.95		0.385		
1000.0	1009.4	6.942				207.65		0.385		
1050.0	1060.0	6.344				219.07		0.383		
1100.0	1110.7	5.961				226.31		0.384		
1150.0	1161.3	5.627				231.29		0.381		
1200.0	1211.9	5.358				234.47		0.378		
1300.0	1313.2	4.993				239.50		0.376		
1400.0	1414.6	4.698				244.09		0.376		
1500.0	1516.0	4.442				248.20		0.374		
1600.0	1617.4	4.242				251.23		0.372		
1700.0	1718.9	4.100				253.45		0.372		
1800.0	1820.5	4.014				253.84		0.372		
1900.0	1922.1	3.918				255.60		0.371		
2000.0	2023.7	3.860	3.660	34.972	27.799	255.79	-60.54	0.370		
2100.0	2125.4	3.702	3.491	34.973	27.817	258.69	-58.87	0.368		
2200.0	2227.2	3.604	3.381	34.987	27.839	259.29	-59.01	0.368		
2300.0	2328.9	3.505	3.270	34.984	27.847	260.03	-59.05	0.368		
2400.0	2430.8	3.373	3.126	34.972	27.851	262.68	-57.48	0.368		

Depth (m)	Pres (db)	Temp (°C)	Pot.T (°C)	CTD Sal (ppt)	Sigma-t (kg/m^3)	CTD O_2 (μmole/kg)	O_2 Anom (μmole/kg)	BAC (m^{-1})	PAR ($\mu E/m^2/s$)	Fluor (rfu)
2500.0	2532.7	3.252	2.993	34.963	27.856	264.78	-56.37	0.368		
2600.0	2634.6	3.147	2.875	34.956	27.861	265.87	-56.13	0.368		
2700.0	2736.6	3.066	2.781	34.951	27.866	266.29	-56.37	0.368		
2800.0	2838.6	2.975	2.678	34.947	27.872	266.63	-56.77	0.366		
2900.0	2940.7	2.895	2.584	34.942	27.876	268.07	-55.99	0.364		
3000.0	3042.8	2.800	2.476	34.937	27.882	268.49	-56.35	0.366		
3100.0	3144.9	2.691	2.353	34.933	27.889	269.96	-55.79	0.367		
3200.0	3247.2	2.593	2.241	34.928	27.894	270.10	-56.46	0.365		
3300.0	3349.4	2.516	2.150	34.923	27.898	269.99	-57.22	0.368		
3400.0	3451.7	2.455	2.074	34.921	27.903	269.30	-58.42	0.365		
3500.0	3554.1	2.398	2.002	34.916	27.904	268.37	-59.83	0.366		
3600.0	3656.5	2.353	1.941	34.912	27.906	267.51	-61.07	0.368		
3700.0	3758.9	2.323	1.895	34.909	27.907	266.17	-62.67	0.368		
3800.0	3861.4	2.293	1.848	34.904	27.907	264.90	-64.21	0.369		
3900.0	3964.0	2.271	1.810	34.899	27.906	263.68	-65.62	0.370		
4000.0	4066.5	2.257	1.778	34.894	27.904	262.20	-67.23	0.373		

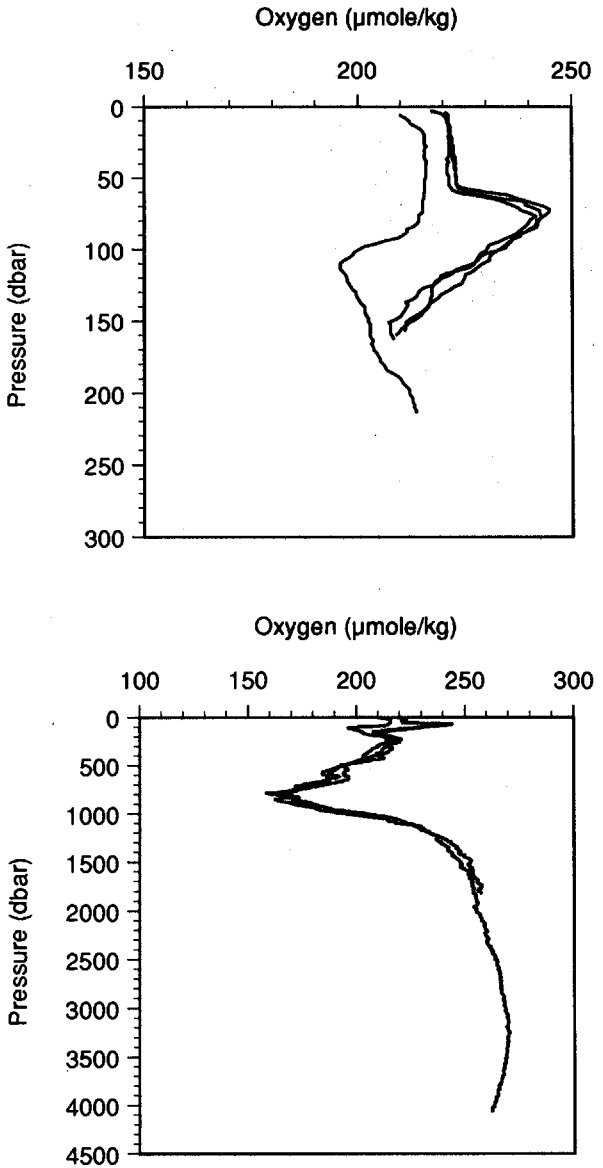
BATS 2—CTD Temperature Profile



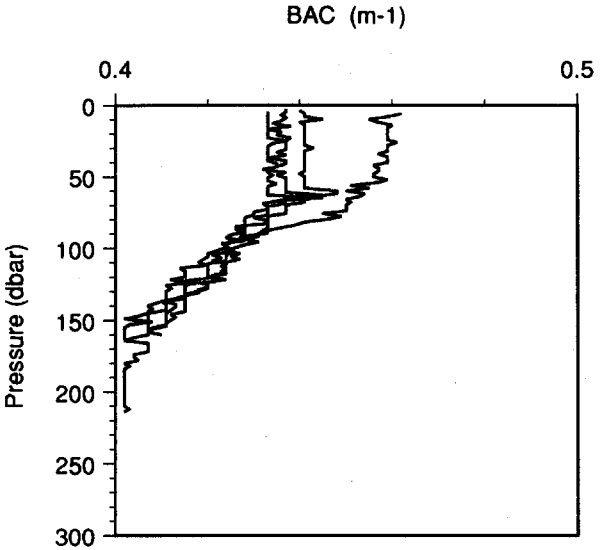
BATS 2—CTD Salinity Profile



BATS 2—CTD Oxygen Profile



BATS 2—CTD BAC Profile



BATS 2—Bottle Data
November 23-28, 1988
Physical Parameters

Bottle ID	Depth (m)	Pressure (db)	Temp (°C)	Pot. Temp (°C)	Salinity (ppt)	Sigma-t (kg/m^3)
G0201G12	3.9	3.9	24.091	24.090	36.455	24.718
G0201G11	10.9	11.0	24.110	24.108	36.481	24.733
G0201G10	25.8	26.0	24.109	24.103	36.449	24.710
G0201G09	51.8	52.1	24.060	24.049	36.466	24.739
G0201G08	99.7	100.5	20.841	20.821	36.692	25.833
G0201G07	153.4	154.5	19.096	19.068	36.584	26.216
G0201G06	200.1	201.6	18.628	18.592	36.553	26.314
G0201G05	250.1	252.0	18.424	18.379	36.577	26.386
G0201G04	1196.3	1208.1	5.347	5.229	35.072	27.705
G0201G03	1400.4	1414.9	4.638	4.503	35.029	27.755
G0201G02	1604.7	1622.2	4.322	4.166	35.016	27.781
G0201G01	1802.4	1822.9	4.068			
G0202G12	300.9	303.3	18.058	18.005	36.497	26.419
G0202G11	300.9	303.3	18.058	18.005	36.495	26.418
G0202G10	400.1	403.3	17.560	17.490	36.558	26.593
G0202G09	501.3	505.5	16.418	16.333	36.237	26.623
G0202G08	501.3	505.5	16.418	16.333	36.235	26.622
G0202G07	600.1	605.2	14.806	14.711	35.978	26.791
G0202G06	750.5	757.1	11.579	11.476	35.511	27.086
G0202G05	750.5	757.1	11.579	11.476	35.515	27.089
G0202G04	801.2	808.3	10.460	10.356	35.374	27.183
G0202G03	903.6	911.9	8.407	8.302	35.176	27.366
G0202G02	1000.0	1009.4	6.923	6.816	35.103	27.526
G0202G01	1000.0	1009.4	6.923	6.816	35.102	27.525
G0203G12	3.8	3.8	24.110			
G0203G11	11.1	11.1	24.100			
G0203G10	26.3	26.5	24.113			
G0203G09	50.7	51.1	24.115			
G0203G08	76.4	77.0	21.822	21.807	36.720	25.581
G0203G07	100.9	101.7	20.530			
G0203G06	124.7	125.6	19.824			
G0203G05	150.0	151.1	19.209			
G0203G04	175.0	176.3	18.806	18.774	36.564	26.276
G0203G03	199.0	200.5	18.615			
G0203G02	224.2	225.9	18.517	18.477	36.549	26.340
G0203G01	249.5	251.4	18.376			
G0204G12	1998.6	2022.3	3.872			
G0204G11	2197.3	2224.4	3.589	3.366	34.986	27.839
G0204G10	2396.4	2427.1	3.328	3.082	34.969	27.853
G0204G09	2598.8	2633.3	3.127	2.856	34.955	27.863
G0204G08	2796.5	2835.0	2.963	2.666	34.947	27.873
G0204G07	2997.6	3040.2	2.776			
G0204G06	3200.4	3247.5	2.571	2.219	34.928	27.896
G0204G05	3399.2	3450.9	2.440	2.059	34.918	27.901
G0204G04	3600.9	3657.4	2.349	1.937	34.913	27.907
G0204G03	3798.0	3859.3	2.292			
G0204G02	4003.0	4069.6	2.255	1.776	34.894	27.904
G0204G01	4003.1	4069.7	2.256			

BATS 2—Bottle Data
November 23-28, 1988
Gases

Bottle ID	Depth (m)	$O_2(1)$ (µmole/kg)	$O_2(2)$ (µmole/kg)	$O_2(1)$ anomaly (µmole/kg)	$O_2(2)$ anomaly (µmole/kg)	TCO_2 (µmole/kg)
G0201G12	3.9	226.37		24.34		
G0201G11	10.9	224.63		22.75		
G0201G10	25.8	225.50		23.61		
G0201G09	51.8	225.93		23.85		
G0201G08	99.7	239.51		21.50		
G0201G07	153.4	213.78		-11.95		
G0201G06	200.1	218.54		-9.05		
G0201G05	250.1	221.14		-7.10		
G0201G04	1196.3	239.62		-40.88		
G0201G03	1400.4					
G0201G02	1604.7					
G0201G01	1802.4	262.16				
G0202G12	300.9	217.22		-12.46		
G0202G11	300.9	217.22		-12.46		
G0202G10	400.1	208.07		-23.19		
G0202G09	501.3	195.91		-39.84		
G0202G08	501.3	194.17		-41.58		
G0202G07	600.1	192.42		-49.16		
G0202G06	750.5	169.38		-83.61		
G0202G05	750.5	171.55		-81.43		
G0202G04	801.2	168.07		-89.04		
G0202G03	903.6	171.53		-93.84		
G0202G02	1000.0	196.25		-75.94		
G0202G01	1000.0					
G0203G12	3.8	224.63				2015.6
G0203G11	11.1	225.07				2001.6
G0203G10	26.3	224.63				2000.5
G0203G09	50.7	222.02				2009.9
G0203G08	76.4	246.98		33.63		2030.3
G0203G07	100.9	233.41				2057.4
G0203G06	124.7	220.77				2065.8
G0203G05	150.0	213.35				2078.3
G0203G04	175.0	214.20		-12.71		2071.1
G0203G03	199.0	221.14				2068.3
G0203G02	224.2	219.84		-8.14		
G0203G01	249.5	217.22				

Bottle ID	Depth (m)	O_2(1) (µmole/kg)	O_2(2) (µmole/kg)	O_2(1) anomaly (µmole/kg)	O_2(2) anomaly (µmole/kg)	TCO_2 (µmole/kg)
G0204G12	1998.6					
G0204G11	2197.3	260.85		-29.85		
G0204G10	2396.4	262.58	262.58	-29.95	-29.95	
G0204G09	2598.8	265.18		-28.81		
G0204G08	2796.5	267.77	268.64	-27.45	-26.58	
G0204G07	2997.6					
G0204G06	3200.4	268.63	269.50	-29.94	-29.07	
G0204G05	3399.2	269.06		-30.74		
G0204G04	3600.9	268.62	268.62	-32.12	-32.12	
G0204G03	3798.0	265.15				
G0204G02	4003.0	266.02		-36.02		
G0204G01	4003.1					

BATS 2—Bottle Data
November 23-28, 1988
Nutrients

Bottle ID	Depth (m)	Nitrate+Nitrite (µmole/kg)	Phosphate (µmole/kg)	Silicate (µmole/kg)
G0201G12	3.9	0.00	0.00	1.41
G0201G11	10.9	0.00	0.04	1.33
G0201G10	25.8	0.09	0.00	1.16
G0201G09	51.8	0.07	0.04	1.16
G0201G08	99.7	0.11	0.00	0.99
G0201G07	153.4	0.38	0.07	1.08
G0201G06	200.1	2.52	0.11	1.25
G0201G05	250.1	2.72	0.14	0.99
G0201G04	1196.3	18.38		12.65
G0201G03	1400.4	18.19		12.24
G0201G02	1604.7			
G0201G01	1802.4	18.70		12.65
G0202G12	300.9	3.99	0.17	1.25
G0202G11	300.9			
G0202G10	400.1	5.93	0.32	1.67
G0202G09	501.3	8.86	0.43	2.41
G0202G08	501.3			
G0202G07	600.1	11.40	0.60	3.25
G0202G06	750.5		1.14	8.66
G0202G05	750.5			
G0202G04	801.2	20.91	1.25	9.94
G0202G03	903.6		1.45	
G0202G02	1000.0		1.39	13.43
G0202G01	1000.0			

Bottle ID	Depth (m)	Nitrate+Nitrite (µmole/kg)	Phosphate (µmole/kg)	Silicate (µmole/kg)
G0203G12	3.8			
G0203G11	11.1			
G0203G10	26.3			
G0203G09	50.7			
G0203G08	76.4	0.70	0.04	1.25
G0203G07	100.9			
G0203G06	124.7	1.03	0.11	1.25
G0203G05	150.0			
G0203G04	175.0	2.47	0.09	1.67
G0203G03	199.0			
G0203G02	224.2	2.70	0.04	1.67
G0203G01	249.5			
G0204G12	1998.6			
G0204G11	2197.3	18.96		15.77
G0204G10	2396.4	18.83		17.59
G0204G09	2598.8	19.14	1.09	18.72
G0204G08	2796.5	19.01	1.15	20.07
G0204G07	2997.6			
G0204G06	3200.4	18.00	1.16	22.14
G0204G05	3399.2	17.69	1.19	23.95
G0204G04	3600.9	18.76	1.14	25.43
G0204G03	3798.0	19.34	1.16	
G0204G02	4003.0	19.34	1.24	28.71
G0204G01	4003.1			

BATS 2—Bottle Data November 23-28, 1988 Particulates

Bottle ID	Depth (m)	Chl *a* (µg/kg)	POC (µg/kg)	PON (µg/kg)	Bacteria (# x 10^8/kg)
G0201G12	3.9	0.084	46.92	3.91	0.92
G0201G11	10.9	0.043	41.44	3.61	1.07
G0201G10	25.8	0.047	68.50	6.58	0.97
G0201G09	51.8	0.049	38.47	3.56	0.84
G0201G08	99.7	0.170	36.24	2.98	0.42
G0201G07	153.4	0.039	34.65	1.91	0.30
G0201G06	200.1	0.008	30.61	1.36	0.20
G0201G05	250.1	0.008	27.17	2.14	0.20
G0201G04	1196.3				
G0201G03	1400.4				
G0201G02	1604.7				
G0201G01	1802.4				

Bottle ID	Depth (m)	Chl *a* (µg/kg)	POC (µg/kg)	PON (µg/kg)	Bacteria (# x 10^8/kg)
G0202G12	300.9		12.31	1.08	
G0202G11	300.9		31.48	2.93	
G0202G10	400.1		18.65	1.09	
G0202G09	501.3		18.25	0.76	
G0202G08	501.3		17.33	0.99	
G0202G07	600.1		17.47	0.80	
G0202G06	750.5		20.18	1.06	
G0202G05	750.5		9.81	0.85	
G0202G04	801.2		19.23	0.86	
G0202G03	903.6		18.04	0.90	
G0202G02	1000.0		9.42	0.78	
G0202G01	1000.0		17.19	0.82	
G0203G12	3.8				
G0203G11	11.1				
G0203G10	26.3				
G0203G09	50.7				
G0203G08	76.4		42.98	4.02	
G0203G07	100.9		20.89	2.51	
G0203G06	124.7		19.75	1.76	
G0203G05	150.0		27.43	1.92	
G0203G04	175.0				
G0203G03	199.0				
G0203G02	224.2				
G0203G01	249.5				

Cruise Report, BATS 3

Cruise dates: December 16-20, 1988
Personnel: A.H. Knap, R.L. Sherriff-Dow, M. Tuel, R. Johnson.
R.V. Cape Henlopen

December 16, 1988

Depart St. George's at 1600 hrs

Arrive BATS Station at 2100

Sediment trap launched 2250. Lat: 31.737 N; Long: 64.242

Seas rough 6-8'. Storm approaching.

December 17, 1988

CTD **Cast 1**: Start: 0715 End: 0940
Lat: 31.719 N; Long: 64.219 W
Sea: 4-6'. Wind: 20 knots from south. Ship roll: 15-20°
2000-4200 m cast. CTD wire like corkscrew. New termination put on. Left to cure overnight.
Nominal depths: 2000, 2200, 2400, 2600, 2800, 3000, 3200, 3400, 3600, 3800, 4000, 4200 m.

Samples:

dissolved O_2 -duplicates	12 depths
salinity	12 depths
NO_3, PO_4, SiO_4,	12 depths

December 18, 1988

Primary Production Cast: Start: 0400
Lat: 31.669N; Long: 64.049W
Wire kinked. New termination. No more casting till 1300
Seas: 8'. Wind: 23 knots, bearing 176°. Ship roll: 20-25°

Primary Production samples drawn from GoFlos at 125, 100, 75, 50, 25m. GoFlo lowered on hand line to 5 m for near-surface production sample. Production array deployed.

CTD **Cast 2**: 0425—0555, Lat: 31.703 N; Long: 64.153W
CTD sent to 2800 m to pick up a bottle that leaked on previous deep cast. All contact with CTD lost after bottle tripped. Cast terminated. On return, found wire kinked. New termination. Cure overnight.
Seas: Very rough 8-10'. Winds: 30 knots, gusting to over 40 knots. Ship Roll to 20°.

December 19, 1988

CTD **Cast 3**: 0425-0655, Lat: 31.669 N; Long: 64.050 W
Sea: 5-6'. Wind 15 knots.
Nominal depths: 1, 10, 25, 50, 100, 150, 200, 250, 1200, 1400, 1600, 1800 m.

Samples:

dissolved O_2	12 depths
salinity	12 depths
NO_3, PO_4, SiO_4,	12 depths
PON/POC - BBSR	8 depths 1-250m
Chlor. a - BBSR	8 depths 1-250m

CTD **Cast 4**: 1005-1142. Lat: 31.689N; Long: 64.022 W
Nominal depths: 300, 300, 400, 500, 500, 600, 750, 750, 800, 900, 1000, 1000 m.

Samples:

dissolved O_2 -duplicates	12 depths
salinity	12 depths
NO_3, PO_4, SiO_4,	12 depths
PON/POC - BBSR	12 depths

CTD **Cast 5**: 1431-1500, Lat: 31.683 N; Long: 64.017 W
Seas: 6'. Wind: 18-20 knots, bearing 216°. Ship roll: 10-15°
Nominal depths: 1, 10, 25, 50, 75, 100, 125, 150, 175, 200, 225, 250 m.

Samples:

dissolved O_2 -duplicates	12 depths
salinity	12 depths
NO_3, PO_4, SiO_4,	12 depths
PON/POC - BBSR	12 depths

Pick up sediment traps at 1630. Lat: 31.708 N; Long: 64.000 W

CTD **Cast 6**: 1730, Lat: 31.680 N; Long: 63.975 W
Wind: 22 knots, bearing 156°. Seas: 6', ship roll: 10-15°
Nominal depths: 1, 10, 25, 50, 75, 100, 125, 150, 175, 200, 225, 250 m.

Samples:

CO_2 -Brewer	11 depths, 1 surface replicate
Chlorophyll *a* - BBSR	12 depths
Picoplankton - Ducklow	

CTD **Cast 7**: 2115-2155, Lat: 31.782 N; Long: 64.061 W
Nominal depths: 1, 1, 1, 90, 90, 90, 125, 200, 200, 200, 200, 200 m.

Samples:
PON/ POC large vol. samples

December 20, 1988

Return to St. George around 0700.

CTD Sensor Corrections to Bottle Data for BATS 3:

On BATS 3 through BATS 7 cruises on the R.V. Cape Henlopen, a Neil Brown Mark-IIIB CTD system was used as per the University of Delaware, normal operating procedures. They applied a single correction factor for salinity on all CTD casts on these cruises. This correction factors are detailed below. They also applied a 7.5 db correction to all pressure measurements to correct a 7.5 db negative offset in the Neil Brown pressure sensor. CTD Oxygen corrections were performed at BBSR using the CTD oxygen and the bottle measurements as per the standard BATS method.

Salinity:

$$DS = \sum_{i=0}^{n} R_i C^i$$

MS = SC + DS

Where:

DS = Wet Salinity - CTD Salinity
R_i = regression coefficients
C = conductivity backcalculated from bottle salinity measurement (milliMohs)
n = order of the polynomial function
MS = modified salinity
SC = uncorrected salinity

$R_\emptyset$ = 0.104304
R_1 = -0.00623
R_2 = 4.2427E-05

Oxygen:

$$DO = R_0 + \sum_{i=1}^{l} A_i \frac{P^i}{4300} + \sum_{i=1}^{m} B_i \frac{OC^i}{300}$$

MO=OC+300 x DO

Where:

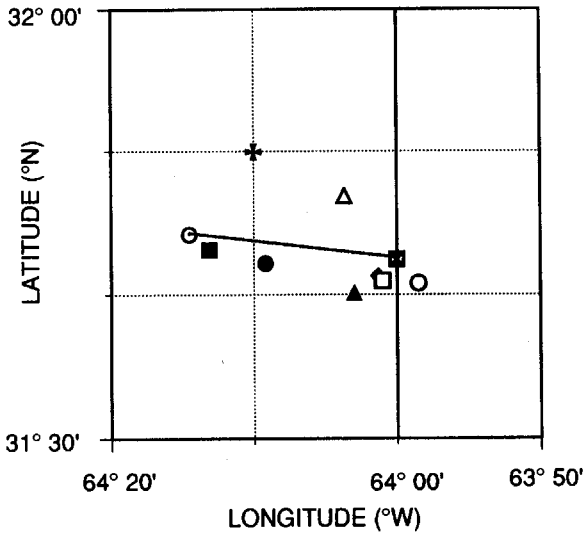
DO = (wet oxygens-CTD oxygen)/300
OC = uncorrected CTD oxygen (µmole/kg)
P = pressure (dbar)
MO = modified CTD oxygen (µmole/kg)
l = 4; m = 2
$R_\emptyset$,A_j, B_i = regression coefficients

$R_\emptyset$ = -1.3283508e-01
A_1 = -8.4841986e-01

A_2 = 4.2075316e+00
A_3 = -5.4086873e+00
A_4 = 2.1533578e+00
B_1 = 5.2954181e-01
B_2 = -5.5862817e-01

model correlation coefficient = 9.981e-01
standard deviation of model residuals = 2.642e+00 μmole/kg

BATS 3—Cast Positions:



BATS 3, CTD Cast 1
17 December, 1988; Start 07:15; End 09:40
Lat: 31.719 N; Long: 64.218 W

Depth (m)	Pres (db)	Temp (°C)	Pot.T (°C)	CTD Sal (ppt)	Sigma-t (kg/m^3)	CTD O_2 (μmole/kg)	O_2 Anom (μmole/kg)	BAC (m^{-1})	PAR ($\mu E/m^2/s$)	Fluor (rfu)
3.0	3.0	21.481	21.480	36.512	25.514	206.46	-10.26			
10.0	10.1	21.492	21.490	36.503	25.505	202.71	-13.99			
20.0	20.1	21.486	21.482	36.501	25.505	207.97	-8.75			
30.0	30.2	21.473	21.468	36.497	25.507	211.83	-4.94			
40.0	40.3	21.448	21.440	36.499	25.516	214.08	-2.79			
50.0	50.4	21.443	21.433	36.497	25.516	215.23	-1.66			
60.0	60.4	21.412	21.400	36.496	25.524	216.09	-0.92			
70.0	70.5	21.414	21.400	36.496	25.524	215.13	-1.87			
80.0	80.6	21.417	21.402	36.496	25.524	212.18	-4.81			
90.0	90.6	21.415	21.397	36.497	25.526	208.45	-8.55			
100.0	100.7	20.542	20.523	36.591	25.837	207.90	-12.37			
110.0	110.8	20.019	19.998	36.607	25.990	208.26	-14.08			
120.0	120.9	19.802	19.779	36.594	26.038	205.49	-17.75			
130.0	131.0	19.446	19.422	36.580	26.121	199.51	-25.20			
140.0	141.0	19.292	19.266	36.576	26.158	191.86	-33.49			
150.0	151.1	19.124	19.096	36.585	26.210	186.92	-39.12			
160.0	161.2	18.953	18.924	36.581	26.251	184.49	-42.27			
170.0	171.3	18.805	18.775	36.573	26.283	184.06	-43.33			
180.0	181.3	18.702	18.670	36.568	26.306	182.97	-44.87			
190.0	191.4	18.631	18.597	36.563	26.321	182.32	-45.82			
200.0	201.5	18.489	18.453	36.547	26.345	182.76	-46.01			
210.0	211.6	18.382	18.345	36.536	26.364	182.80	-46.44			
220.0	221.7	18.303	18.264	36.528	26.378	182.43	-47.16			
230.0	231.7	18.230	18.189	36.518	26.389	183.04	-46.88			
240.0	241.8	18.148	18.105	36.506	26.401	184.06	-46.24			
250.0	251.9	18.059	18.015	36.491	26.412	184.41	-46.29			
275.0	277.1	17.957	17.909	36.478	26.429	185.28	-45.89			
300.0	302.3	17.826	17.773	36.460	26.448	184.88	-46.89			
325.0	327.5	17.721	17.664	36.443	26.462	182.56	-49.69			
350.0	352.7	17.480	17.419	36.406	26.493	180.96	-52.42			
375.0	378.0	17.259	17.195	36.368	26.519	178.73	-55.69			
400.0	403.2	17.096	17.027	36.342	26.539	176.87	-58.32			
425.0	428.4	16.858	16.786	36.300	26.565	174.64	-61.69			
450.0	453.6	16.551	16.475	36.249	26.599	172.60	-65.21			
475.0	478.9	16.139	16.061	36.181	26.643	171.57	-68.26			
500.0	504.1	15.786	15.704	36.120	26.678	170.59	-71.00			
550.0	554.6	15.009	14.921	35.991	26.754	169.04	-76.49			
600.0	605.1	14.295	14.203	35.879	26.824	169.42	-79.83			
650.0	655.6	13.261	13.165	35.713	26.913	160.17	-94.66			
700.0	706.1	12.235	12.136	35.576	27.011	155.65	-104.89			
750.0	756.6	11.325	11.224	35.462	27.095	151.66	-114.14			
800.0	807.2	10.110	10.008	35.318	27.199	149.68	-123.43			
850.0	857.7	9.128	9.025	35.222	27.289	150.99	-128.26			
900.0	908.3	8.485	8.380	35.174	27.353	156.18	-127.21			
950.0	958.9	7.690	7.583	35.131	27.439	167.94	-120.67			
1000.0	1009.4	7.071	6.963	35.112	27.512	178.61	-114.16			
1050.0	1060.0	6.570	6.459	35.100	27.572	189.17	-107.05			
1100.0	1110.7	6.287	6.173	35.113	27.620	199.30	-98.85			
1150.0	1161.3	6.010	5.892	35.109	27.653	205.73	-94.37			
1200.0	1211.9	5.741	5.619	35.107	27.686	213.46	-88.56			
1300.0	1313.2	5.114	4.986	35.059	27.724	227.83	-78.84			

Depth (m)	Pres (db)	Temp (°C)	Pot.T (°C)	CTD Sal (ppt)	Sigma-t (kg/m^3)	CTD 0_2 (µmole/kg)	0_2 Anom (µmole/kg)	BAC (m^{-1})	PAR ($\mu E/m^2/s$)	Fluor (rfu)
1400.0	1414.6	4.823	4.686	35.048	27.749	235.64	-73.20			
1500.0	1516.0	4.503	4.357	35.019	27.763	242.63	-68.68			
1600.0	1617.4	4.304	4.149	35.005	27.775	248.39	-64.45			
1700.0	1718.9	4.184	4.018	35.007	27.790	251.42	-62.34			
1800.0	1820.5	4.014	3.837	34.993	27.798	256.37	-58.72			
1900.0	1922.1	3.916	3.728	34.995	27.810	259.46	-56.39			
2000.0	2023.7	3.829	3.629	34.999	27.823	261.52	-54.99			
2100.0	2125.4	3.696	3.485	34.989	27.830	263.77	-53.80			
2200.0	2227.2	3.552	3.329	34.979	27.837	266.39	-52.34			
2300.0	2328.9	3.452	3.218	34.973	27.843	269.38	-50.15			
2400.0	2430.8	3.347	3.101	34.969	27.851	270.78	-49.59			
2500.0	2532.7	3.230	2.971	34.963	27.859	272.36	-48.96			
2600.0	2634.6	3.132	2.860	34.956	27.863	274.12	-48.00			
2700.0	2736.6	3.061	2.777	34.953	27.868	274.48	-48.22			
2800.0	2838.6	2.950	2.653	34.945	27.873	276.12	-47.48			
2900.0	2940.7	2.849	2.538	34.938	27.877	277.50	-46.95			
3000.0	3042.8	2.751	2.428	34.933	27.883	277.94	-47.31			
3100.0	3144.9	2.650	2.313	34.927	27.888	278.35	-47.75			
3200.0	3247.2	2.577	2.226	34.923	27.892	277.87	-48.83			
3300.0	3349.4	2.506	2.140	34.919	27.895	277.41	-49.89			
3400.0	3451.7	2.442	2.062	34.914	27.898	276.33	-51.51			
3500.0	3554.1	2.374	1.978	34.910	27.901	275.56	-52.86			
3600.0	3656.5	2.337	1.925	34.906	27.903	274.02	-54.72			
3700.0	3758.9	2.297	1.869	34.904	27.905	272.41	-56.66			
3800.0	3861.4	2.257	1.813	34.900	27.906	270.87	-58.54			
3900.0	3964.0	2.234	1.773	34.897	27.907	269.02	-60.59			
4000.0	4066.5	2.224	1.746	34.895	27.908	267.57	-62.13			
4100.0	4169.2	2.222	1.726	34.894	27.908	266.54	-63.18			

BATS 3, CTD Cast 2
19 December, 1988; Start 04:25; End 05:55
Lat: 31.703 N; Long: 64.153 W

Depth (m)	Pres (db)	Temp (°C)	Pot.T (°C)	CTD Sal (ppt)	Sigma-t (kg/m^3)	CTD 0_2 (µmole/kg)	0_2 Anom (µmole/kg)	BAC (m^{-1})	PAR ($\mu E/m^2/s$)	Fluor (rfu)
1.0	1.0	21.580	21.580	36.546	25.512	212.32	-3.98			
10.0	10.1	21.585	21.583	36.543	25.509	209.37	-6.92			
20.0	20.1	21.591	21.587	36.541	25.507	209.43	-6.83			
30.0	30.2	21.590	21.584	36.539	25.506	209.24	-7.03			
40.0	40.3	21.594	21.586	36.537	25.504	207.85	-8.41			
50.0	50.4	21.594	21.584	36.534	25.502	204.79	-11.47			
60.0	60.4	21.585	21.573	36.534	25.505	206.47	-9.82			
70.0	70.5	21.577	21.564	36.532	25.506	206.53	-9.79			
80.0	80.6	21.573	21.557	36.532	25.508	201.42	-14.92			
90.0	90.6	21.530	21.512	36.536	25.523	205.47	-11.03			
100.0	100.7	20.330	20.311	36.623	25.918	211.63	-9.43			
110.0	110.8	19.946	19.926	36.613	26.013	207.90	-14.73			
120.0	120.9	19.688	19.665	36.597	26.070	202.41	-21.28			
130.0	131.0	19.496	19.472	36.592	26.117	196.50	-27.99			

BATS 3, CTD Cast 3
19 December, 1988; Start 04:25; End 06:55
Lat: 31.669 N; Long: 64.050 W

Depth (m)	Pres (db)	Temp (°C)	Pot.T (°C)	CTD Sal (ppt)	Sigma-t (kg/m^3)	CTD O_2 (µmole/kg)	O_2 Anom (µmole/kg)	BAC (m^{-1})	PAR ($\mu E/m^2/s$)	Fluor (rfu)
4.0	4.0	21.424	21.423	36.578	25.580	206.39	-10.46			
10.0	10.1	21.447	21.445	36.549	25.552	203.57	-13.23			
20.0	20.1	21.449	21.445	36.549	25.552	206.04	-10.75			
30.0	30.2	21.450	21.444	36.549	25.553	205.71	-11.08			
40.0	40.3	21.450	21.442	36.549	25.553	203.66	-13.13			
50.0	50.4	21.452	21.442	36.547	25.552	203.72	-13.07			
60.0	60.4	21.455	21.443	36.545	25.550	204.47	-12.31			
70.0	70.5	21.454	21.440	36.543	25.549	205.01	-11.77			
80.0	80.6	21.446	21.430	36.540	25.549	205.39	-11.43			
90.0	90.6	21.435	21.417	36.538	25.551	205.57	-11.29			
100.0	100.7	20.884	20.865	36.588	25.742	205.43	-13.50			
110.0	110.8	19.959	19.938	36.643	26.033	202.23	-20.30			
120.0	120.9	19.581	19.558	36.627	26.121	195.63	-28.46			
130.0	131.0	19.401	19.377	36.614	26.159	189.89	-34.96			
140.0	141.0	19.271	19.246	36.614	26.193	185.20	-40.18			
150.0	151.1	19.117	19.089	36.611	26.231	180.07	-45.96			
160.0	161.2	19.015	18.986	36.604	26.253	177.36	-49.11			
170.0	171.3	18.923	18.892	36.602	26.275	177.13	-49.72			
180.0	181.3	18.840	18.807	36.601	26.296	177.31	-49.89			
190.0	191.4	18.745	18.711	36.596	26.317	176.91	-50.70			
200.0	201.5	18.629	18.593	36.584	26.338	177.59	-50.53			
210.0	211.6	18.499	18.461	36.567	26.358	178.89	-49.81			
220.0	221.7	18.374	18.335	36.554	26.380	179.64	-49.61			
230.0	231.7	18.280	18.239	36.536	26.391	180.03	-49.65			
240.0	241.8	18.203	18.160	36.527	26.403	180.71	-49.32			
250.0	251.9	18.130	18.086	36.522	26.418	181.38	-48.97			
275.0	277.1	18.005	17.956	36.504	26.437	181.95	-48.97			
300.0	302.3	17.878	17.825	36.484	26.454	180.88	-50.62			
325.0	327.5	17.770	17.713	36.469	26.470	179.19	-52.80			
350.0	352.7	17.589	17.528	36.440	26.493	178.12	-54.72			
375.0	378.0	17.390	17.325	36.408	26.518	175.64	-58.13			
400.0	403.2	17.197	17.128	36.382	26.546	174.94	-59.73			
425.0	428.4	16.928	16.855	36.333	26.574	172.27	-63.68			
450.0	453.6	16.501	16.425	36.257	26.617	168.77	-69.26			
475.0	478.9	16.209	16.130	36.209	26.649	167.30	-72.15			
500.0	504.1	15.877	15.795	36.155	26.684	167.02	-74.08			
550.0	554.6	15.192	15.104	36.040	26.752	165.88	-78.67			
600.0	605.1	14.288	14.195	35.897	26.840	164.20	-85.05			
650.0	655.6	13.328	13.231	35.743	26.922	158.48	-95.94			
700.0	706.1	12.264	12.165	35.587	27.014	149.45	-110.92			
750.0	756.6	11.189	11.088	35.442	27.104	146.52	-120.09			
800.0	807.2	10.160	10.058	35.327	27.198	146.49	-126.30			
850.0	857.7	9.129	9.026	35.236	27.299	149.54	-129.68			
900.0	908.3	8.238	8.134	35.173	27.390	157.33	-127.63			
950.0	958.9	7.681	7.575	35.150	27.455	166.50	-122.13			
1000.0	1009.4	7.072	6.964	35.127	27.524	176.86	-115.88			
1050.0	1060.0	6.589	6.478	35.114	27.580	188.35	-107.71			
1100.0	1110.7	6.220	6.106	35.116	27.631	198.83	-99.78			
1150.0	1161.3	5.917	5.799	35.116	27.670	205.69	-95.06			
1200.0	1211.9	5.735	5.613	35.119	27.696	211.31	-90.72			
1300.0	1313.2	5.398	5.267	35.120	27.739	222.72	-81.74			

Depth (m)	Pres (db)	Temp (°C)	Pot.T (°C)	CTD Sal (ppt)	Sigma-t (kg/m^3)	CTD 0_2 (µmole/kg)	0_2 Anom (µmole/kg)	BAC (m^{-1})	PAR ($\mu E/m^2/s$)	Fluor (rfu)
1400.0	1414.6	4.986	4.847	35.085	27.761	233.03	-74.53			
1500.0	1516.0	4.812	4.663	35.083	27.780	238.14	-70.70			
1600.0	1617.4	4.700	4.539	35.091	27.800	241.64	-68.02			
1700.0	1718.9	4.486	4.316	35.079	27.815	245.61	-65.69			
1800.0	1820.5	4.229	4.049	35.055	27.825	251.87	-61.44			

BATS 3, CTD Cast 4
19 December, 1988; Start 10:05; End 11:42
Lat: 31.689 N; Long: 64.022 W

Depth (m)	Pres (db)	Temp (°C)	Pot.T (°C)	CTD Sal (ppt)	Sigma-t (kg/m^3)	CTD 0_2 (µmole/kg)	0_2 Anom (µmole/kg)	BAC (m^{-1})	PAR ($\mu E/m^2/s$)	Fluor (rfu)
5.0	5.0	21.465	21.464	36.576	25.568	202.57	-14.12			
10.0	10.1	21.467	21.465	36.574	25.566	203.23	-13.46			
20.0	20.1	21.469	21.465	36.571	25.563	202.94	-13.74			
30.0	30.2	21.472	21.466	36.568	25.561	203.29	-13.39			
40.0	40.3	21.474	21.466	36.567	25.560	204.23	-12.44			
50.0	50.4	21.472	21.462	36.564	25.559	203.97	-12.71			
60.0	60.4	21.474	21.462	36.563	25.558	203.42	-13.26			
70.0	70.5	21.464	21.450	36.560	25.559	202.33	-14.39			
80.0	80.6	21.054	21.038	36.595	25.700	203.63	-14.62			
90.0	90.6	20.179	20.162	36.648	25.978	203.81	-17.83			
100.0	100.7	19.980	19.961	36.643	26.027	200.91	-21.53			
110.0	110.8	19.651	19.631	36.614	26.093	196.92	-26.90			
120.0	120.9	19.457	19.435	36.614	26.144	190.75	-33.86			
130.0	131.0	19.291	19.267	36.612	26.185	185.20	-40.10			
140.0	141.0	19.192	19.166	36.615	26.214	180.55	-45.16			
150.0	151.1	19.055	19.028	36.604	26.242	177.28	-49.02			
160.0	161.2	18.945	18.916	36.600	26.267	175.78	-50.98			
170.0	171.3	18.825	18.794	36.594	26.294	175.36	-51.92			
180.0	181.3	18.693	18.660	36.584	26.321	174.28	-53.57			
190.0	191.4	18.585	18.551	36.574	26.341	174.10	-54.22			
200.0	201.5	18.505	18.469	36.565	26.354	173.51	-55.17			
210.0	211.6	18.425	18.387	36.554	26.367	174.21	-54.82			
220.0	221.7	18.355	18.316	36.544	26.377	176.33	-53.02			
230.0	231.7	18.243	18.202	36.524	26.390	177.16	-52.70			
240.0	241.8	18.168	18.126	36.515	26.403	178.09	-52.10			
250.0	251.9	18.120	18.076	36.510	26.411	179.00	-51.41			
275.0	277.1	18.024	17.976	36.497	26.426	179.58	-51.27			
300.0	302.3	17.908	17.856	36.479	26.443	179.19	-52.19			
325.0	327.5	17.756	17.699	36.458	26.465	176.71	-55.37			
350.0	352.7	17.558	17.497	36.425	26.489	174.81	-58.19			
375.0	378.0	17.362	17.297	36.395	26.515	173.04	-60.88			
400.0	403.2	17.264	17.195	36.392	26.537	178.78	-55.58			
425.0	428.4	17.031	16.958	36.341	26.555	174.58	-60.90			
450.0	453.6	16.857	16.780	36.309	26.573	170.20	-66.12			
475.0	478.9	16.472	16.392	36.242	26.613	166.84	-71.35			
500.0	504.1	16.152	16.069	36.190	26.648	166.30	-73.45			
550.0	554.6	15.341	15.252	36.054	26.729	163.33	-80.48			
600.0	605.1	14.619	14.525	35.940	26.802	162.37	-85.16			
650.0	655.6	13.769	13.671	35.803	26.878	160.73	-91.30			
700.0	706.1	12.517	12.416	35.611	26.984	148.23	-110.72			
750.0	756.6	11.374	11.273	35.468	27.091	146.91	-118.59			

Depth (m)	Pres (db)	Temp (°C)	Pot.T (°C)	CTD Sal (ppt)	Sigma-t (kg/m^3)	CTD 0_2 (µmole/kg)	0_2 Anom (µmole/kg)	BAC (m^{-1})	PAR ($\mu E/m^2/s$)	Fluor (rfu)
800.0	807.2	10.198	10.096	35.303	27.172	140.58	-132.04			
850.0	857.7	9.451	9.346	35.248	27.256	144.94	-132.28			
900.0	908.3	8.513	8.407	35.183	27.356	154.04	-129.15			
950.0	958.9	7.713	7.606	35.140	27.443	162.95	-125.49			
1000.0	1009.4	7.083	6.975	35.112	27.511	171.69	-121.01			

BATS 3, CTD Cast 5
19 December, 1988; Start 14:31
Lat: 31.683 N; Long: 64.017 W

Depth (m)	Pres (db)	Temp (°C)	Pot.T (°C)	CTD Sal (ppt)	Sigma-t (kg/m^3)	CTD 0_2 (µmole/kg)	0_2 Anom (µmole/kg)	BAC (m^{-1})	PAR ($\mu E/m^2/s$)	Fluor (rfu)
5.0	5.0	21.447	21.446	36.559	25.560	205.09	-11.70			
10.0	10.1	21.447	21.445	36.556	25.558	208.48	-8.32			
20.0	20.1	21.452	21.448	36.554	25.555	206.64	-10.13			
30.0	30.2	21.449	21.443	36.549	25.553	205.46	-11.33			
40.0	40.3	21.444	21.436	36.543	25.550	205.20	-11.62			
50.0	50.4	21.453	21.443	36.543	25.548	205.25	-11.53			
60.0	60.4	21.452	21.441	36.540	25.546	204.95	-11.85			
70.0	70.5	21.454	21.440	36.536	25.544	204.33	-12.46			
80.0	80.6	21.434	21.418	36.531	25.546	202.65	-14.23			
90.0	90.6	21.031	21.013	36.558	25.679	201.70	-16.70			
100.0	100.7	20.123	20.104	36.640	25.987	200.10	-21.77			
110.0	110.8	19.659	19.638	36.599	26.079	195.20	-28.61			
120.0	120.9	19.413	19.391	36.600	26.145	187.91	-36.91			
130.0	131.0	19.287	19.263	36.602	26.179	182.62	-42.71			
140.0	141.0	19.050	19.024	36.590	26.232	178.98	-47.36			
150.0	151.1	18.934	18.906	36.589	26.262	177.10	-49.73			
160.0	161.2	18.824	18.795	36.585	26.287	174.65	-52.65			
170.0	171.3	18.722	18.691	36.579	26.309	172.61	-55.13			
180.0	181.3	18.634	18.602	36.573	26.327	173.26	-54.85			
190.0	191.4	18.539	18.505	36.563	26.344	174.78	-53.75			
200.0	201.5	18.454	18.418	36.552	26.358	175.20	-53.71			
210.0	211.6	18.396	18.358	36.545	26.367	175.45	-53.72			
220.0	221.7	18.331	18.292	36.538	26.379	175.86	-53.60			
230.0	231.7	18.276	18.235	36.533	26.389	176.56	-53.14			
240.0	241.8	18.181	18.138	36.516	26.400	176.52	-53.61			
250.0	251.9	18.093	18.049	36.502	26.412	178.53	-52.01			

BATS 3, CTD Cast 6
19 December 1988; Start 17:30; End 18:05
Lat: 31.680 N; Long: 63.975 W

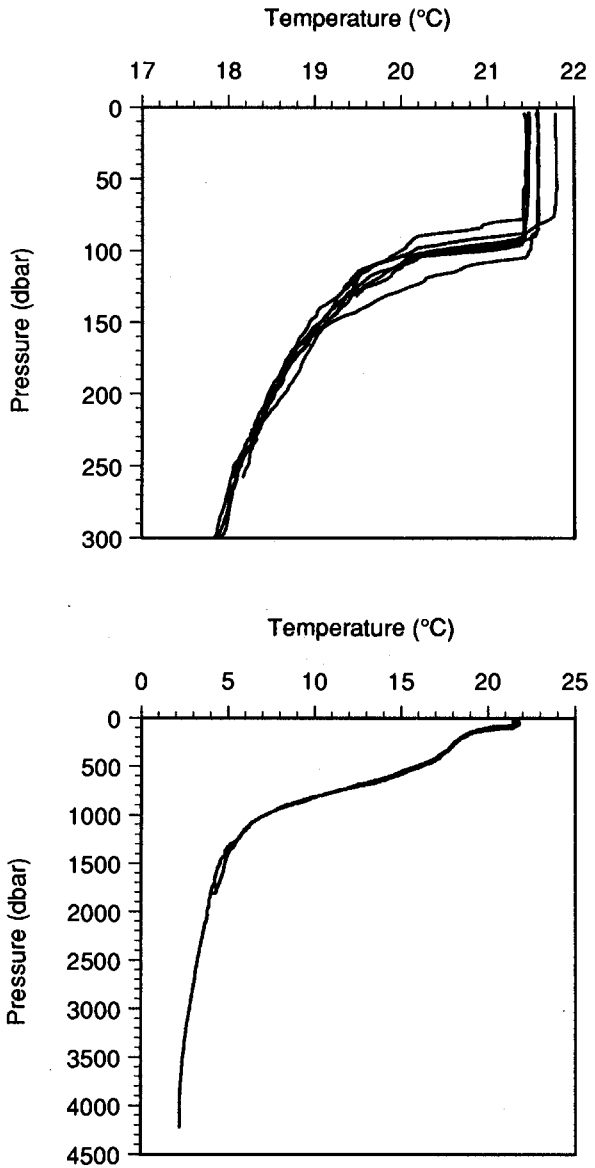
Depth (m)	Pres (db)	Temp (°C)	Pot.T (°C)	CTD Sal (ppt)	Sigma-t (kg/m^3)	CTD 0_2 (µmole/kg)	0_2 Anom (µmole/kg)	BAC (m^{-1})	PAR ($\mu E/m^2/s$)	Fluor (rfu)
4.0	4.0	21.783	21.782	36.605	25.501	202.96	-12.48			
10.0	10.1	21.786	21.784	36.604	25.499	204.82	-10.61			
20.0	20.1	21.787	21.784	36.601	25.497	204.82	-10.60			
30.0	30.2	21.795	21.789	36.597	25.493	204.86	-10.55			

Depth (m)	Pres (db)	Temp (°C)	Pot.T (°C)	CTD Sal (ppt)	Sigma-t (kg/m^3)	CTD 0_2 (µmole/kg)	0_2 Anom (µmole/kg)	BAC (m^{-1})	PAR ($\mu E/m^2/s$)	Fluor (rfu)
40.0	40.3	21.798	21.790	36.593	25.489	204.90	-10.50			
50.0	50.4	21.799	21.789	36.590	25.487	204.29	-11.11			
60.0	60.4	21.790	21.778	36.587	25.488	203.36	-12.08			
70.0	70.5	21.778	21.765	36.585	25.490	202.26	-13.22			
80.0	80.6	21.641	21.625	36.586	25.530	201.73	-14.28			
90.0	90.6	21.391	21.373	36.599	25.611	202.12	-14.82			
100.0	100.7	20.314	20.295	36.630	25.928	201.35	-19.77			
110.0	110.8	19.678	19.657	36.612	26.084	196.93	-26.79			
120.0	120.9	19.494	19.471	36.607	26.129	191.05	-33.43			
130.0	131.0	19.369	19.345	36.602	26.158	186.54	-38.45			
140.0	141.0	19.205	19.179	36.595	26.196	183.85	-41.84			
150.0	151.1	19.041	19.014	36.582	26.228	181.51	-44.88			
160.0	161.2	18.882	18.853	36.569	26.260	180.51	-46.56			
170.0	171.3	18.731	18.700	36.556	26.289	180.50	-47.23			
180.0	181.3	18.643	18.610	36.548	26.306	180.79	-47.32			
190.0	191.4	18.586	18.552	36.546	26.319	181.43	-46.93			
200.0	201.5	18.496	18.460	36.537	26.336	180.89	-47.87			
210.0	211.6	18.444	18.407	36.532	26.345	180.76	-48.22			
220.0	221.7	18.388	18.348	36.528	26.357	181.70	-47.53			
230.0	231.7	18.327	18.286	36.519	26.366	182.71	-46.79			
240.0	241.8	18.253	18.211	36.512	26.379	182.41	-47.43			
250.0	251.9	18.206	18.162	36.506	26.387	182.40	-47.65			

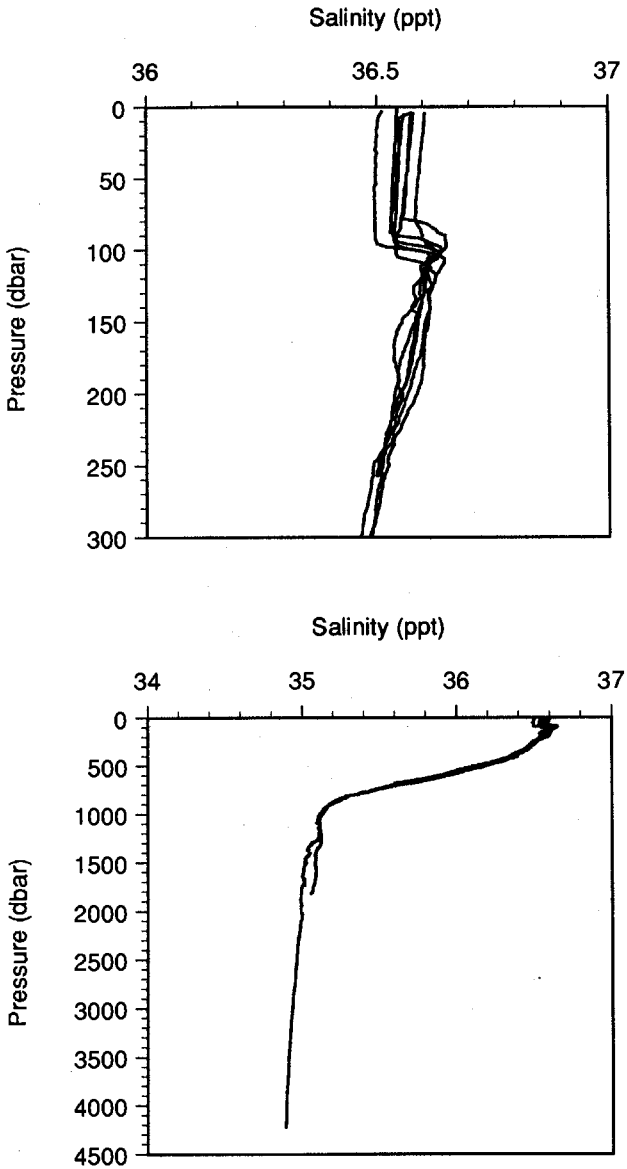
BATS 3, CTD Cast 7
19 December, 1988; Start 21:15; End 21:55
Lat: 31.782 N; Long: 64.061 W

Depth (m)	Pres (db)	Temp (°C)	Pot.T (°C)	CTD Sal (ppt)	Sigma-t (kg/m^3)	CTD 0_2 (µmole/kg)	0_2 Anom (µmole/kg)	BAC (m^{-1})	PAR ($\mu E/m^2/s$)	Fluor (rfu)
4.0	4.0	21.564	21.563	36.580	25.543	202.01	-14.30			
10.0	10.1	21.583	21.581	36.578	25.537	198.85	-17.39			
20.0	20.1	21.585	21.581	36.575	25.534	205.79	-10.45			
30.0	30.2	21.579	21.573	36.571	25.534	207.87	-8.40			
40.0	40.3	21.582	21.574	36.568	25.531	206.38	-9.88			
50.0	50.4	21.586	21.576	36.564	25.527	205.09	-11.16			
60.0	60.4	21.586	21.574	36.559	25.524	204.03	-12.22			
70.0	70.5	21.594	21.580	36.557	25.521	202.88	-13.35			
80.0	80.6	21.585	21.569	36.552	25.520	203.27	-13.00			
90.0	90.6	21.508	21.490	36.542	25.534	203.61	-12.97			
100.0	100.7	21.479	21.459	36.541	25.542	203.46	-13.23			
110.0	110.8	20.761	20.739	36.610	25.793	203.84	-15.54			
120.0	120.9	20.276	20.254	36.627	25.937	203.96	-17.32			
130.0	131.0	19.842	19.818	36.602	26.034	201.65	-21.41			
140.0	141.0	19.526	19.500	36.576	26.098	196.83	-27.56			
150.0	151.1	19.168	19.140	36.554	26.174	189.23	-36.68			
160.0	161.2	18.931	18.902	36.539	26.224	182.01	-44.91			
170.0	171.3	18.770	18.739	36.537	26.265	178.55	-49.05			
180.0	181.3	18.670	18.638	36.540	26.293	177.49	-50.53			
190.0	191.4	18.592	18.558	36.548	26.319	177.72	-50.61			
200.0	201.5	18.533	18.497	36.556	26.340	177.62	-50.95			

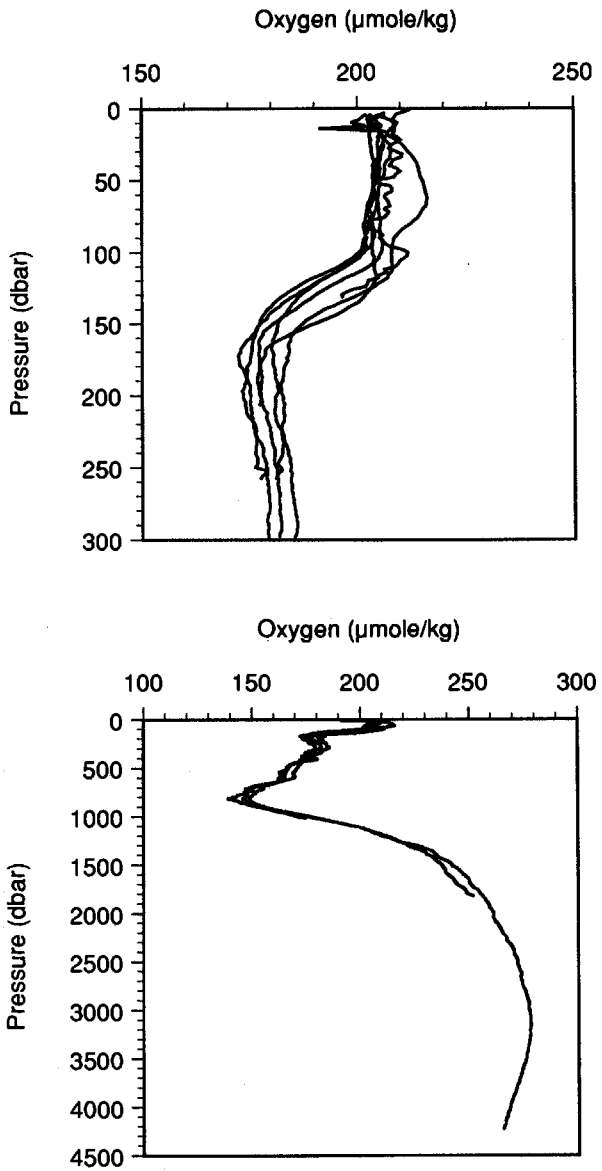
BATS 3—CTD Temperature Profile



BATS 3—CTD Salinity Profile



BATS 3—CTD Oxygen Profile



BATS 3—Bottle Data
December 16-20, 1988
Physical Parameters

Bottle ID	Depth (m)	Pressure (db)	Temp (°C)	Pot. Temp (°C)	Salinity (ppt)	Sigma-t (kg/m^3)
G0303N10	3.2	3.2	21.460	21.459	36.535	25.537
G0303N09	17.2	17.3	21.470	21.467	36.533	25.534
G0303G02	34.2	34.4	21.470	21.463	36.553	25.550
G0303N08	60.7	61.1	21.470	21.458	36.540	25.542
G0303N07	84.4	85.0	21.430	21.414	36.532	25.548
G0303N06	108.2	109.0	20.070	20.050	36.643	26.004
G0303N05	130.3	131.3	19.440	19.416	36.616	26.150
G0303N04	154.9	156.0	19.090	19.062	36.605	26.234
G0303G01	1206.0	1218.0	5.710			
G0303N03	1408.4	1423.1	4.950			
G0303N02	1611.0	1628.6	4.660			
G0303N01	1805.5	1826.0	4.220			
G0305N10	4.2	4.2	21.450	21.449	36.541	25.545
G0305N09	18.9	19.0	21.450			
G0305G02	32.9	33.1	21.440	21.434	36.534	25.544
G0305N08	57.8	58.2	21.440			
G0305N07	82.3	82.9	21.430			
G0305N06	107.9	108.7	19.780	19.760	36.619	26.062
G0305N04	156.6	157.8	18.860	18.832	36.592	26.283
G0305G01	182.3	183.7	18.620	18.588	36.579	26.335
G0305N03	209.0	210.6	18.390	18.353	36.554	26.376
G0305N02	231.4	233.1	18.260	18.219	36.553	26.408
G0305N01	259.9	261.9	18.050	18.004	36.503	26.424
G0306N10	2.1	2.1	21.777			
G0306N09	17.1	17.2	21.803			
G0306G02	32.1	32.3	21.805			
G0306N08	57.3	57.7	21.799			
G0306N07	81.8	82.4	21.570			
G0306N06	107.0	107.8	19.736			
G0306N05	131.9	132.9	19.340			
G0306N04	157.2	158.4	19.005			
G0306G01	181.1	182.5	18.629			
G0306N03	207.0	208.6	18.458			
G0306N02	230.8	232.7	18.301			
G0306N01	261.0	263.0	18.139			
G0304N10	306.3	308.7	17.880	17.827	36.478	26.449
G0304N09	307.2	309.6	17.870			
G0304G02	408.4	411.7	17.250	17.180	36.389	26.538
G0304N08	506.0	510.2	15.970	15.887	36.166	26.672
G0304N07	508.4	512.6	15.970			
G0304N06	606.7	611.8	14.370	14.277	35.906	26.829
G0304N05	758.4	765.1	11.210	11.109	35.473	27.125
G0304N04	759.3	766.0	11.190			
G0304G01	808.3	815.5	10.040	9.938	35.292	27.191
G0304N03	907.3	915.6	8.420	8.315	35.180	27.367
G0304N02	1007.0	1016.5	7.010	6.903	35.116	27.524
G0304N01	1007.3	1016.8	7.010			

Bottle ID	Depth (m)	Pressure (db)	Temp (°C)	Pot. Temp (°C)	Salinity (ppt)	Sigma-t (kg/m^3)
G0301N11	2005.8	2029.6	3.830	3.632	34.997	27.822
G0301N10	2207.7	2235.0	3.600	3.379	34.995	27.845
G0301N09	2409.1	2440.0	3.370	3.126	34.977	27.855
G0301N08	2607.1	2641.8	3.140	2.872	34.959	27.864
G0301N07	2803.2	2841.8	2.970			
G0301N06	3008.1	3051.0	2.760	2.441	34.936	27.884
G0301N05	3207.8	3255.1	2.580	2.235	34.928	27.895
G0301N04	3408.0	3459.9	2.430	2.057	34.915	27.899
G0301G01	3607.8	3664.4	2.330			
G0301N03	3808.7	3870.3	2.260	1.825	34.904	27.909
G0301N02	4006.0	4072.6	2.220	1.753	34.898	27.909
G0301N01	4210.6	4282.7	2.220	1.717	34.896	27.911

BATS 3—Bottle Data
December 16-20, 1988
Gases

Bottle ID	Depth (m)	$O_2(1)$ (µmole/kg)	$O_2(2)$ (µmole/kg)	$O_2(1)$ anomaly (µmole/kg)	$O_2(2)$ anomaly (µmole/kg)	TCO_2 (µmole/kg)
G0303N10	3.2	214.36		-1.85		
G0303N09	17.2	210.88		-5.24		
G0303G02	34.2	211.31	212.18	-4.74	-3.87	
G0303N08	60.7	211.75		-4.25		
G0303N07	84.4	210.45		-5.70		
G0303N06	108.2	206.43	205.99	-15.82	-16.25	
G0303N05	130.3	194.67		-30.32		
G0303N04	154.9	181.62		-44.81		
G0303G01	1206.0					
G0303N03	1408.4					
G0303N02	1611.0					
G0303N01	1805.5					
G0305N10	4.2	208.70		-7.54		
G0305N09	18.9	208.28	208.28			
G0305G02	32.9	208.71		-7.52		
G0305N08	57.8	207.41				
G0305N07	82.3	207.41	208.28			
G0305N06	107.9	198.59		-24.97		
G0305N04	156.6	179.00	180.30	-48.41	-47.10	
G0305G01	182.3	181.16		-47.18		
G0305N03	209.0	182.46		-46.79		
G0305N02	231.4	185.50		-44.21		
G0305N01	259.9		188.97		-41.58	

Bottle ID	Depth (m)	$O_2(1)$ (µmole/kg)	$O_2(2)$ (µmole/kg)	$O_2(1)$ anomaly (µmole/kg)	$O_2(2)$ anomaly (µmole/kg)	TCO_2 (µmole/kg)
G0306N10	2.1					2029.2
G0306N09	17.1					
G0306G02	32.1					2023.9
G0306N08	57.3					2047.8
G0306N07	81.8					2035.1
G0306N06	107.0					2066.7
G0306N05	131.9	198.14				2053.7
G0306N04	157.2					2060.5
G0306G01	181.1					2058.1
G0306N03	207.0					2059.2
G0306N02	230.8					2064.3
G0306N01	261.0					2064.3
G0304N10	306.3	200.70		-30.43		
G0304N09	307.2	198.96				
G0304G02	408.4	200.69	200.69	-32.74	-32.74	
G0304N08	506.0	181.56		-56.68		
G0304N07	508.4	181.57				
G0304N06	606.7	174.17	173.74	-69.82	-70.26	
G0304N05	758.4	154.17		-101.05		
G0304N04	759.3	152.87				
G0304G01	808.3	144.18	143.31	-115.55	-116.41	
G0304N03	907.3	157.63		-108.62		
G0304N02	1007.0	178.01		-94.69		
G0304N01	1007.3	178.88				
G0301N11	2005.8	264.75	264.32	-25.51	-25.95	
G0301N10	2207.7		265.18		-26.53	
G0301N09	2409.1	267.78	266.91	-25.52	-26.39	
G0301N08	2607.1	272.55	270.81	-22.47	-24.21	
G0301N07	2803.2					
G0301N06	3008.1	271.23	272.10	-26.84	-25.98	
G0301N05	3207.8		275.13		-24.54	
G0301N04	3408.0	276.43		-24.67		
G0301G01	3607.8	272.09	272.96			
G0301N03	3808.7					
G0301N02	4006.0		266.44		-37.14	
G0301N01	4210.6	265.14	265.57	-38.73	-38.30	

BATS 3—Bottle Data
December 16-20, 1988
Nutrients

Bottle ID	Depth (m)	Nitrate+Nitrite (µmole/kg)	Phosphate (µmole/kg)	Silicate (µmole/kg)
G0303N10	3.2	0.06	0.00	0.74
G0303N09	17.2	0.05	0.00	0.97
G0303G02	34.2	0.00	0.00	0.83
G0303N08	60.7	0.00	0.00	1.12
G0303N07	84.4	0.05	0.04	0.76
G0303N06	108.2	0.19	0.03	0.81
G0303N05	130.3	0.58	0.00	0.76
G0303N04	154.9	1.39	0.04	1.09
G0303G01	1206.0			
G0303N03	1408.4			
G0303N02	1611.0			
G0303N01	1805.5			
G0305N10	4.2	0.00	0.00	0.64
G0305N09	18.9	0.00	0.00	0.92
G0305G02	32.9	0.00	0.00	0.76
G0305N08	57.8	0.00	0.00	0.81
G0305N07	82.3	0.06	0.00	0.72
G0305N06	107.9	0.23	0.03	0.85
G0305N04	156.6	2.40	0.06	1.28
G0305G01	182.3	3.40	0.14	1.41
G0305N03	209.0	3.94	0.13	1.25
G0305N02	231.4	4.10	0.13	1.37
G0305N01	259.9	4.31	0.14	1.32
G0306N10	2.1			
G0306N09	17.1			
G0306G02	32.1			
G0306N08	57.3			
G0306N07	81.8			
G0306N06	107.0			
G0306N05	131.9	0.16	0.03	1.10
G0306N04	157.2			
G0306G01	181.1			
G0306N03	207.0			
G0306N02	230.8			
G0306N01	261.0			
G0304N10	306.3	4.76	0.18	1.51
G0304N09	307.2	4.70	0.20	1.52
G0304G02	408.4	5.82	0.22	1.93
G0304N08	506.0	9.68	0.42	3.08
G0304N07	508.4	9.94	0.45	3.14
G0304N06	606.7	13.02	0.67	5.21
G0304N05	758.4	19.35	1.12	9.52
G0304N04	759.3			
G0304G01	808.3	23.91	1.33	12.58
G0304N03	907.3	24.36	1.36	13.65
G0304N02	1007.0	23.91	1.34	14.37
G0304N01	1007.3	23.39	1.36	14.46

Bottle ID	Depth (m)	Nitrate+Nitrite (µmole/kg)	Phosphate (µmole/kg)	Silicate (µmole/kg)
G0301N11	2005.8	18.52	1.12	13.84
G0301N10	2207.7	18.19	1.17	15.72
G0301N09	2409.1	18.84	1.14	16.17
G0301N08	2607.1			
G0301N07	2803.2	18.13	1.14	18.87
G0301N06	3008.1	17.86		20.67
G0301N05	3207.8	17.74	1.19	22.29
G0301N04	3408.0	18.13	1.18	23.90
G0301G01	3607.8	18.91	1.22	26.06
G0301N03	3808.7	18.84	1.24	28.75
G0301N02	4006.0	18.91	1.27	30.82
G0301N01	4210.6	19.03	1.34	31.54

BATS 3—Bottle Data
December 16-20, 1988
Particulates

Bottle ID	Depth (m)	Chl *a* (µg/kg)	POC (µg/kg)	PON (µg/kg)	Bacteria (# x 10^8/kg)
G0303N10	3.2		19.63	3.07	
G0303N09	17.2		17.13	3.03	
G0303G02	34.2		34.63	3.87	
G0303N08	60.7		32.61	4.22	
G0303N07	84.4		22.13	3.37	
G0303N06	108.2		20.55	2.50	
G0303N05	130.3		21.82	2.08	
G0303N04	154.9		12.09	1.56	
G0303G01	1206.0				
G0303N03	1408.4				
G0303N02	1611.0				
G0303N01	1805.5				
G0305N10	4.2		25.35	3.28	
G0305N09	18.9		23.62	3.42	
G0305G02	32.9		21.33	3.02	
G0305N08	57.8		21.79	3.33	
G0305N07	82.3		32.69	4.02	
G0305N06	107.9		15.15	1.94	
G0305N04	156.6		12.01	1.36	
G0305G01	182.3				
G0305N03	209.0				
G0305N02	231.4				
G0305N01	259.9				

Bottle ID	Depth (m)	Nitrate+Nitrite (µmole/kg)	Phosphate (µmole/kg)	Silicate (µmole/kg)
G0301N11	2005.8	18.52	1.12	13.84
G0301N10	2207.7	18.19	1.17	15.72
G0301N09	2409.1	18.84	1.14	16.17
G0301N08	2607.1			
G0301N07	2803.2	18.13	1.14	18.87
G0301N06	3008.1	17.86		20.67
G0301N05	3207.8	17.74	1.19	22.29
G0301N04	3408.0	18.13	1.18	23.90
G0301G01	3607.8	18.91	1.22	26.06
G0301N03	3808.7	18.84	1.24	28.75
G0301N02	4006.0	18.91	1.27	30.82
G0301N01	4210.6	19.03	1.34	31.54

BATS 3—Bottle Data
December 16-20, 1988
Particulates

Bottle ID	Depth (m)	Chl *a* (µg/kg)	POC (µg/kg)	PON (µg/kg)	Bacteria (# x 10^8/kg)
G0303N10	3.2		19.63	3.07	
G0303N09	17.2		17.13	3.03	
G0303G02	34.2		34.63	3.87	
G0303N08	60.7		32.61	4.22	
G0303N07	84.4		22.13	3.37	
G0303N06	108.2		20.55	2.50	
G0303N05	130.3		21.82	2.08	
G0303N04	154.9		12.09	1.56	
G0303G01	1206.0				
G0303N03	1408.4				
G0303N02	1611.0				
G0303N01	1805.5				
G0305N10	4.2		25.35	3.28	
G0305N09	18.9		23.62	3.42	
G0305G02	32.9		21.33	3.02	
G0305N08	57.8		21.79	3.33	
G0305N07	82.3		32.69	4.02	
G0305N06	107.9		15.15	1.94	
G0305N04	156.6		12.01	1.36	
G0305G01	182.3				
G0305N03	209.0				
G0305N02	231.4				
G0305N01	259.9				

Bottle ID	Depth (m)	Chl *a* (µg/kg)	POC (µg/kg)	PON (µg/kg)	Bacteria (# x 10^8/kg)
G0306N10	2.1	0.095			
G0306N09	17.1	0.114			
G0306G02	32.1	0.089			
G0306N08	57.3	0.093			
G0306N07	81.8	0.122			
G0306N06	107.0	0.110			
G0306N05	131.9	0.045	19.24	2.21	
G0306N04	157.2	0.037			
G0306G01	181.1	0.015			
G0306N03	207.0	0.009			
G0306N02	230.8	0.007			
G0306N01	261.0	0.007			
G0304N10	306.3		6.67	0.52	
G0304N09	307.2		12.59	0.56	
G0304G02	408.4				
G0304N08	506.0		13.11	0.37	
G0304N07	508.4		6.33	0.54	
G0304N06	606.7				
G0304N05	758.4		11.28	0.51	
G0304N04	759.3		3.49	0.49	
G0304G01	808.3				
G0304N03	907.3				
G0304N02	1007.0		8.86	0.52	
G0304N01	1007.3		2.52	0.87	

BATS 3, Primary Production Data

R.V. Cape Henlopen

Light Bottles		Dark Bottles		Time-zero Bottles	
Depth (m)	Lt. Prod ($mg/m^2/day$)	Depth (m)	Dk. Prod ($mg/m^2/day$)	Depth (m)	$T_{\emptyset}$ Prod ($mg/m^2/day$)
5	7.21	5	0.75	5	1.26
5	6.59				
5					
25	6.00	25		25	1.97
25					
25					
50	3.62	50	1.02	50	1.57
50	2.69				
50	3.19				
75	2.21	75	1.43	75	1.47
75	1.40				
75	1.55				
100	1.15	100	0.95	100	1.46
100	1.78				
100	8.48				
120	1.29	120	1.01	120	2.08
120	0.75				
120	1.47				

Sediment Trap Estimated Particle Fluxes

Depth (m)	Sample #	Mass ($mg/m^2/d$)	Total Carbon ($mg\ C/m^2/d$)	Organic Carbon ($mg\ C/m^2/d$)	Nitrogen ($mg\ N/m^2/d$)
150	A	59.03	26.85		1.84
150[1]	B	97.77		17.85	3.73
320	C	30.44	15.71		2.04
320[1]	D	73.79		9.75	2.10

1. Sample acidified to remove carbonates. On this cruise, the acidified samples came from separate Multi-traps.

Cruise Report, BATS 4

Cruise dates: January 25-29, 1989
Personnel: R.L. Sherriff-Dow, P. Wassmann, R. Johnson, M. Tuel, S. Lorenz, W. Connelly.
R.V. Cape Henlopen

January 25, 1989

Depart St. George at 1200.

Light Cast: 1515, Lat: 32.033 N; Long: 64.392 W
Light cast used to determine sampling depths for Primary Production cast the next morning (Data not used—too far from station).

Trap deployed at 2003. Lat: 31.667 N; Long: 64.270 W

January 26, 1989

Primary Production Cast. 0330
Used GoFlo bottles on the rosette.
Samples incubated in deck incubators
Weather bad. Seas rough 8-12' Winds 25-35k.

CTD **Cast 1**: 0820-0855, Lat: 31.658 N; Long: 64.212 W
Nominal Depths: 1, 13, 30, 44, 58, 73, 88, 120, 150, 200, 225, 250 m.

Samples:

dissolved O_2 -duplicates	12 depths
salinity	12 depths
NO_3, PO_4, SiO_4,	12 depths
PON/POC - BBSR	12 depths

CTD **Cast 2**: 1325-1425, Lat: 31.661 N, Long: 64.228 W
Seas: 8-10'. Wind: 25 knots bearing 210°, Cloudy. Ship roll: 10-15°.
Nominal Depths: 300, 300, 400, 500, 500, 600, 750, 750, 800, 900, 1000, 1000 m.

Samples:

dissolved O_2 -duplicates	12 depths
salinity	12 depths
NO_3, PO_4, SiO_4,	12 depths
PON/POC - BBSR	8 depths

January 27, 1989

Primary Production Cast. 0400
Nominal sampling depths: 3.2, 17.7, 41.1, 61.7, 81.1, 102.1 m

Used Kevlar line. Kevlar line marked to light depths. Actual sampling depths approximate because of wire angle. Two sets of production samples taken form each GoFlo bottle. One set put in incubator, one set *in situ*.

0500 Captain informs us that strobe seems to be under water on sediment trap buoy. Follow closely until first light.

0700 Pick up main Sediment trap buoy. Weight was broken causing spar to turn upside down. Replace weight and re-release.

CTD **Cast 3**, 0755-1345,Lat: 31.695 N; Long: 64.252 W
Seas: 6-8'. Wind: 15 knots, bearing NNE. Overcast.
By 1000, wind shifted to 20-25 knots, bearing 180°
Nominal Depths: 1600, 1800, 2000, 2200, 2400, 2600, 2800, 3400, 3600, 3800, 4000, 4200 m.
Winch develops very bad leak. Gear case filling with hydraulic oil.

Samples:

dissolved O_2 -duplicates	12 depths
salinity	12 depths
NO_3, PO_4, SiO_4,	12 depths

CTD **Cast 4**, 1642-1710.
Lat: 31.634 N; Long: 64.146 W
Seas: 8'. Wind: 21 knots, bearing 170°
Nominal depths: 1, 3.2, 17.7, 41.1, 61.7, 81.1, 102.1, 120 m

Samples:

dissolved O_2 -duplicates	8 depths
salinity	8 depths
NO_3, PO_4, SiO_4,	8 depths
POC/PON	8 depths

January 28, 1989

CTD **Cast 5**: 1400-1440, Lat: 31.655 N; Long: 64.252 W
Wind: decreasing from 18 knots, bearing 170°
Nominal depths: 1, 3.2, 17.7, 41.1, 61.7, 81.1, 102.1, 125, 175, 200, 225, 250 m

Samples:
Chlor a - BBSR
CO_2 - Brewer
CO_2 - Keeling.

1830 Retrieve *in situ* PP buoy. End incubation also.

2100 Retrieve sed. trap array. Lat: 31.635 N; Long 64.270 W.

January 29, 1989

0730 Return to BBSR

CTD Sensor Corrections to Bottle Data for BATS 4:

On BATS 3 through BATS 7 cruises on the R.V. Cape Henlopen, a Neil Brown Mark-IIIB CTD system was used as per the University of Delaware, normal operating procedures. They applied a single correction factor for salinity on all CTD casts on these cruises. This correction factors are detailed below. They also applied a 7.5 db correction to all pressure measurements to correct a 7.5 db negative offset in the Neil Brown pressure sensor. CTD Oxygen corrections were performed at BBSR using the CTD oxygen and the bottle measurements as per the standard BATS method.

Salinity:

$$DS = \sum_{i=0}^{n} R_i C^i$$

MS = SC + DS

Where:

DS = Wet Salinity - CTD Salinity
R_i = regression coefficients
C = conductivity backcalculated from bottle salinity measurement (milliMohs)
n = order of the polynomial function
MS = modified salinity
SC = uncorrected salinity

$R_\emptyset$ = 0.104304
R_1 = -0.00623
R_2 = 4.2427E-05

Oxygen:

$$DO = R_0 + \sum_{i=1}^{l} A_i \frac{P^i}{4300} + \sum_{i=1}^{m} B_i \frac{OC^i}{300}$$

MO=OC+300 x DO

Where:

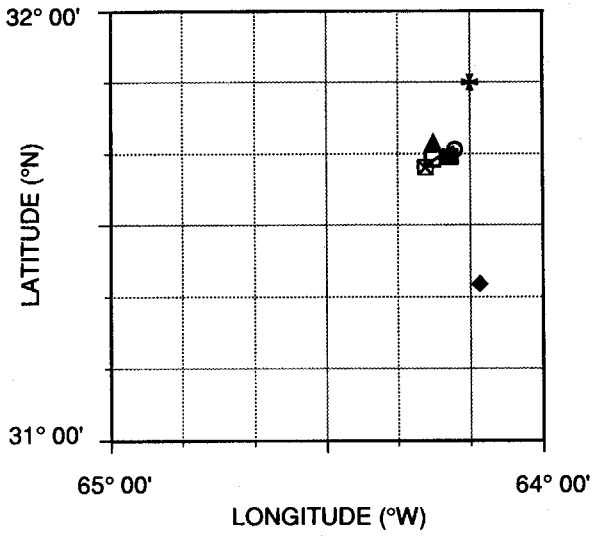
DO = (wet oxygens-CTD oxygen)/300
OC = uncorrected CTD oxygen (µmole/kg)
P = pressure (dbar)
MO = modified CTD oxygen (µmole/kg)
l = 4; m = 2
$R_\emptyset$,A_i, B_i = regression coefficients

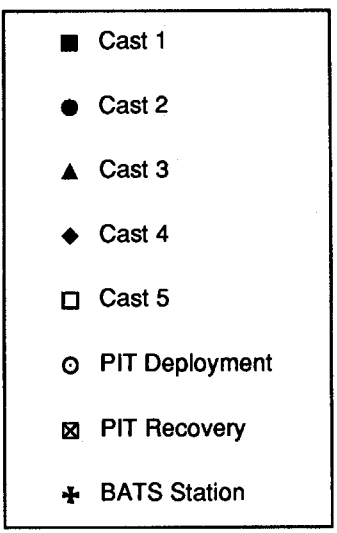
$R_\emptyset$ = -3.8586564e-01
A_1 = -1.9775552e-02
A_2 = 3.0439480e-01
A_3 = -1.6042715e-01

A_4 = -5.7679385e+02
B_1 = 1.2763495e+00
B_2 = -9.7313497e-01

model correlation coefficient = 9.9721e-01
standard deviation of model residuals = 2.703e+00 µmole/kg

BATS 4—Cast Positions:





BATS 4, CTD Cast 1
26 January, 1989; Start 08:20; End 08:55
Lat: 31.658 N; Long: 64.212 W

Depth (m)	Pres (db)	Temp (°C)	Pot.T (°C)	CTD Sal (ppt)	Sigma-t (kg/m^3)	CTD O_2 (μmole/kg)	O_2 Anom (μmole/kg)	BAC (m^{-1})	PAR ($\mu E/m^2/s$)	Fluor (rfu)
4.0	4.0	20.850	20.849	36.658	25.799	261.28	42.32	0.459	561.28	
10.0	10.1	20.849	20.847	36.658	25.800	230.77	11.81	0.446	336.81	
20.0	20.1	20.864	20.860	36.655	25.794	231.72	12.81	0.445	258.12	
30.0	30.2	20.866	20.860	36.652	25.792	230.95	12.05	0.445	181.00	
40.0	40.3	20.870	20.862	36.650	25.790	228.80	9.91	0.444	130.01	
50.0	50.4	20.871	20.862	36.648	25.788	228.05	9.16	0.446	89.85	
60.0	60.4	20.874	20.863	36.646	25.786	229.06	10.18	0.445	62.03	
70.0	70.5	20.876	20.862	36.644	25.785	225.98	7.10	0.445	41.09	
80.0	80.6	20.875	20.860	36.643	25.785	223.23	4.35	0.445	27.75	
90.0	90.6	20.877	20.860	36.642	25.784	222.97	4.09	0.446	19.39	
100.0	100.7	20.877	20.858	36.641	25.784	224.63	5.75	0.446	0.00	
110.0	110.8	20.855	20.834	36.637	25.788	225.00	6.03	0.445	0.00	
120.0	120.9	20.730	20.707	36.624	25.812	222.58	3.10	0.441	0.00	
130.0	131.0	20.005	19.981	36.624	26.008	217.77	-4.60	0.426	0.00	
140.0	141.0	19.562	19.536	36.619	26.121	210.91	-13.27	0.422	0.00	
150.0	151.1	19.340	19.312	36.604	26.168	206.64	-18.48	0.421	0.00	
160.0	161.2	19.150	19.120	36.588	26.206	207.07	-18.86	0.420	0.00	
170.0	171.3	19.054	19.023	36.581	26.226	207.77	-18.56	0.420	0.00	
180.0	181.3	18.924	18.891	36.574	26.254	207.07	-19.82	0.419	0.00	
190.0	191.4	18.851	18.817	36.565	26.266	205.77	-21.44	0.417	0.00	
200.0	201.5	18.754	18.717	36.561	26.288	204.46	-23.17	0.418	0.00	
210.0	211.6	18.654	18.616	36.555	26.310	206.56	-21.50	0.416	0.00	
220.0	221.7	18.545	18.506	36.543	26.328	207.95	-20.59	0.416	0.00	
230.0	231.7	18.485	18.444	36.538	26.340	207.96	-20.84	0.415	0.00	
240.0	241.8	18.440	18.397	36.537	26.352	208.83	-20.17	0.415	0.00	
250.0	251.9	18.405	18.360	36.534	26.358	207.13	-22.02	0.415	0.00	

BATS 4, CTD Cast 2
26 January, 1989; Start 13:25; End 14:25
Lat: 31.661 N; Long: 64.228 W

Depth (m)	Pres (db)	Temp (°C)	Pot.T (°C)	CTD Sal (ppt)	Sigma-t (kg/m^3)	CTD O_2 (μmole/kg)	O_2 Anom (μmole/kg)	BAC (m^{-1})	PAR ($\mu E/m^2/s$)	Fluor (rfu)
4.0	4.0	20.810	20.809	36.661	25.813	218.92	-0.19	0.441		
10.0	10.1	20.827	20.825	36.657	25.805	221.64	2.59	0.440		
20.0	20.1	20.828	20.824	36.654	25.803	220.08	1.03	0.439		
30.0	30.2	20.825	20.819	36.651	25.802	220.93	1.87	0.439		
40.0	40.3	20.828	20.820	36.648	25.800	224.36	5.30	0.440		
50.0	50.4	20.830	20.821	36.646	25.798	225.88	6.82	0.442		
60.0	60.4	20.832	20.821	36.644	25.797	225.72	6.67	0.441		
70.0	70.5	20.837	20.823	36.643	25.795	224.93	5.90	0.441		
80.0	80.6	20.840	20.825	36.641	25.793	224.64	5.62	0.441		
90.0	90.6	20.841	20.824	36.639	25.792	225.01	5.99	0.440		
100.0	100.7	20.836	20.817	36.637	25.793	224.25	5.21	0.437		
110.0	110.8	20.699	20.678	36.624	25.820	222.54	2.94	0.430		
120.0	120.9	20.216	20.193	36.617	25.945	219.42	-2.11	0.419		
130.0	131.0	19.980	19.956	36.629	26.018	215.73	-6.73	0.416		

Depth (m)	Pres (db)	Temp (°C)	Pot.T (°C)	CTD Sal (ppt)	Sigma-t (kg/m^3)	CTD 0_2 (μmole/kg)	0_2 Anom (μmole/kg)	BAC (m^{-1})	PAR ($\mu E/m^2/s$)	Fluor (rfu)
140.0	141.0	19.732	19.706	36.625	26.081	214.47	-9.00	0.414		
150.0	151.1	19.479	19.451	36.615	26.140	212.97	-11.55	0.412		
160.0	161.2	19.267	19.238	36.598	26.183	211.09	-14.33	0.411		
170.0	171.3	19.048	19.017	36.582	26.228	208.95	-17.41	0.409		
180.0	181.3	18.854	18.822	36.567	26.266	207.50	-19.69	0.407		
190.0	191.4	18.764	18.729	36.563	26.287	206.64	-20.94	0.407		
200.0	201.5	18.700	18.663	36.559	26.301	206.97	-20.89	0.407		
210.0	211.6	18.621	18.583	36.551	26.315	207.85	-20.35	0.407		
220.0	221.7	18.547	18.508	36.545	26.330	208.02	-20.50	0.407		
230.0	231.7	18.491	18.449	36.539	26.340	206.73	-22.05	0.405		
240.0	241.8	18.448	18.405	36.535	26.348	205.37	-23.59	0.405		
250.0	251.9	18.403	18.359	36.535	26.360	206.69	-22.47	0.406		
275.0	277.1	18.282	18.233	36.523	26.382	208.03	-21.67	0.406		
300.0	302.3	18.155	18.102	36.506	26.402	207.58	-22.69	0.406		
325.0	327.5	18.020	17.963	36.487	26.422	206.07	-24.81	0.407		
350.0	352.7	17.914	17.852	36.474	26.440	203.24	-28.13	0.407		
375.0	378.0	17.768	17.702	36.454	26.461	201.24	-30.79	0.407		
400.0	403.2	17.607	17.537	36.430	26.483	197.69	-35.09	0.408		
425.0	428.4	17.442	17.368	36.405	26.505	195.46	-38.08	0.408		
450.0	453.6	17.103	17.025	36.353	26.548	191.32	-43.82	0.409		
475.0	478.9	16.867	16.786	36.312	26.574	190.25	-46.01	0.409		
500.0	504.1	16.442	16.358	36.241	26.621	187.70	-50.63	0.409		
550.0	554.6	15.707	15.617	36.119	26.698	184.96	-56.99	0.410		
600.0	605.1	14.925	14.829	35.992	26.775	185.22	-60.72	0.411		
650.0	655.6	14.038	13.938	35.851	26.859	181.61	-68.97	0.410		
700.0	706.1	13.045	12.943	35.704	26.951	176.69	-79.28	0.411		
750.0	756.6	12.070	11.965	35.560	27.032	169.53	-91.94	0.411		
800.0	807.2	11.114	11.007	35.441	27.119	161.36	-105.67	0.411		
850.0	857.7	9.999	9.891	35.318	27.220	160.04	-113.73	0.412		
900.0	908.3	8.876	8.768	35.214	27.323	162.66	-118.18	0.411		
950.0	958.9	8.101	7.992	35.154	27.397	172.05	-113.83	0.413		
1000.0	1009.4	7.258	7.149	35.114	27.488	188.70	-102.81	0.414		

BATS 4, CTD Cast 3
27 January, 1988; Start 07:55; End 13:45
Lat: 31.695 N; Long: 64.252 W

Depth (m)	Pres (db)	Temp (°C)	Pot.T (°C)	CTD Sal (ppt)	Sigma-t (kg/m^3)	CTD 0_2 (μmole/kg)	0_2 Anom (μmole/kg)	BAC (m^{-1})	PAR ($\mu E/m^2/s$)	Fluor (rfu)
3.0	3.0	20.798	20.797	36.669	25.822	221.29	2.14			
10.0	10.1	20.805	20.803	36.661	25.814	219.00	-0.13			
20.0	20.1	20.808	20.804	36.658	25.812	219.85	0.73			
30.0	30.2	20.812	20.806	36.654	25.808	219.27	0.16			
40.0	40.3	20.812	20.805	36.650	25.806	219.25	0.13			
50.0	50.4	20.810	20.801	36.648	25.805	220.17	1.04			
60.0	60.4	20.810	20.798	36.646	25.804	221.86	2.73			
70.0	70.5	20.809	20.795	36.644	25.804	221.67	2.52			
80.0	80.6	20.810	20.794	36.643	25.803	220.78	1.64			
90.0	90.6	20.809	20.792	36.642	25.803	221.87	2.73			
100.0	100.7	20.812	20.793	36.641	25.802	223.43	4.29			
110.0	110.8	20.593	20.572	36.624	25.849	220.83	0.81			
120.0	120.9	20.135	20.112	36.635	25.981	217.22	-4.61			
130.0	131.0	19.665	19.641	36.612	26.088	213.45	-10.32			

Depth (m)	Pres (db)	Temp (°C)	Pot.T (°C)	CTD Sal (ppt)	Sigma-t (kg/m^3)	CTD 0_2 (µmole/kg)	0_2 Anom (µmole/kg)	BAC (m^{-1})	PAR ($\mu E/m^2/s$)	Fluor (rfu)
140.0	141.0	19.367	19.341	36.604	26.161	210.50	-14.50			
150.0	151.1	19.305	19.278	36.602	26.175	208.79	-16.47			
160.0	161.2	19.102	19.072	36.590	26.219	207.85	-18.27			
170.0	171.3	18.960	18.929	36.579	26.248	206.20	-20.53			
180.0	181.3	18.845	18.812	36.570	26.271	205.69	-21.54			
190.0	191.4	18.787	18.752	36.566	26.284	205.33	-22.15			
200.0	201.5	18.674	18.637	36.556	26.305	205.77	-22.20			
210.0	211.6	18.608	18.570	36.555	26.321	207.76	-20.50			
220.0	221.7	18.556	18.517	36.552	26.333	210.37	-18.11			
230.0	231.7	18.521	18.480	36.552	26.342	212.20	-16.42			
240.0	241.8	18.485	18.442	36.548	26.349	212.63	-16.15			
250.0	251.9	18.454	18.409	36.544	26.354	213.06	-15.86			
275.0	277.1	18.307	18.257	36.526	26.378	210.15	-19.44			
300.0	302.3	18.134	18.081	36.505	26.406	208.94	-21.42			
325.0	327.5	18.005	17.948	36.490	26.428	207.27	-23.67			
350.0	352.7	17.932	17.870	36.482	26.441	206.41	-24.86			
375.0	378.0	17.824	17.758	36.468	26.458	203.92	-27.84			
400.0	403.2	17.663	17.593	36.445	26.481	201.77	-30.73			
425.0	428.4	17.486	17.411	36.419	26.505	199.05	-34.28			
450.0	453.6	17.261	17.183	36.382	26.532	197.03	-37.36			
475.0	478.9	16.940	16.859	36.329	26.569	194.05	-41.86			
500.0	504.1	16.478	16.394	36.251	26.619	192.00	-46.14			
550.0	554.6	15.893	15.802	36.158	26.685	189.35	-51.66			
600.0	605.1	14.976	14.881	36.004	26.774	187.67	-58.00			
650.0	655.6	14.221	14.120	35.886	26.847	185.00	-64.61			
700.0	706.1	13.225	13.122	35.734	26.938	177.74	-77.23			
750.0	756.6	12.166	12.060	35.581	27.030	168.63	-92.28			
800.0	807.2	11.176	11.068	35.458	27.120	165.19	-101.46			
850.0	857.7	10.002	9.894	35.321	27.222	163.34	-110.40			
900.0	908.3	8.759	8.652	35.213	27.341	166.47	-115.11			
950.0	958.9	8.099	7.990	35.170	27.409	174.41	-111.46			
1000.0	1009.4	7.593	7.481	35.151	27.470	185.62	-103.59			
1050.0	1060.0	6.785	6.673	35.107	27.549	195.32	-99.41			
1100.0	1110.7	6.356	6.241	35.108	27.607	206.37	-91.31			
1150.0	1161.3	6.040	5.922	35.114	27.653	217.59	-82.28			
1200.0	1211.9	5.754	5.632	35.107	27.684	226.90	-75.02			
1300.0	1313.2	5.397	5.266	35.111	27.732	237.62	-66.87			
1400.0	1414.6	5.167	5.026	35.111	27.760	242.95	-63.21			
1500.0	1516.0	4.837	4.688	35.082	27.776	250.12	-58.54			
1600.0	1617.4	4.569	4.411	35.062	27.792	254.54	-56.17			
1700.0	1718.9	4.326	4.158	35.046	27.806	258.21	-54.37			
1800.0	1820.5	4.161	3.983	35.038	27.819	260.06	-53.80			
1900.0	1922.1	3.944	3.755	35.019	27.827	262.72	-52.86			
2000.0	2023.7	3.819	3.619	35.010	27.833	265.02	-51.54			
2100.0	2125.4	3.703	3.492	35.005	27.842	265.64	-51.84			
2200.0	2227.2	3.616	3.393	35.002	27.849	265.68	-52.49			
2300.0	2328.9	3.472	3.237	34.991	27.856	267.58	-51.75			
2400.0	2430.8	3.310	3.064	34.980	27.863	268.93	-51.71			
2500.0	2532.7	3.189	2.931	34.972	27.869	270.16	-51.46			
2600.0	2634.6	3.056	2.786	34.964	27.876	271.09	-51.62			
2700.0	2736.6	2.984	2.701	34.960	27.880	271.70	-51.60			
2800.0	2838.6	2.874	2.578	34.953	27.886	273.01	-51.19			
2900.0	2940.7	2.780	2.471	34.948	27.891	274.10	-50.88			
3000.0	3042.8	2.686	2.364	34.942	27.895	274.01	-51.75			
3100.0	3144.9	2.609	2.273	34.937	27.899	274.94	-51.47			
3200.0	3247.2	2.509	2.159	34.931	27.904	275.27	-51.98			
3300.0	3349.4	2.440	2.075	34.927	27.907	275.07	-52.76			

Depth (m)	Pres (db)	Temp (°C)	Pot.T (°C)	CTD Sal (ppt)	Sigma-t (kg/m^3)	CTD O_2 ($\mu mole/kg$)	O_2 Anom ($\mu mole/kg$)	BAC (m^{-1})	PAR ($\mu E/m^2/s$)	Fluor (rfu)
3400.0	3451.7	2.351	1.972	34.920	27.910	275.51	-53.07			
3500.0	3554.1	2.304	1.910	34.915	27.911	274.87	-54.11			
3600.0	3656.5	2.271	1.861	34.910	27.910	274.46	-54.81			
3700.0	3758.9	2.238	1.811	34.908	27.913	273.72	-55.84			
3800.0	3861.4	2.228	1.785	34.908	27.915	272.94	-56.70			
3900.0	3964.0	2.205	1.745	34.906	27.916	271.84	-57.99			
4000.0	4066.5	2.209	1.731	34.905	27.917	271.29	-58.51			
4100.0	4169.2	2.209	1.713	34.904	27.917	269.85	-59.95			
4200.0	4271.8	2.217	1.703	34.903	27.917	269.84	-59.90			

BATS 4, CTD Cast 4
27 January, 1989; Start 16:42; End 17:10
Lat: 31.364 N; Long: 64.146 W

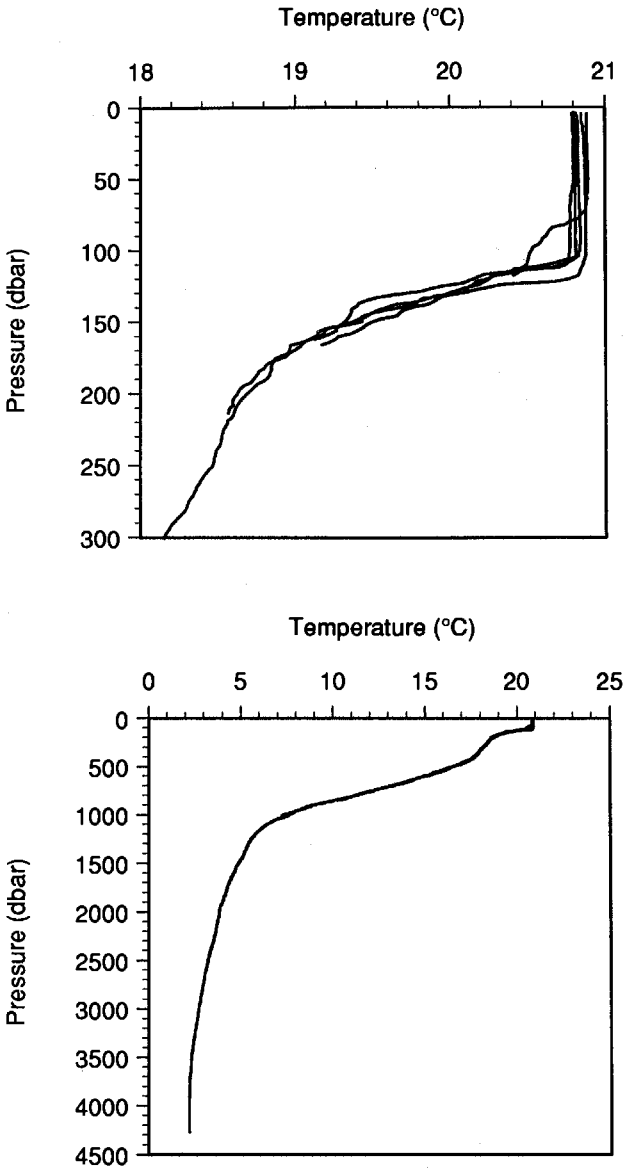
Depth (m)	Pres (db)	Temp (°C)	Pot.T (°C)	CTD Sal (ppt)	Sigma-t (kg/m^3)	CTD O_2 ($\mu mole/kg$)	O_2 Anom ($\mu mole/kg$)	BAC (m^{-1})	PAR ($\mu E/m^2/s$)	Fluor (rfu)
4.0	4.0	20.883	20.882	36.669	25.799	222.07	3.26			
10.0	10.1	20.883	20.881	36.667	25.798	220.07	1.26			
20.0	20.1	20.884	20.880	36.663	25.795	219.29	0.47			
30.0	30.2	20.885	20.879	36.663	25.795	218.87	0.05			
40.0	40.3	20.888	20.880	36.659	25.792	220.11	1.30			
50.0	50.4	20.891	20.881	36.657	25.790	221.60	2.80			
60.0	60.4	20.889	20.877	36.654	25.788	221.59	2.78			
70.0	70.5	20.876	20.862	36.648	25.788	221.58	2.71			
80.0	80.6	20.765	20.750	36.625	25.801	220.67	1.33			
90.0	90.6	20.615	20.598	36.604	25.826	220.25	0.29			
100.0	100.7	20.524	20.505	36.595	25.845	218.64	-1.70			
110.0	110.8	20.487	20.466	36.592	25.853	216.77	-3.72			

BATS 4, CTD Cast 5
28 January, 1989; Start 14:00; End 14:40
Lat: 31.655 N; Long: 64.252 W

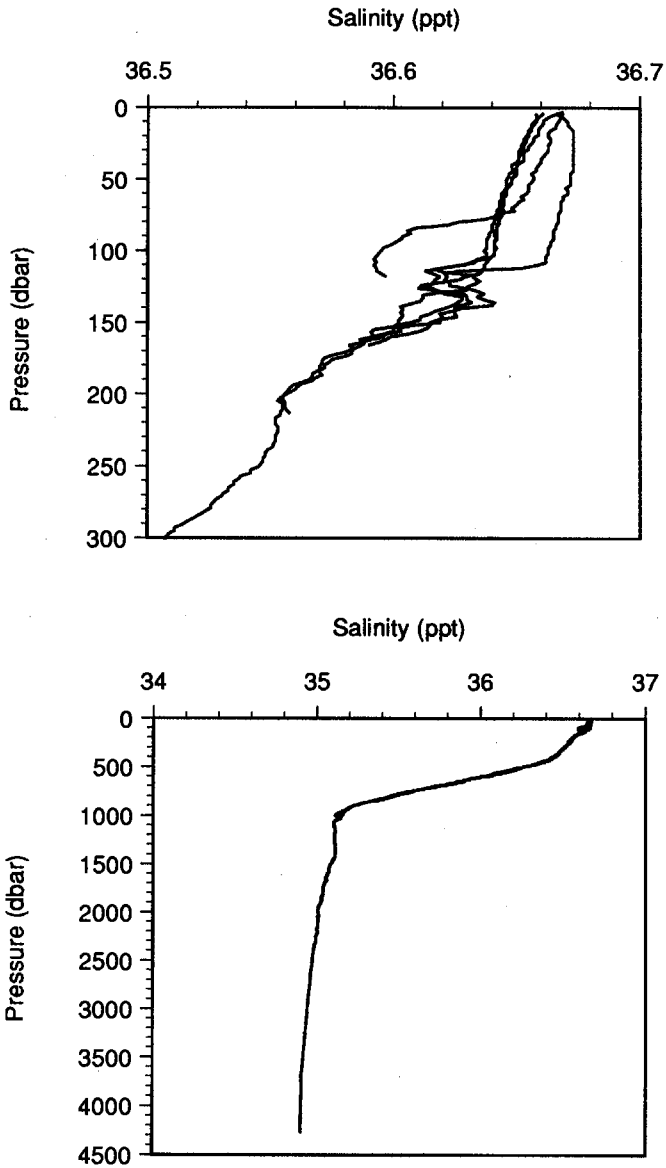
Depth (m)	Pres (db)	Temp (°C)	Pot.T (°C)	CTD Sal (ppt)	Sigma-t (kg/m^3)	CTD O_2 ($\mu mole/kg$)	O_2 Anom ($\mu mole/kg$)	BAC (m^{-1})	PAR ($\mu E/m^2/s$)	Fluor (rfu)
4.0	4.0	20.791	20.790	36.666	25.822	214.06	-5.12			
10.0	10.1	20.792	20.790	36.671	25.825	212.81	-6.35			
20.0	20.1	20.798	20.794	36.673	25.826	216.54	-2.60			
30.0	30.2	20.797	20.791	36.673	25.827	217.67	-1.48			
40.0	40.3	20.798	20.790	36.673	25.827	217.25	-1.89			
50.0	50.4	20.797	20.787	36.672	25.827	218.44	-0.71			
60.0	60.4	20.786	20.774	36.671	25.830	218.02	-1.17			
70.0	70.5	20.774	20.760	36.668	25.831	216.30	-2.95			
80.0	80.6	20.777	20.762	36.667	25.830	215.98	-3.25			
90.0	90.6	20.774	20.757	36.665	25.830	216.78	-2.47			
100.0	100.7	20.770	20.751	36.663	25.830	216.78	-2.48			
110.0	110.8	20.732	20.711	36.656	25.835	216.04	-3.38			
120.0	120.9	20.243	20.221	36.622	25.942	213.29	-8.13			
130.0	131.0	20.034	20.009	36.636	26.009	208.84	-13.39			

Depth (m)	Pres (db)	Temp (°C)	Pot.T (°C)	CTD Sal (ppt)	Sigma-t (kg/m^3)	CTD O_2 (μmole/kg)	O_2 Anom (μmole/kg)	BAC (m^{-1})	PAR ($\mu E/m^2/s$)	Fluor (rfu)
140.0	141.0	19.638	19.612	36.626	26.107	205.55	-18.30			
150.0	151.1	19.382	19.355	36.613	26.164	202.64	-22.29			
160.0	161.2	19.118	19.089	36.593	26.218	200.17	-25.88			
170.0	171.3	18.958	18.928	36.583	26.252	198.16	-28.57			
180.0	181.3	18.803	18.770	36.572	26.283	199.08	-28.32			
190.0	191.4	18.719	18.685	36.564	26.299	199.99	-27.78			
200.0	201.5	18.614	18.578	36.555	26.320	199.99	-28.24			
210.0	211.6	18.572	18.534	36.557	26.332	201.25	-27.15			
220.0	221.7	18.548	18.508	36.557	26.339	202.62	-25.88			
230.0	231.7	18.510	18.469	36.551	26.344	203.22	-25.46			
240.0	241.8	18.471	18.428	36.549	26.353	204.01	-24.84			
250.0	251.9	18.425	18.380	36.544	26.361	203.18	-25.87			

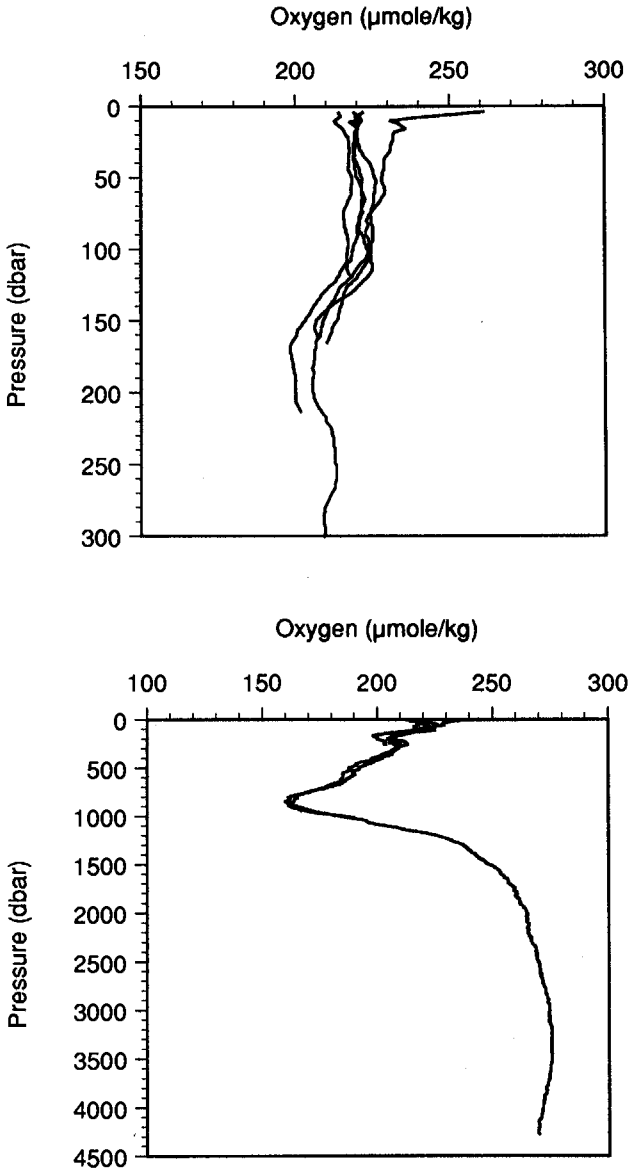
BATS 4—CTD Temperature Profile



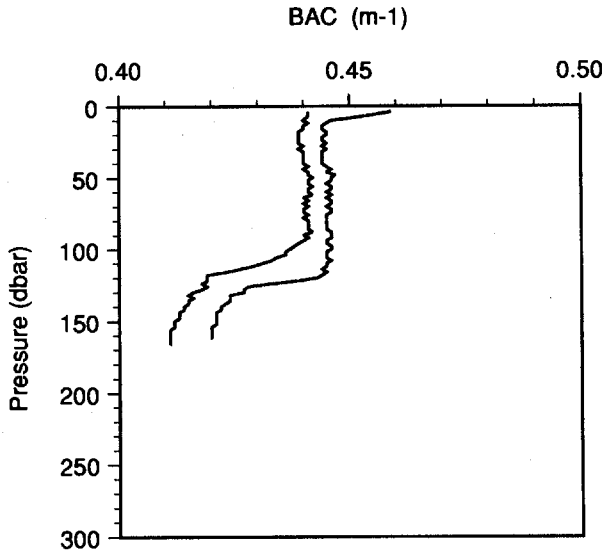
BATS 4—CTD Salinity Profile



BATS 4—CTD Oxygen Profile



BATS 4—CTD BAC Profile



BATS 4—Bottle Data
January 25-29, 1989
Physical Parameters

Bottle ID	Depth (m)	Pressure (db)	Temp (°C)	Pot. Temp (°C)	Salinity (ppt)	Sigma-t (kg/m^3)
G0401N10	4.8	4.8	20.844	20.843	36.634	25.783
G0401N09	16.3	16.4	20.853	20.850	36.630	25.778
G0401N08	35.1	35.3	20.858	20.851	36.634	25.781
G0401N07	49.5	49.9	20.862	20.852	36.632	25.779
G0401G02	63.5	64.0	20.862	20.850	36.632	25.779
G0401N06	76.4	76.9	20.863	20.848	36.628	25.777
G0401N05	94.6	95.3	20.862	20.844	36.631	25.780
G0401N04	125.1	126.0	20.241	20.217	36.627	25.947
G0401G01	158.0	159.2	19.264	19.235	36.599	26.184
G0401N03	205.7	207.2	18.701	18.664	36.560	26.301
G0401N02	228.7	230.4	18.515	18.474	36.540	26.334
G0401N01	251.2	253.1	18.403	18.358	36.532	26.357
G0404G02	2.5	2.5	20.878	20.878	36.648	25.784
G0404N06	8.7	8.8	20.879	20.877	36.648	25.784
G0404N05	20.2	20.3	20.889	20.885	36.646	25.780
G0404N04	44.4	44.7	20.892	20.883	36.646	25.781
G0404G01	61.3	61.7	20.885	20.873	36.646	25.784
G0404N03	79.2	79.8	20.772	20.757	36.625	25.799
G0404N02	98.6	99.3	20.514	20.495	36.591	25.844
G0404N01	117.5	118.4	20.426	20.404	36.593	25.871
G0405N10	2.4	2.4	20.875			
G0405N09	5.5	5.5	20.790			
G0405N08	19.7	19.8	20.795			
G0405N07	42.9	43.2	20.784			
G0405G02	63.6	64.4	20.779			
G0405N06	83.1	83.7	20.781			
G0405N05	101.6	102.3	20.768			
G0405N04	127.1	128.0	20.080			
G0405G01	174.5	175.8	18.881			
G0405N03	202.0	203.5	18.590			
G0405N02	226.0	227.8	18.518			
G0405N01	249.0	250.9	18.423			
G0402N10	302.5	304.8	18.114	18.060	36.505	26.411
G0402N09	300.1	302.4	18.133			
G0402N08	399.7	402.9	17.576	17.506	36.425	26.487
G0402N07	504.8	508.9	16.403	16.318	36.236	26.626
G0402G02	504.7	508.8	16.406			
G0402N06	602.5	607.6	14.936	14.840	35.999	26.779
G0402N05	747.2	753.8	12.130			
G0402N04	751.9	758.5	12.112			
G0402G01	799.3	806.4	11.134	11.026	35.445	27.118
G0402N03	899.9	908.2	8.843	8.735	35.211	27.326
G0402N02	1006.0	1015.5	7.107	6.998	35.106	27.503
G0402N01	1004.9	1014.4	7.135			

Bottle ID	Depth (m)	Pressure (db)	Temp (°C)	Pot. Temp (°C)	Salinity (ppt)	Sigma-t (kg/m^3)
G0403N10	1597.6	1615.0	4.582	4.424	35.053	27.783
G0403N09	1792.0	1812.3	4.171	3.993	35.026	27.808
G0403N08	2000.6	2024.3	3.925	3.724	35.010	27.823
G0403N07	2201.4	2228.5	3.671	3.447	34.992	27.836
G0403G02	2460.6	2492.5	3.280	3.026	34.970	27.859
G0403N06	2608.5	2643.2	3.110	2.838	34.952	27.862
G0403N05	2803.5	2842.1	2.907	2.610	34.943	27.875
G0403N04	3397.7	3449.3	2.356	1.978	34.906	27.898
G0403G01	3599.6	3656.0	2.262	1.852	34.901	27.904
G0403N03	3799.0	3860.3	2.223	1.780	34.891	27.902
G0403N02	4003.0	4069.5	2.207	1.729	34.897	27.910
G0403N01	4200.1	4271.9	2.217	1.703	34.904	27.918

BATS 4—Bottle Data
January 25-29, 1989
Gases

Bottle ID	Depth (m)	$O_2(1)$ (µmole/kg)	$O_2(2)$ (µmole/kg)	$O_2(1)$ anomaly (µmole/kg)	$O_2(2)$ anomaly (µmole/kg)	TCO_2 (µmole/kg)
G0401N10	4.8	221.23		0.97		
G0401N09	16.3	222.11		1.91		
G0401N08	35.1	221.67		1.55		
G0401N07	49.5	221.67		1.61		
G0401G02	63.5	225.59		5.56		
G0401N06	76.4	220.81		0.81		
G0401N05	94.6	221.24		1.30		
G0401N04	125.1	212.51		-10.24		
G0401G01	158.0	202.90		-24.14		
G0401N03	205.7	203.31		-26.04		
G0401N02	228.7	205.91		-24.17		
G0401N01	251.2	206.35		-24.15		
G0404G02	2.5	233.41		13.31		
G0404N06	8.7	232.97		12.90		
G0404N05	20.2	234.71		14.72		
G0404N04	44.4	234.28		14.36		
G0404G01	61.3	236.45		16.55		
G0404N03	79.2	231.23		10.81		
G0404N02	98.6	229.48		7.86		
G0404N01	117.5	229.48		7.50		

Bottle ID	Depth (m)	$O_2(1)$ (µmole/kg)	$O_2(2)$ (µmole/kg)	$O_2(1)$ anomaly (µmole/kg)	$O_2(2)$ anomaly (µmole/kg)	TCO_2 (µmole/kg)
G0405N10	2.4					2019.8
G0405N09	5.5					2023.4
G0405N08	19.7					2018.4
G0405N07	42.9					2018.7
G0405G02	63.6					2019.4
G0405N06	83.1					
G0405N05	101.6					2040.6
G0405N04	127.1					
G0405G01	174.5					
G0405N03	202.0					2055.7
G0405N02	226.0					2052.1
G0405N01	249.0					2054.2
G0402N10	302.5	220.24		-11.33		
G0402N09	300.1	215.03				
G0402N08	399.7	207.63		-25.93		
G0402N07	504.8	197.63		-40.41		
G0402G02	504.7	199.80				
G0402N06	602.5	190.67		-52.77		
G0402N05	747.2					
G0402N04	751.9	170.67				
G0402G01	799.3	163.72		-93.41		
G0402N03	899.9	164.57		-101.65		
G0402N02	1006.0	187.55		-86.59		
G0402N01	1004.9	185.38				
G0403N10	1597.6		260.42		-27.24	
G0403N09	1792.0		263.44		-26.77	
G0403N08	2000.6	263.87		-27.80		
G0403N07	2201.4	264.74		-28.60		
G0403G02	2460.6	271.24	270.37	-24.96	-25.82	
G0403N06	2608.5	269.93	270.80	-27.57	-26.71	
G0403N05	2803.5		271.66		-27.46	
G0403N04	3397.7	275.12	276.42	-29.01	-27.71	
G0403G01	3599.6	273.38	272.51	-31.75	-32.62	
G0403N03	3799.0	273.38	272.94	-32.30	-32.74	
G0403N02	4003.0	271.64	271.21	-34.40	-34.84	
G0403N01	4200.1	269.47		-36.74		

Bottle ID	Depth (m)	$O_2(1)$ (µmole/kg)	$O_2(2)$ (µmole/kg)	$O_2(1)$ anomaly (µmole/kg)	$O_2(2)$ anomaly (µmole/kg)	TCO_2 (µmole/kg)
G0405N10	2.4					2019.8
G0405N09	5.5					2023.4
G0405N08	19.7					2018.4
G0405N07	42.9					2018.7
G0405G02	63.6					2019.4
G0405N06	83.1					
G0405N05	101.6					2040.6
G0405N04	127.1					
G0405G01	174.5					
G0405N03	202.0					2055.7
G0405N02	226.0					2052.1
G0405N01	249.0					2054.2
G0402N10	302.5	220.24		-11.33		
G0402N09	300.1	215.03				
G0402N08	399.7	207.63		-25.93		
G0402N07	504.8	197.63		-40.41		
G0402G02	504.7	199.80				
G0402N06	602.5	190.67		-52.77		
G0402N05	747.2					
G0402N04	751.9	170.67				
G0402G01	799.3	163.72		-93.41		
G0402N03	899.9	164.57		-101.65		
G0402N02	1006.0	187.55		-86.59		
G0402N01	1004.9	185.38				
G0403N10	1597.6		260.42		-27.24	
G0403N09	1792.0		263.44		-26.77	
G0403N08	2000.6	263.87		-27.80		
G0403N07	2201.4	264.74		-28.60		
G0403G02	2460.6	271.24	270.37	-24.96	-25.82	
G0403N06	2608.5	269.93	270.80	-27.57	-26.71	
G0403N05	2803.5		271.66		-27.46	
G0403N04	3397.7	275.12	276.42	-29.01	-27.71	
G0403G01	3599.6	273.38	272.51	-31.75	-32.62	
G0403N03	3799.0	273.38	272.94	-32.30	-32.74	
G0403N02	4003.0	271.64	271.21	-34.40	-34.84	
G0403N01	4200.1	269.47		-36.74		

BATS 4—Bottle Data
January 25-29, 1989
Nutrients

Bottle ID	Depth (m)	Nitrate+Nitrite (μmole/kg)	Phosphate (μmole/kg)	Silicate (μmole/kg)
G0401N10	4.8	0.10	0.00	1.39
G0401N09	16.3	0.07	0.00	1.47
G0401N08	35.1	0.00	0.04	1.09
G0401N07	49.5	0.06	0.00	1.12
G0401G02	63.5	0.05	0.00	1.33
G0401N06	76.4	0.06	0.05	1.11
G0401N05	94.6	0.06	0.04	1.50
G0401N04	125.1	0.43	0.04	1.11
G0401G01	158.0	1.15	0.07	1.10
G0401N03	205.7	2.56	0.12	1.37
G0401N02	228.7	2.77	0.15	1.38
G0401N01	251.2	2.93	0.16	1.39
G0404G02	2.5	0.05	0.06	1.01
G0404N06	8.7	0.06	0.06	1.13
G0404N05	20.2	0.00	0.04	1.05
G0404N04	44.4	0.06	0.04	1.19
G0404G01	61.3	0.12	0.03	1.32
G0404N03	79.2	0.07	0.03	1.03
G0404N02	98.6	0.21	0.06	1.00
G0404N01	117.5	0.27	0.05	1.01
G0402N10	302.5	3.87	0.20	1.60
G0402N09	300.1	3.84	0.18	1.66
G0402N08	399.7	5.70	0.25	2.08
G0402N07	504.8	8.72	0.42	3.05
G0402G02	504.7	8.61	0.41	3.15
G0402N06	602.5	11.43	0.60	4.00
G0402N05	747.2			
G0402N04	751.9	17.41	1.08	7.36
G0402G01	799.3	19.54	1.21	9.50
G0402N03	899.9	21.90	1.42	12.67
G0402N02	1006.0	21.53	1.41	12.95
G0402N01	1004.9	21.49	1.41	13.33
G0403N10	1597.6	18.11	1.13	12.11
G0403N09	1792.0	17.74	1.13	12.30
G0403N08	2000.6	17.65	1.13	13.88
G0403N07	2201.4	17.98	1.14	15.65
G0403G02	2460.6	17.72	1.14	17.23
G0403N06	2608.5	17.88	1.13	19.28
G0403N05	2803.5	17.66	1.14	19.34
G0403N04	3397.7	18.04	1.21	24.88
G0403G01	3599.6	18.15	1.22	26.55
G0403N03	3799.0	18.31	1.23	28.88
G0403N02	4003.0	18.65	1.25	30.01
G0403N01	4200.1	18.43	1.26	30.37

BATS 4—Bottle Data
January 25-29, 1989
Particulates

Bottle ID	Depth (m)	Chl *a* (μg/kg)	POC (μg/kg)	PON (μg/kg)	Bacteria (# x 10^8/kg)
G0401N10	4.8		16.33	3.02	
G0401N09	16.3		19.74	3.46	
G0401N08	35.1		17.65	3.02	
G0401N07	49.5		17.58	2.67	
G0401G02	63.5		24.03	4.30	
G0401N06	76.4		18.84	3.58	
G0401N05	94.6		16.55	3.26	
G0401N04	125.1		8.05	1.65	
G0401G01	158.0		7.34	1.27	
G0401N03	205.7		6.33	0.98	
G0401N02	228.7		4.60	0.90	
G0401N01	251.2		13.01	2.14	
G0404G02	2.5		20.69	2.87	
G0404N06	8.7		17.97	3.02	
G0404N05	20.2		16.65	2.64	
G0404N04	44.4		15.66	2.49	
G0404G01	61.3		14.21	2.25	
G0404N03	79.2		14.56	2.60	
G0404N02	98.6		13.00	2.09	
G0404N01	117.5		15.48	2.33	
G0405N10	2.4	0.094			
G0405N09	5.5	0.094			
G0405N08	19.7	0.097			
G0405N07	42.9	0.091			
G0405G02	63.6	0.095			
G0405N06	83.1	0.088			
G0405N05	101.6				
G0405N04	127.1				
G0405G01	174.5				
G0405N03	202.0				
G0405N02	226.0				
G0405N01	249.0				
G0402N10	302.5		4.04	0.67	
G0402N09	300.1		9.40	0.78	
G0402N08	399.7				
G0402N07	504.8		3.57	0.44	
G0402G02	504.7		3.36	0.30	
G0402N06	602.5				
G0402N05	747.2		3.65	0.46	
G0402N04	751.9		4.44	0.67	
G0402G01	799.3				
G0402N03	899.9				
G0402N02	1006.0		8.99	0.82	
G0402N01	1004.9		10.17	0.82	

BATS 4, Primary Production Data

R.V. Cape Henlopen

Light Bottles		Dark Bottles		Time-zero Bottles	
Depth (m)	Lt. Prod ($mg/m^2/day$)	Depth (m)	Dk. Prod ($mg/m^2/day$)	Depth (m)	$T_{\emptyset}$ Prod ($mg/m^2/day$)
17.7	3.77	17.7	0.18	17.7	0.19
17.7	3.75				
17.7	4.36				
41.1	3.66	41.1	0.21	41.1	0.21
41.1	3.55				
41.1	3.92				
61.7	2.17	61.7	0.16	61.7	0.09
61.7	2.33				
61.7	2.05				
81.1	0.93	81.1	0.19	81.1	0.09
81.1	0.92				
81.1	1.02				
102.1	0.79	102.1	0.21	102.1	0.10
102.1	0.64				
102.1	0.67				

Sediment Trap Estimated Particle Fluxes

Depth (m)	Sample #	Mass ($mg/m^2/d$)	Total Carbon (mg $C/m^2/d$)	Organic Carbon (mg $C/m^2/d$)	Nitrogen (mg $N/m^2/d$)
150	1	60.73	19.13		3.29
150[1]	1			17.27	3.09
150	2	75.07	19.90		3.01
150[1]	2			15.59	2.81
200	4	58.20	14.83		1.64
200[1]	4			12.62	1.99
200	5	69.16	18.36		2.82
200[1]	5			13.67	2.37
300	7	57.35	19.01		2.55
300[1]	7			17.90	2.66
300	8	53.98	17.28		1.91
300[1]	8			14.78	1.48
400	10	30.36	5.94		0.51
400[1]	11	24.46		5.25	0.67

1. Subsample acidified to remove carbonates.

Cruise Report, BATS 5

Cruise dates: February 17-21, 1989
Personnel: R.L. Sherriff-Dow, P. Wassmann, R. Johnson, M. Tuel, L. Mallini, M. Tracy.
R.V. Cape Henlopen

February 17, 1989

1200 Depart BBSR

1700 Arrive at BATS Station.

1733 Traps deployed. Seas calm, 2-4'. Lat: 31.679 N; Long: 64.202 W

CTD **Cast 1**: 1746-2145, Lat: 31.650 N; Long: 64.214 W
Nominal depths: 2000, 2200, 2400, 2600, 2800, 3000, 3200, 3400, 3600, 3800, 4000, 4200 m.
4000 m bottle did not close. Spigot on bottle 8 (2600 m) leaking on recovery.

Samples:
11 oxygen - duplicates
11 salinities
11 NO_3, PO_4, SiO_2

February 18, 1989

Cast 2: 0920-1030, Lat: 31.654 N; Long. 64.344 W
Seas: Calm, 2-4' swells. Wind: SE at 10 knots
Nominal depths: 300, 300, 400, 500, 500, 600, 750, 750, 800, 900, 1000, 1000 m.
Niskin #12 (300m) dropped and sample compromised, drew salinity sample, discard remainder.

Samples:
11 oxygen - duplicates
12 salinities
11 NO_3, PO_4, SiO_2

1230 Light cast for primary production depths.

February 19, 1989

Primary Production Cast 0330 Deploy production array before dawn.

CTD **Cast 3**, 0-1800m
0705-0920, Lat: 31.650 N; Long:64.552 W
Seas calm, 2-4 ft., winds from SSE at 15-20 knots

0900 Retrieve CTD. 5 bottles not fired because of water in a connector. The 7 bottles that were fired correctly were removed to wet lab.

0945 Send CTD back down for 5 missed bottles.

Seas: calm, 2-4' swell. Wind: SSE at 15-20 knots
Nominal Depths: 1, 20, 30 46, 75, 100, 151, 202, 1200, 1400, 1600, 1800 m.

Samples:
12 oxygen - duplicates
12 salinities
12 NO_3, PO_4, SiO_2
8 PON/ POC

Attempt to run oxygen samples at sea. Cast 1 run. Seas pick up and we had to stop.

CTD **Cast 4:** 1430-1450, Lat: 31.715 N; Long: 64.608 W
Seas: Calm, 2-4'
Nominal Depths: 3, 10, 20, 25, 30, 35, 46, 87, 101, 150, 200, 250 m.

Samples:
12 oxygen - duplicates
12 salinities
12 NO_3, PO_4, SiO_2
12 PON/ POC

1830 Retrieve *in situ* primary productivity array.

February 20, 1989

CTD **Cast 5** 0-300m
1230-1255, Lat: 31.706 N; Long: 64.837 W
Nominal Depths: 3, 10, 20, 25, 30, 46, 86, 99, 150, 175, 201, 301 m.

Samples:
12 Chlor. a
12 CO_2 - Brewer

1728 Retrieve sediment traps. Lat: 31.693 N; Long: 64.883 W

February 21, 1989

0730 Return to BBSR

CTD Sensor Corrections to Bottle Data for BATS 5:

On BATS 3 through BATS 7 cruises on the R.V. Cape Henlopen, a Neil Brown Mark-IIIB CTD system was used as per the University of Delaware, normal operating procedures. They applied a single correction factor for salinity on all CTD casts on these cruises. This correction factors are detailed below. They also applied a 7.5 db correction to all pressure measurements to correct a 7.5 db negative offset in the Neil Brown pressure sensor. CTD Oxygen corrections were performed at BBSR using the CTD oxygen and the bottle measurements as per the standard BATS method.

Salinity:

$$DS = \sum_{i=0}^{n} R_i C^i$$

MS = SC + DS

Where:

DS = Wet Salinity - CTD Salinity
R_i = regression coefficients
C = conductivity backcalculated from bottle salinity measurement (milliMohs)
n = order of the polynomial function
MS = modified salinity
SC = uncorrected salinity

$R_\emptyset$ = 0.104304
R_1 = -0.00623
R_2 = 4.2427E-05

Oxygen:

$$DO = R_0 + \sum_{i=1}^{l} A_i \frac{P^i}{4300} + \sum_{i=1}^{m} B_i \frac{OC^i}{300}$$

MO=OC+300 x DO

Where:

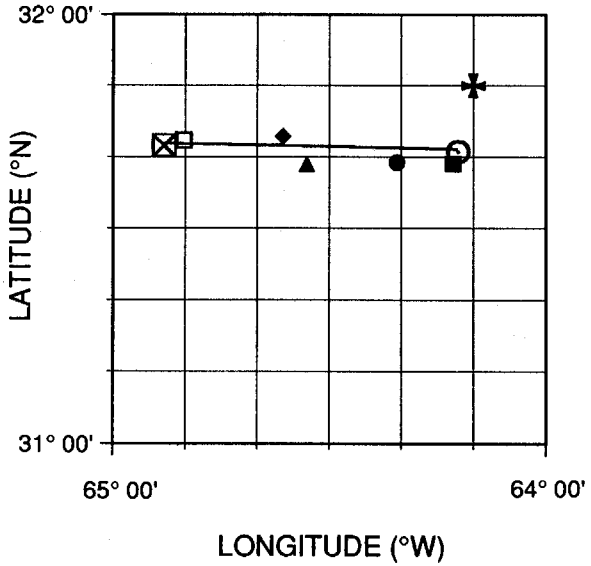
DO = (wet oxygens-CTD oxygen)/300
OC = uncorrected CTD oxygen (µmole/kg)
P = pressure (dbar)
MO = modified CTD oxygen (µmole/kg)
l = 4; m = 2
$R_\emptyset$, A_i, B_i = regression coefficients

$R_\emptyset$ = -6551590e-01
A_1 = -4.6202522e-01
A_2 = 1.6869262e+01
A_3 = -1.5323348e+02

A_4 = 3.5111587e+02
B_1 = 1.4235140e+00
B_2 = -1.346264e+00

model correlation coefficient = 9.976e-01
standard deviation of model residuals = 2.020e+00 µmole/kg

BATS 5—Cast Positions



BATS 5, CTD Cast 1
17 February, 1989; Start 17:46; End 21:45
Lat: 31.650 N; Long: 64.214 W

Depth (m)	Pres (db)	Temp (°C)	Pot.T (°C)	CTD Sal (ppt)	Sigma-t (kg/m^3)	CTD 0_2 (µmole/kg)	0_2 Anom (µmole/kg)	BAC (m^{-1})	PAR ($\mu E/m^2/s$)	Fluor (rfu)
3.0	3.0	19.719	19.718	36.636	26.086	238.42	14.91			
10.0	10.1	19.597	19.596	36.628	26.113	239.12	15.10			
20.0	20.1	19.485	19.481	36.626	26.141	237.09	12.60			
30.0	30.2	19.424	19.419	36.619	26.152	235.38	10.64			
40.0	40.3	19.393	19.386	36.615	26.158	234.43	9.56			
50.0	50.4	19.389	19.379	36.616	26.159	233.52	8.62			
60.0	60.4	19.389	19.378	36.617	26.161	233.54	8.65			
70.0	70.5	19.391	19.378	36.617	26.161	233.37	8.49			
80.0	80.6	19.392	19.377	36.617	26.161	233.34	8.46			
90.0	90.6	19.393	19.376	36.617	26.161	232.75	7.87			
100.0	100.7	19.395	19.376	36.618	26.162	232.83	7.96			
110.0	110.8	19.389	19.369	36.617	26.163	233.14	8.25			
120.0	120.9	19.389	19.367	36.617	26.164	233.26	8.37			
130.0	131.0	19.392	19.368	36.617	26.164	232.75	7.88			
140.0	141.0	19.394	19.368	36.618	26.164	232.46	7.59			
150.0	151.1	19.396	19.368	36.618	26.164	232.41	7.55			
160.0	161.2	19.397	19.368	36.618	26.164	233.01	8.16			
170.0	171.3	19.399	19.368	36.618	26.164	233.22	8.37			
180.0	181.3	19.400	19.367	36.618	26.165	233.15	8.30			
190.0	191.4	19.399	19.364	36.618	26.165	232.89	8.04			
200.0	201.5	19.400	19.363	36.618	26.166	232.45	7.61			
210.0	211.6	19.400	19.361	36.618	26.166	232.94	8.09			
220.0	221.7	19.399	19.358	36.618	26.167	233.37	8.52			
230.0	231.7	19.343	19.300	36.614	26.179	233.17	8.08			
240.0	241.8	19.236	19.192	36.612	26.206	232.32	6.79			
250.0	251.9	19.195	19.149	36.607	26.213	231.63	5.92			
275.0	277.1	19.072	19.021	36.593	26.235	231.40	5.16			
300.0	302.3	18.843	18.789	36.573	26.279	228.28	1.05			
325.0	327.5	18.563	18.504	36.554	26.337	223.18	-5.26			
350.0	352.7	18.438	18.375	36.544	26.362	222.35	-6.64			
375.0	378.0	18.293	18.225	36.527	26.387	221.06	-8.59			
400.0	403.2	18.124	18.052	36.505	26.413	219.52	-10.89			
425.0	428.4	17.909	17.834	36.475	26.445	218.23	-13.15			
450.0	453.6	17.690	17.611	36.447	26.478	217.58	-14.81			
475.0	478.9	17.639	17.556	36.440	26.486	215.96	-16.65			
500.0	504.1	17.448	17.361	36.416	26.516	215.41	-18.09			
550.0	554.6	16.867	16.773	36.318	26.582	209.82	-26.44			
600.0	605.1	16.044	15.944	36.168	26.660	192.97	-47.32			
650.0	655.6	15.163	15.058	36.020	26.746	186.51	-58.22			
700.0	706.1	14.074	13.966	35.843	26.846	176.97	-73.45			
750.0	756.6	12.782	12.673	35.649	26.962	162.72	-94.74			
800.0	807.2	11.602	11.492	35.481	27.060	150.29	-113.92			
850.0	857.7	9.867	9.760	35.264	27.199	147.07	-127.59			
900.0	908.3	8.786	8.678	35.166	27.300	154.65	-126.85			
950.0	958.9	8.026	7.917	35.135	27.393	163.30	-123.11			
1000.0	1009.4	6.928	6.821	35.089	27.514	181.16	-112.63			
1050.0	1060.0	6.265	6.157	35.078	27.594	194.75	-103.63			
1100.0	1110.7	5.877	5.766	35.082	27.647	206.75	-94.36			
1150.0	1161.3	5.461	5.347	35.058	27.680	218.95	-85.19			
1200.0	1211.9	5.386	5.268	35.078	27.706					
1300.0	1313.2	4.950	4.823	35.058	27.742					

Depth (m)	Pres (db)	Temp (°C)	Pot.T (°C)	CTD Sal (ppt)	Sigma-t (kg/m^3)	CTD 0_2 (μmole/kg)	0_2 Anom (μmole/kg)	BAC (m^{-1})	PAR ($\mu E/m^2/s$)	Fluor (rfu)
1400.0	1414.6	4.502	4.368	35.017	27.760					
1500.0	1516.0	4.300	4.157	35.004	27.773					
1600.0	1617.4	4.135	3.981	34.994	27.783					
1700.0	1718.9	4.036	3.872	34.988	27.790					
1800.0	1820.5	3.943	3.767	34.986	27.799					
1900.0	1922.1	3.866	3.679	34.990	27.811					
2000.0	2023.7	3.813	3.613	34.998	27.824					
2100.0	2125.4	3.740	3.528	35.004	27.838					
2200.0	2227.2	3.609	3.386	34.998	27.847					
2300.0	2328.9	3.499	3.264	34.992	27.854					
2400.0	2430.8	3.370	3.123	34.983	27.860					
2500.0	2532.7	3.240	2.981	34.974	27.866					
2600.0	2634.6	3.123	2.852	34.965	27.871					
2700.0	2736.6	3.032	2.748	34.957	27.874					
2800.0	2838.6	2.932	2.635	34.951	27.879					
2900.0	2940.7	2.820	2.510	34.944	27.884					
3000.0	3042.8	2.733	2.410	34.940	27.890					
3100.0	3144.9	2.660	2.323	34.937	27.895					
3200.0	3247.2	2.580	2.228	34.934	27.900					
3300.0	3349.4	2.487	2.122	34.929	27.905					
3400.0	3451.7	2.408	2.028	34.924	27.909					
3500.0	3554.1	2.354	1.959	34.921	27.911					
3600.0	3656.5	2.306	1.895	34.918	27.914					
3700.0	3758.9	2.277	1.850	34.916	27.916					
3800.0	3861.4	2.254	1.810	34.913	27.917					
3900.0	3964.0	2.235	1.774	34.912	27.919					
4000.0	4066.5	2.222	1.744	34.910	27.920					
4100.0	4169.2	2.217	1.721	34.908	27.920					
4200.0	4271.8	2.217	1.703	34.908	27.921					

BATS 5, CTD Cast 2
18 February, 1989; Start 09:20; End10:55
Lat: 31.654 N; Long: 64.344 W

Depth (m)	Pres (db)	Temp (°C)	Pot.T (°C)	CTD Sal (ppt)	Sigma-t (kg/m^3)	CTD 0_2 (μmole/kg)	0_2 Anom (μmole/kg)	BAC (m^{-1})	PAR ($\mu E/m^2/s$)	Fluor (rfu)
3.0	3.0	19.567	19.566	36.641	26.130					
10.0	10.1	19.525	19.523	36.636	26.137					
20.0	20.1	19.474	19.470	36.629	26.146					
30.0	30.2	19.448	19.442	36.624	26.150					
40.0	40.3	19.436	19.428	36.624	26.153					
50.0	50.4	19.405	19.396	36.620	26.158					
60.0	60.4	19.391	19.380	36.619	26.162					
70.0	70.5	19.388	19.375	36.618	26.162					
80.0	80.6	19.387	19.372	36.617	26.162					
90.0	90.6	19.388	19.371	36.617	26.163					
100.0	100.7	19.385	19.367	36.616	26.163					
110.0	110.8	19.386	19.365	36.616	26.163					
120.0	120.9	19.384	19.362	36.615	26.164					
130.0	131.0	19.385	19.361	36.615	26.164					
140.0	141.0	19.384	19.358	36.615	26.164					
150.0	151.1	19.383	19.356	36.615	26.165					
160.0	161.2	19.378	19.348	36.614	26.166					

Depth (m)	Pres (db)	Temp (°C)	Pot.T (°C)	CTD Sal (ppt)	Sigma-t (kg/m^3)	CTD 0_2 (µmole/kg)	0_2 Anom (µmole/kg)	BAC (m^{-1})	PAR ($\mu E/m^2/s$)	Fluor (rfu)
170.0	171.3	19.380	19.348	36.614	26.166					
180.0	181.3	19.375	19.341	36.613	26.168					
190.0	191.4	19.348	19.313	36.612	26.174					
200.0	201.5	19.299	19.262	36.611	26.187					
210.0	211.6	19.267	19.228	36.609	26.194					
220.0	221.7	19.228	19.188	36.607	26.203					
230.0	231.7	19.191	19.149	36.605	26.211					
240.0	241.8	19.141	19.097	36.597	26.219					
250.0	251.9	19.012	18.966	36.577	26.237					
275.0	277.1	18.930	18.879	36.575	26.258					
300.0	302.3	18.795	18.741	36.568	26.288					
325.0	327.5	18.544	18.486	36.548	26.337					
350.0	352.7	18.434	18.371	36.538	26.359					
375.0	378.0	18.268	18.201	36.518	26.386					
400.0	403.2	18.111	18.040	36.498	26.411					
425.0	428.4	17.901	17.826	36.469	26.442					
450.0	453.6	17.636	17.557	36.433	26.481					
475.0	478.9	17.445	17.362	36.412	26.512					
500.0	504.1	17.231	17.144	36.379	26.539					
550.0	554.6	16.647	16.554	36.268	26.595					
600.0	605.1	15.829	15.730	36.126	26.677					
650.0	655.6	14.770	14.667	35.945	26.775					
700.0	706.1	13.499	13.394	35.748	26.892					
750.0	756.6	12.403	12.296	35.588	26.990					
800.0	807.2	11.333	11.225	35.436	27.075					
850.0	857.7	10.013	9.905	35.275	27.184					
900.0	908.3	8.978	8.870	35.172	27.274					
950.0	958.9	8.189	8.079	35.132	27.366					
1000.0	1009.4	7.251	7.142	35.091	27.471					

BATS 5, CTD Cast 3
19 February, 1989; Start 07:05; End 09:20
Lat: 31.650 N; Long: 64.552 W

Depth (m)	Pres (db)	Temp (°C)	Pot.T (°C)	CTD Sal (ppt)	Sigma-t (kg/m^3)	CTD 0_2 (µmole/kg)	0_2 Anom (µmole/kg)	BAC (m^{-1})	PAR ($\mu E/m^2/s$)	Fluor (rfu)
3.0	3.0	20.233	20.232	36.640	25.953			0.466		
10.0	10.1	20.234	20.232	36.639	25.952			0.463		
20.0	20.1	20.085	20.082	36.629	25.984			0.476		
30.0	30.2	19.686	19.681	36.630	26.092			0.504		
40.0	40.3	19.518	19.511	36.621	26.129			0.510		
50.0	50.4	19.477	19.467	36.617	26.138			0.496		
60.0	60.4	19.425	19.414	36.614	26.149			0.466		
70.0	70.5	19.413	19.400	36.613	26.152			0.454		
80.0	80.6	19.400	19.386	36.612	26.155			0.443		
90.0	90.6	19.397	19.380	36.611	26.156			0.441		
100.0	100.7	19.391	19.373	36.610	26.157			0.438		
110.0	110.8	19.389	19.369	36.609	26.157			0.440		
120.0	120.9	19.388	19.366	36.609	26.158			0.440		
130.0	131.0	19.382	19.358	36.607	26.158			0.435		
140.0	141.0	19.384	19.358	36.607	26.158			0.436		
150.0	151.1	19.386	19.358	36.607	26.158			0.438		
160.0	161.2	19.387	19.357	36.606	26.158			0.436		

Depth (m)	Pres (db)	Temp (°C)	Pot.T (°C)	CTD Sal (ppt)	Sigma-t (kg/m^3)	CTD 0_2 (μmole/kg)	0_2 Anom (μmole/kg)	BAC (m^{-1})	PAR ($\mu E/m^2/s$)	Fluor (rfu)
170.0	171.3	19.386	19.355	36.607	26.159			0.435		
180.0	181.3	19.355	19.322	36.606	26.167			0.431		
190.0	191.4	19.304	19.269	36.604	26.179			0.429		
200.0	201.5	19.278	19.241	36.603	26.185			0.426		
210.0	211.6	19.239	19.200	36.600	26.194			0.426		
220.0	221.7	19.210	19.169	36.598	26.200			0.425		
230.0	231.7	19.175	19.133	36.593	26.206			0.425		
240.0	241.8	19.073	19.029	36.576	26.220			0.425		
250.0	251.9	19.032	18.986	36.575	26.230			0.424		
275.0	277.1	18.943	18.893	36.568	26.249			0.422		
300.0	302.3	18.720	18.665	36.552	26.295			0.420		
325.0	327.5	18.519	18.461	36.539	26.337			0.419		
350.0	352.7	18.388	18.325	36.527	26.362			0.419		
375.0	378.0	18.232	18.165	36.505	26.385			0.418		
400.0	403.2	18.076	18.004	36.483	26.409			0.416		
425.0	428.4	17.945	17.869	36.469	26.431			0.417		
450.0	453.6	17.702	17.622	36.435	26.466			0.418		
475.0	478.9	17.485	17.402	36.403	26.495			0.418		
500.0	504.1	17.233	17.147	36.363	26.526			0.419		
550.0	554.6	16.569	16.476	36.247	26.598			0.420		
600.0	605.1	15.545	15.447	36.068	26.697			0.421		
650.0	655.6	14.512	14.410	35.902	26.797			0.423		
700.0	706.1	13.674	13.568	35.768	26.872			0.422		
750.0	756.6	12.635	12.526	35.617	26.966			0.422		
800.0	807.2	11.260	11.152	35.418	27.074			0.424		
850.0	857.7	10.082	9.974	35.274	27.171			0.426		
900.0	908.3	8.719	8.612	35.155	27.302			0.427		
950.0	958.9	7.988	7.879	35.122	27.388			0.424		
1000.0	1009.4	7.129	7.021	35.079	27.479			0.425		
1050.0	1060.0	6.396	6.286	35.061	27.564			0.424		
1100.0	1110.7	5.678	5.568	35.034	27.634			0.424		
1150.0	1161.3	5.372	5.259	35.029	27.668			0.426		
1200.0	1211.9	5.132	5.016	35.026	27.694			0.428		
1300.0	1313.2	4.746	4.621	35.005	27.723			0.429		
1400.0	1414.6	4.467	4.334	34.992	27.744			0.426		
1500.0	1516.0	4.311	4.168	34.984	27.756			0.426		
1600.0	1617.4	4.270	4.115	34.996	27.771			0.419		
1700.0	1718.9	4.124	3.958	34.993	27.785			0.419		
1800.0	1820.5	3.997	3.820	34.989	27.796			0.416		

BATS 5, CTD Cast 4
19 February, 1989; Start 14:30; End 14:50
Lat: 31.715 N; Long: 64.608 W

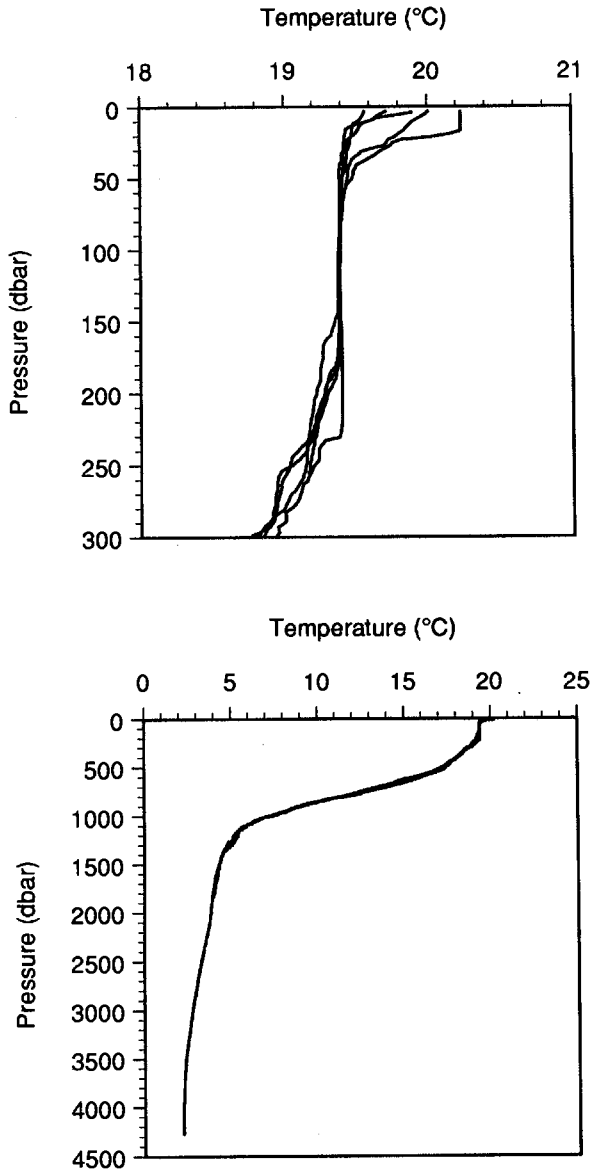
Depth (m)	Pres (db)	Temp (°C)	Pot.T (°C)	CTD Sal (ppt)	Sigma-t (kg/m^3)	CTD 0_2 (μmole/kg)	0_2 Anom (μmole/kg)	BAC (m^{-1})	PAR ($\mu E/m^2/s$)	Fluor (rfu)
4.0	4.0	19.899	19.898	36.623	26.029			0.524		
10.0	10.1	19.596	19.595	36.614	26.102			0.588		
20.0	20.1	19.429	19.425	36.613	26.146			0.576		
30.0	30.2	19.419	19.413	36.612	26.148			0.530		
40.0	40.3	19.417	19.410	36.611	26.148			0.508		
50.0	50.4	19.411	19.402	36.609	26.149			0.482		
60.0	60.4	19.406	19.395	36.608	26.150			0.481		

Depth (m)	Pres (db)	Temp (°C)	Pot.T (°C)	CTD Sal (ppt)	Sigma-t (kg/m^3)	CTD O_2 (μmole/kg)	O_2 Anom (μmole/kg)	BAC (m^{-1})	PAR (μE/m^2/s)	Fluor (rfu)
70.0	70.5	19.402	19.389	36.607	26.150			0.465		
80.0	80.6	19.397	19.382	36.606	26.151			0.453		
90.0	90.6	19.388	19.372	36.604	26.152			0.434		
100.0	100.7	19.380	19.362	36.603	26.154			0.424		
110.0	110.8	19.377	19.357	36.603	26.156			0.422		
120.0	120.9	19.376	19.354	36.602	26.156			0.423		
130.0	131.0	19.377	19.353	36.602	26.156			0.424		
140.0	141.0	19.379	19.353	36.602	26.156			0.423		
150.0	151.1	19.381	19.353	36.602	26.156			0.424		
160.0	161.2	19.381	19.352	36.602	26.156			0.423		
170.0	171.3	19.374	19.343	36.598	26.156			0.422		
180.0	181.3	19.359	19.326	36.594	26.157			0.419		
190.0	191.4	19.313	19.278	36.595	26.170			0.417		
200.0	201.5	19.277	19.240	36.594	26.179			0.417		
210.0	211.6	19.254	19.215	36.596	26.187			0.417		
220.0	221.7	19.230	19.190	36.595	26.193			0.415		
230.0	231.7	19.208	19.166	36.593	26.198			0.415		
240.0	241.8	19.190	19.146	36.593	26.203			0.415		
250.0	251.9	19.173	19.127	36.593	26.208			0.415		

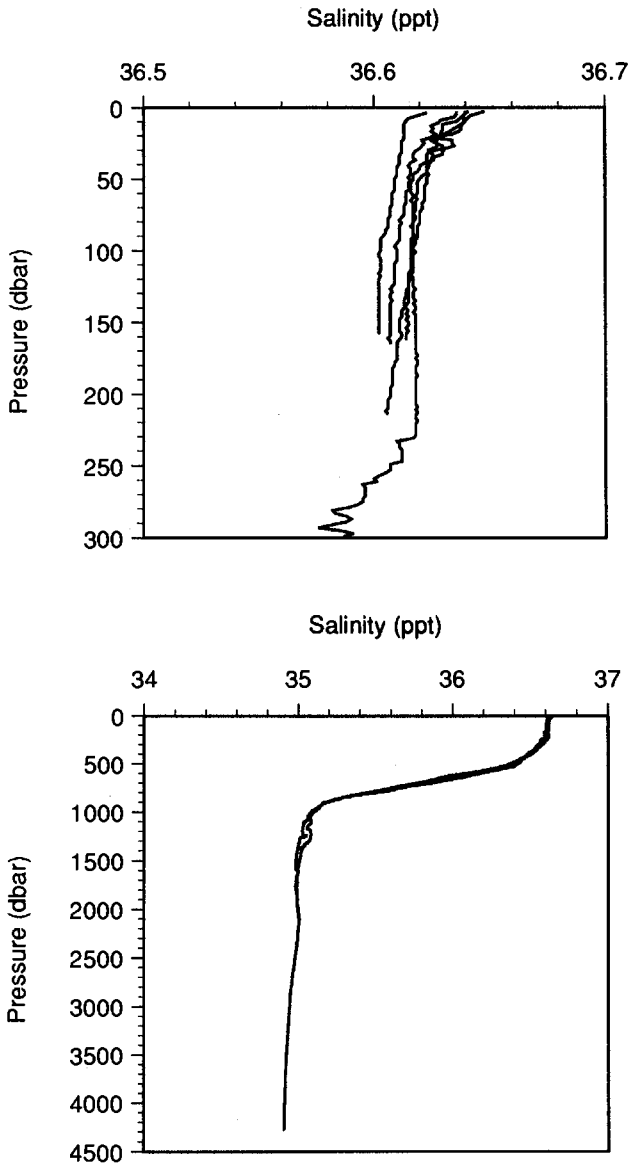
BATS 5, CTD Cast 5
20 February, 1989; Start 12:30; End 12:55
Lat: 31.706 N; Long: 64.837 W

Depth (m)	Pres (db)	Temp (°C)	Pot.T (°C)	CTD Sal (ppt)	Sigma-t (kg/m^3)	CTD O_2 (μmole/kg)	O_2 Anom (μmole/kg)	BAC (m^{-1})	PAR (μE/m^2/s)	Fluor (rfu)
3.0	3.0	20.014	20.013	36.648	26.017			0.549		
10.0	10.1	19.908	19.906	36.639	26.039			0.551		
20.0	20.1	19.788	19.784	36.628	26.063			0.572		
30.0	30.2	19.573	19.568	36.627	26.119			0.575		
40.0	40.3	19.463	19.456	36.623	26.145			0.561		
50.0	50.4	19.445	19.435	36.623	26.150			0.535		
60.0	60.4	19.422	19.411	36.622	26.156			0.503		
70.0	70.5	19.408	19.395	36.621	26.159			0.468		
80.0	80.6	19.396	19.382	36.620	26.162			0.451		
90.0	90.6	19.386	19.370	36.619	26.165			0.442		
100.0	100.7	19.381	19.363	36.617	26.165			0.438		
110.0	110.8	19.382	19.362	36.616	26.164			0.432		
120.0	120.9	19.381	19.359	36.616	26.165			0.430		
130.0	131.0	19.380	19.356	36.614	26.164			0.428		
140.0	141.0	19.374	19.348	36.612	26.165			0.427		
150.0	151.1	19.349	19.321	36.611	26.171			0.425		
160.0	161.2	19.310	19.281	36.611	26.182			0.424		
170.0	171.3	19.269	19.237	36.610	26.192			0.425		
180.0	181.3	19.254	19.221	36.608	26.195			0.424		
190.0	191.4	19.248	19.213	36.608	26.197			0.424		
200.0	201.5	19.222	19.185	36.607	26.203			0.424		
210.0	211.6	19.199	19.160	36.605	26.209			0.424		
220.0	221.7	19.178	19.137	36.605	26.214			0.423		
230.0	231.7	19.163	19.121	36.604	26.218			0.423		
240.0	241.8	19.151	19.107	36.603	26.221			0.422		
250.0	251.9	19.144	19.098	36.601	26.221			0.422		
275.0	277.1	19.009	18.959	36.578	26.240			0.420		
300.0	302.3	18.829	18.774	36.557	26.271			0.420		

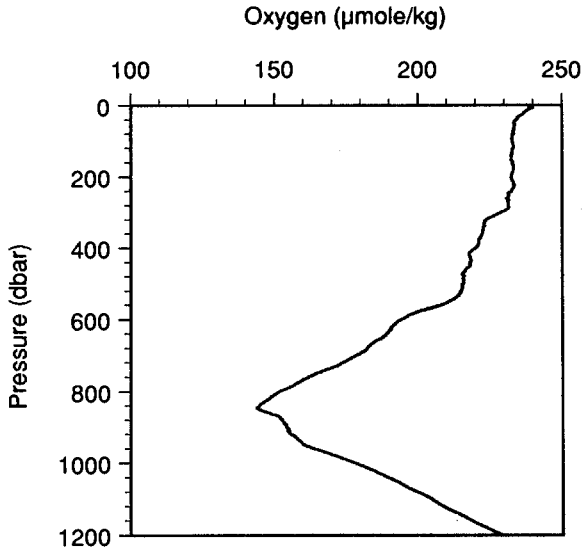
BATS 5—CTD Temperature Profile



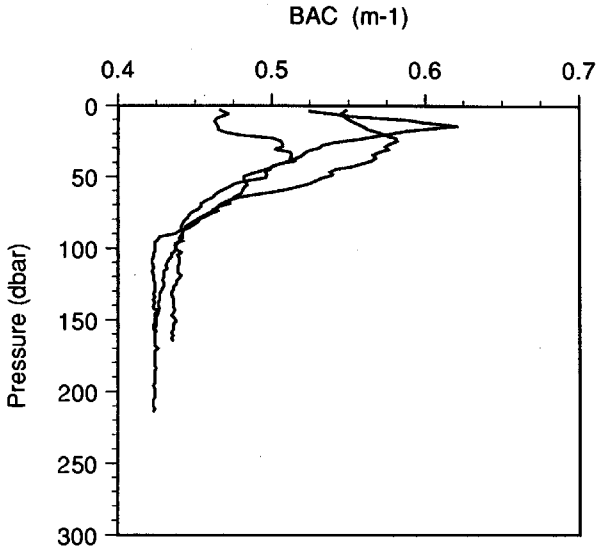
BATS 5—CTD Salinity Profile



BATS 5—CTD Oxygen Profile



BATS 5—CTD BAC Profile



BATS 5—Bottle Data
February 17-21, 1989
Physical Parameters

Bottle ID	Depth (m)	Pressure (db)	Temp (°C)	Pot. Temp (°C)	Salinity (ppt)	Sigma-t (kg/m^3)
G0504N10	3.3	3.3	19.928	19.927	36.621	26.019
G0504N09	17.7	17.8	19.438	19.435	36.612	26.142
G0504N08	28.1	28.3	19.421	19.416	36.615	26.149
G0504N07	32.3	32.5	19.419	19.413	36.611	26.147
G0504G02	38.2	38.5	19.417	19.410	36.619	26.154
G0504N06	42.5	42.8	19.416	19.408	36.613	26.150
G0504N05	53.8	54.2	19.413	19.403	36.615	26.153
G0504N04	93.7	94.4	19.389	19.372	36.662	26.197
G0504G01	107.4	108.2	19.377	19.357	36.610	26.161
G0504N03	156.9	158.1	19.381	19.352	36.610	26.162
G0504N02	205.3	206.8	19.265	19.227	36.608	26.193
G0504N01	254.9	256.8	19.164	19.117	36.603	26.218
G0505N10	4.3	4.3	20.007			
G0505N09	16.6	16.7	19.851			
G0505N08	27.6	27.8	19.733			
G0505N07	32.2	32.4	19.528			
G0505G02	37.2	37.4	19.503			
G0505N06	53.1	53.5	19.442			
G0505N05	93.0	93.7	19.385			
G0505N04	105.4	106.2	19.382			
G0505G01	156.2	157.4	19.340			
G0505N03	179.8	181.1	19.263			
G0505N02	206.8	208.3	19.205			
G0505N01	308.3	310.7	18.755			
G0502N10	306.4	308.8	18.729	18.673	36.560	26.299
G0502N09	305.5	307.9	18.735	18.680	36.567	26.303
G0502N08	409.5	412.8	18.104	18.031	36.497	26.413
G0502N07	507.7	511.9	17.302	17.214	36.390	26.531
G0502G02	508.6	512.8	17.303	17.215	36.392	26.532
G0502N06	607.9	613.0	15.941	15.840	36.147	26.668
G0502N05	760.0	766.7	12.304	12.196	35.578	27.001
G0502N04	758.1	764.8	12.337	12.229	35.587	27.001
G0502G01	808.4	815.6	11.121	11.012	35.419	27.100
G0502N03	907.1	915.4	8.811	8.703	35.170	27.299
G0502N02	1005.6	1015.1	7.123	7.014	35.103	27.498
G0502N01	1006.8	1016.3	7.106	6.997	35.112	27.508
G0503N10	3.0	3.0	19.879	19.878	36.626	26.036
G0503N09	26.6	26.8	19.605	19.600	36.616	26.102
G0503N08	37.8	38.1	19.482	19.475	36.610	26.130
G0503N07	52.9	53.3	19.415	19.405	36.611	26.149
G0503G02	80.3	80.9	19.399	19.384	36.609	26.153
G0503N06	106.9	107.7	19.389	19.369	36.638	26.179
G0503N05	156.7	157.9	19.387	19.358	36.612	26.162
G0503N04	206.3	207.8	19.256	19.218	36.623	26.207
G0503G01	1208.5	1220.5	5.133	5.016	35.033	27.700
G0503N03	1407.7	1422.4	4.478			
G0503N02	1608.9	1626.4	4.252	4.096	35.008	27.783
G0503N01	1808.9	1829.5	3.987	3.810	34.995	27.802

Bottle ID	Depth (m)	Pressure (db)	Temp (°C)	Pot. Temp (°C)	Salinity (ppt)	Sigma-t (kg/m^3)
G0501N09	2006.1	2029.9	3.822	3.621	34.987	27.815
G0501N08	2207.0	2234.2	3.627	3.403	34.987	27.837
G0501N07	2408.8	2439.7	3.396	3.147	34.976	27.852
G0501G02	2609.6	2644.3	3.138	2.865	34.955	27.862
G0501N06	2805.2	2843.9	2.956	2.658	34.944	27.871
G0501N05	3005.9	3048.8	2.716	2.392	34.931	27.884
G0501N04	3207.2	3254.5	2.559			
G0501G01	3408.3	3460.2	2.388	2.007	34.910	27.899
G0501N03	3606.9	3663.5	2.305	1.893	34.895	27.896
G0501N02	3808.1	3869.7	2.253	1.808	34.890	27.899
G0501N01	4188.8	4260.3	2.217	1.705	34.910	27.923

BATS 5—Bottle Data
February 17-21, 1989
Gases

Bottle ID	Depth (m)	$O_2(1)$ (µmole/kg)	$O_2(2)$ (µmole/kg)	$O_2(1)$ anomaly (µmole/kg)	$O_2(2)$ anomaly (µmole/kg)	TCO_2 (µmole/kg)
G0504N10	3.3		239.87		15.95	
G0504N09	17.7	241.14	239.84	15.10	13.79	
G0504N08	28.1	237.23	237.23	11.15	11.15	
G0504N07	32.3	236.80	237.67	10.71	11.58	
G0504G02	38.2	235.93	237.23	9.86	11.16	
G0504N06	42.5	234.63	235.93	8.56	9.86	
G0504N05	53.8	232.02		5.97		
G0504N04	93.7	233.32		7.35		
G0504G01	107.4	232.89		6.83		
G0504N03	156.9	233.76	232.89	7.86	6.99	
G0504N02	205.3	229.85	230.71	3.57	4.44	
G0504N01	254.9		232.01		5.44	
G0505N10	4.3					2028.1
G0505N09	16.6					2025.7
G0505N08	27.6					2029.1
G0505N07	32.2					2029.6
G0505G02	37.2					2032.1
G0505N06	53.1					2036.7
G0505N05	93.0					2037.0
G0505N04	105.4					2041.4
G0505G01	156.2					2040.7
G0505N03	179.8					2058.9
G0505N02	206.8					
G0505N01	308.3					

Bottle ID	Depth (m)	$O_2(1)$ (µmole/kg)	$O_2(2)$ (µmole/kg)	$O_2(1)$ anomaly (µmole/kg)	$O_2(2)$ anomaly (µmole/kg)	TCO_2 (µmole/kg)
G0502N10	306.4					
G0502N09	305.5	217.66		-10.64		
G0502N08	409.5		212.00		-18.70	
G0502N07	507.7					
G0502G02	508.6		208.94		-24.79	
G0502N06	607.9		184.17		-54.74	
G0502N05	760.0	162.43		-89.66		
G0502N04	758.1	162.00		-89.97		
G0502G01	808.4		149.83		-106.59	
G0502N03	907.1	155.89	156.33	-109.68	-109.25	
G0502N02	1005.6		184.52		-88.68	
G0502N01	1006.8	184.95		-88.31		
G0503N10	3.0		237.26		13.13	
G0503N09	26.6		238.55		13.26	
G0503N08	37.8		235.50		9.70	
G0503N07	52.9	231.15		5.10		
G0503G02	80.3	232.46		6.41		
G0503N06	106.9		231.15		5.18	
G0503N05	156.7	233.76		7.88		
G0503N04	206.3	228.54		2.25		
G0503G01	1208.5	235.26	234.83	-48.80	-49.24	
G0503N03	1407.7	254.34	254.78			
G0503N02	1608.9	259.98	259.11	-29.11	-29.98	
G0503N01	1808.9	263.45		-27.18		
G0501N09	2006.1	264.31	264.31	-27.20	-27.20	
G0501N08	2207.0	263.44	263.87	-29.25	-28.82	
G0501N07	2408.8	262.13	263.00	-32.15	-31.28	
G0501G02	2609.6	263.86	264.73	-32.38	-31.51	
G0501N06	2805.2	264.72		-32.94		
G0501N05	3005.9	271.23	269.49	-28.48	-30.22	
G0501N04	3207.2	268.18	269.48			
G0501G01	3408.3		268.61		-34.15	
G0501N03	3606.9	266.88	268.18	-36.79	-35.49	
G0501N02	3808.1	269.04	267.31	-35.29	-37.02	
G0501N01	4188.8	263.40	263.83	-41.71	-41.27	

BATS 5—Bottle Data
February 17-21, 1989
Nutrients

Bottle ID	Depth (m)	Nitrate+Nitrite (μmole/kg)	Phosphate (μmole/kg)	Silicate (μmole/kg)
G0504N10	3.3	0.18	0.00	2.60
G0504N09	17.7	0.30	0.03	1.08
G0504N08	28.1	0.38	0.00	0.92
G0504N07	32.3	0.53	0.00	1.07
G0504G02	38.2	0.58	0.00	0.79
G0504N06	42.5	0.62	0.00	0.90
G0504N05	53.8	0.60	0.00	1.06
G0504N04	93.7	0.85	0.00	0.97
G0504G01	107.4	0.96	0.03	0.91
G0504N03	156.9	0.93	0.03	0.95
G0504N02	205.3	1.32	0.05	0.92
G0504N01	254.9	1.31	0.04	0.92
G0502N10	306.4			
G0502N09	305.5	2.89	0.14	1.08
G0502N08	409.5	4.20	0.19	1.54
G0502N07	507.7	5.98	0.23	1.82
G0502G02	508.6	5.87	0.24	1.90
G0502N06	607.9	9.91	0.48	3.33
G0502N05	760.0	18.27	1.10	8.38
G0502N04	758.1	17.93	1.10	8.22
G0502G01	808.4	20.80	1.29	10.27
G0502N03	907.1	23.26	1.47	13.78
G0502N02	1005.6	21.63	1.44	13.01
G0502N01	1006.8	21.97	1.42	13.44
G0503N10	3.0	0.18	0.05	0.84
G0503N09	26.6	0.19	0.01	0.78
G0503N08	37.8	0.41	0.04	0.93
G0503N07	52.9	0.78	0.03	0.91
G0503G02	80.3	0.89	0.03	0.91
G0503N06	106.9	0.11	0.04	0.71
G0503N05	156.7	0.32	0.02	0.92
G0503N04	206.3	0.96	0.04	0.90
G0503G01	1208.5	18.48	1.23	11.47
G0503N03	1407.7	17.87	1.16	11.22
G0503N02	1608.9	17.25	1.12	11.22
G0503N01	1808.9	17.53	1.14	11.90
G0501N09	2006.1	17.71	1.12	13.01
G0501N08	2207.0	17.83	1.17	15.24
G0501N07	2408.8	18.14	1.16	17.20
G0501G02	2609.6	17.89	1.20	18.65
G0501N06	2805.2	17.98	1.19	19.77
G0501N05	3005.9	17.68	1.19	20.63
G0501N04	3207.2			
G0501G01	3408.3	17.92	1.23	24.22
G0501N03	3606.9	18.16	1.29	27.73
G0501N02	3808.1	18.59	1.29	29.78
G0501N01	4188.8	18.48	1.32	30.04

BATS 5—Bottle Data
February 17-21, 1989
Particulates

Bottle ID	Depth (m)	Chl *a* (μg/kg)	POC (μg/kg)	PON (μg/kg)	Bacteria (# x 10^8/kg)
G0504N10	3.3		73.14	8.97	
G0504N09	17.7		58.97	9.56	
G0504N08	28.1		44.65	6.75	
G0504N07	32.3		54.01	7.61	
G0504G02	38.2		36.04	5.87	
G0504N06	42.5		31.76	5.84	
G0504N05	53.8		24.83	4.89	
G0504N04	93.7		11.93	2.20	
G0504G01	107.4		9.91	2.17	
G0504N03	156.9		12.66	1.93	
G0504N02	205.3		32.42	5.41	
G0504N01	254.9		17.72	2.32	
G0505N10	4.3	0.203			
G0505N09	16.6	0.231			
G0505N08	27.6	0.324			
G0505N07	32.2	0.437			
G0505G02	37.2	0.502			
G0505N06	53.1	0.592			
G0505N05	93.0	0.171			
G0505N04	105.4	0.138			
G0505G01	156.2	0.044			
G0505N03	179.8	0.026			
G0505N02	206.8	0.020			
G0505N01	308.3	0.011			
G0502N10	306.4				
G0502N09	305.5				
G0502N08	409.5				
G0502N07	507.7				
G0502G02	508.6				
G0502N06	607.9				
G0502N05	760.0				
G0502N04	758.1				
G0502G01	808.4				
G0502N03	907.1				
G0502N02	1005.6		16.16	1.71	
G0502N01	1006.8				
G0503N10	3.0		55.20	8.08	
G0503N09	26.6		51.99	7.88	
G0503N08	37.8		53.57	8.31	
G0503N07	52.9		29.79	4.69	
G0503G02	80.3		24.61	3.70	
G0503N06	106.9		37.02	4.63	
G0503N05	156.7		36.49	6.84	
G0503N04	206.3		25.39	3.04	
G0503G01	1208.5				
G0503N03	1407.7				
G0503N02	1608.9				
G0503N01	1808.9				

BATS 5, Primary Production Data

R.V. Cape Henlopen

Light Bottles		Dark Bottles		Time-zero Bottles	
Depth (m)	Lt. Prod (mg/m2/day)	Depth (m)	Dk. Prod (mg/m2/day)	Depth (m)	$T_{\emptyset}$ Prod (mg/m2/day)
2.0		2.0	0.44	2.0	0.18
2.0	29.67				
2.0	27.81				
20.0	6.39	20.0	0.38	20.0	0.22
20.0	7.05				
20.0	12.02				
30.0	24.23	30.0	0.39	30.0	0.24
30.0	25.33				
30.0	25.31				
46.6		46.6	0.29	46.6	0.21
46.6	2.06				
46.6	2.21				
75.0	0.83	75.0		75.0	0.24
75.0	0.86				
75.0	0.91				
100.0	0.36	100.0	0.23	100.0	0.22
100.0	0.38				
100.0	0.32				

Sediment Trap Estimated Particle Fluxes

Depth (m)	Sample #	Mass ($mg/m^2/d$)	Total Carbon ($mg\ C/m^2/d$)	Organic Carbon ($mg\ C/m^2/d$)	Nitrogen ($mg\ N/m^2/d$)
150	13	292.30	72.26		11.08
150[1]	13			59.08	11.41
150	14	257.30	67.09		10.34
150[1]	14			54.05	10.47
200	16	171.80	39.31		5.13
200[1]	16			30.87	5.22
200	17	218.80	53.14		7.23
200[1]	17			42.09	7.38
300	19	134.20	32.03		3.65
300[1]	19			24.92	3.83
300	20	173.50	42.62		5.27
300[1]	20			33.23	5.23
400	22	116.20	24.78		2.89
400[1]	22			17.79	2.75
400	23	74.36	29.55		1.06[2]
400[1]	23			13.08	1.73

1. Subsample acidified to remove carbonates.
2. Bad datum not used in further calculations.

Cruise Report, BATS 6

Cruise dates: March 24-28, 1989
Personnel: R.L. Sherriff-Dow, R. Johnson, M. Tuel, K. Gundersen
R.V. Cape Henlopen

March 24, 1989

0900 Depart St.George

1345 Arrive BATS Station

1430 Deploy Sediment traps, Winds 15 knots, seas calm. Lat: 31.663 N; Long 64.195 W

Cast 1 4200 m, 1500-1805 hours, Lat: 31.664 N; Long: 64.190 W
Seas: calm, 2-4' swell. Wind: 10 knots, bearing 180° Sunny
Nominal depths: 2000, 2200, 2400, 2600, 2800, 3000, 3200, 3400, 3600, 3800, 4000, 4200 m.
Samples:
12 oxygen - duplicates
12 salinities
12 NO_3, PO_4, SiO_2
Bacteria - Ducklow

March 25, 1989

0845 Light casts: **Casts 3,4,5,6,7.**(overcast)

CTD **Cast 2,** 0930-1100, Lat: 31.412N; Long: 63.921 W
Seas: calm. Wind: SSW at 10 knots, sunny

Nominal depths: 300, 300, 400, 500, 500, 600, 750, 750, 800, 900, 1000, 1000 m.

Samples:
12 oxygen - duplicates
12 salinities
12 NO_3, PO_4, SiO_2
8 PON/ POC
3 Bacteria.

1200 Light Cast attempted. Trouble with CTD. Wire badly kinked—nearly lost.
Reterminate.
No more casting until tomorrow.

March 26, 1989

0345 Production cast on Kevlar

0500 Launch PP array and place 2nd set of samples in deck incubator.

CTD **Cast 8**: 0-1800m, 0640-0810, Lat: 31.135 N; Long: 63.751 W
Wind: WNW at 15 - 20 knots. Seas 3 - 4' Raining.
Bottle 6 leaking.

Samples:
12 oxygen - duplicates
12 salinities
12 NO_3, PO_4, SiO_2
8 PON/ POC (0 - 250M)
1 Bacteria

0910 Primary production and Sediment trap arrays are tangled. Approach and pull apart.

CTD **Cast 9**: 1230-1305, Lat: 31.058 N; Long: 63.723 W
Seas: 4-6'. Wind: NNW at 16 knots, cloudy.
Nominal Depths: 4, 15, 25, 35, 53, 70, 80, 90, 103, 150, 200, 250 m.
Bottle 5 (90 m) not fired.

Samples:
11 oxygen - duplicates
11 salinities
11 NO_3, PO_4, SiO_2
11 PON/ POC

CTD **Cast 10**: 1550, Lat: 31.019 N; Long: 63.718 W
Wind: NNW at 11 knots, sunny.
Nominal Depth: 90

Samples:
1 oxygen - duplicates
1 salinity
1 NO_3, PO_4, SiO_2
1 PON/ POC

March 27, 1989

CTD **Cast 11**: 0920-1000, Lat: 30.862 N; Long: 63.736 W
Wind: N at 10 knots, sunny.
Nominal Depths: 4, 15, 25, 35, 53, 70, 80, 90, 103, 150, 200, 250
Niskin 7 misfired (70 m)

Samples:
11 Chlor. a - BBSR
11 CO_2 - Brewer
11 Bacteria - Ducklow

CTD **Cast 12**: 1000-1015, Lat: 30.849 N; Long: 63.741 W
Wind: N at 12 knots, sunny.

Nominal Depth: 70 m

March 28, 1989

0700 Return BBSR

CTD Sensor Corrections to Bottle Data for BATS 6:

On BATS 3 through BATS 7 cruises on the R.V. Cape Henlopen, a Neil Brown Mark-IIIB CTD system was used as per the University of Delaware, normal operating procedures. They applied a single correction factor for salinity on all CTD casts on these cruises. This correction factors are detailed below. They also applied a 7.5 db correction to all pressure measurements to correct a 7.5 db negative offset in the Neil Brown pressure sensor. CTD Oxygen corrections were performed at BBSR using the CTD oxygen and the bottle measurements as per the standard BATS method.

Salinity:

$$DS = \sum_{i=0}^{n} R_i C^i$$

MS = SC + DS

Where:

DS = Wet Salinity - CTD Salinity
R_i = regression coefficients
C = conductivity backcalculated from bottle salinity measurement (milliMohs)
n = order of the polynomial function
MS = modified salinity
SC = uncorrected salinity

$R_\emptyset$ = 0.104304
R_1 = -0.00623
R_2 = 4.2427E-05

Oxygen:

$$DO = R_0 + \sum_{i=1}^{l} A_i \frac{P^i}{4300} + \sum_{i=1}^{m} B_i \frac{OC^i}{300}$$

MO = OC+300 x DO

Where:

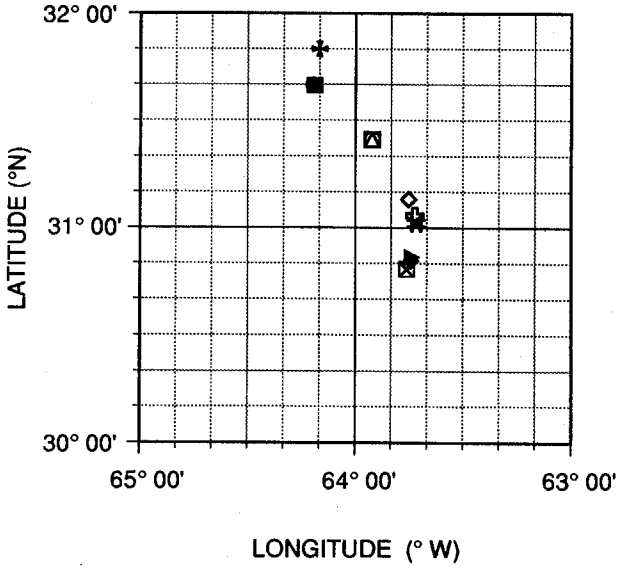
DO = (wet oxygens-CTD oxygen)/300
OC = uncorrected CTD oxygen (µmole/kg)
P = pressure (dbar)
MO = modified CTD oxygen (µmole/kg)
l = 4; m = 2
$R_\emptyset$,A_i, B_i = regression coefficients

$R_\emptyset$ = -3.3837479e-01

A_1 = -7.3338774e-01
A_2 = 29832351e+00
A_3 = -3.8142083e+00
A_4 = 1.5827736e+00
B_1 = 1.0100283e+00
B_2 = -7.5281507e-01

model correlation coefficient = 9.978e-01
standard deviation of model residuals = 2.494e+00 μmole/kg

BATS 6—Cast Positions:



BATS 6, CTD Cast 1
24 March, 1989; Start 15:00; End 18:05
Lat: 31.664 N; Long: 64.190 W

Depth (m)	Pres (db)	Temp (°C)	Pot.T (°C)	CTD Sal (ppt)	Sigma-t (kg/m^3)	CTD O_2 (μmole/kg)	O_2 Anom (μmole/kg)	BAC (m^{-1})	PAR ($\mu E/m^2/s$)	Fluor (rfu)
5.0	5.0	21.069	21.068	36.549	25.656	228.18	9.92			
10.0	10.1	20.876	20.874	36.545	25.707	226.77	7.75			
20.0	20.1	20.476	20.472	36.563	25.829	233.22	12.65			
30.0	30.2	20.312	20.306	36.537	25.854	235.72	14.46			
40.0	40.3	20.217	20.210	36.532	25.876	236.10	14.45			
50.0	50.4	20.139	20.130	36.541	25.904	238.23	16.28			
60.0	60.4	20.042	20.031	36.564	25.948	241.03	18.73			
70.0	70.5	19.865	19.852	36.570	26.000	241.70	18.69			
80.0	80.6	19.690	19.675	36.583	26.057	239.20	15.49			
90.0	90.6	19.551	19.535	36.580	26.092	237.30	13.02			
100.0	100.7	19.478	19.459	36.582	26.113	237.65	13.07			
110.0	110.8	19.449	19.428	36.582	26.121	236.38	11.68			
120.0	120.9	19.404	19.382	36.581	26.132	235.70	10.82			
130.0	131.0	19.371	19.347	36.582	26.142	236.00	10.98			
140.0	141.0	19.337	19.311	36.580	26.150	235.97	10.81			
150.0	151.1	19.321	19.293	36.581	26.155	235.90	10.67			
160.0	161.2	19.304	19.275	36.580	26.159	235.14	9.84			
170.0	171.3	19.276	19.245	36.579	26.167	234.36	8.94			
180.0	181.3	19.258	19.225	36.580	26.172	234.22	8.74			
190.0	191.4	19.231	19.197	36.577	26.178	234.33	8.73			
200.0	201.5	19.166	19.129	36.571	26.190	233.82	7.93			
210.0	211.6	19.048	19.010	36.559	26.212	230.48	4.09			
220.0	221.7	18.981	18.941	36.555	26.227	226.08	-0.60			
230.0	231.7	18.905	18.863	36.548	26.241	225.49	-1.52			
240.0	241.8	18.788	18.745	36.540	26.265	225.19	-2.32			
250.0	251.9	18.732	18.687	36.537	26.278	222.46	-5.29			
275.0	277.1	18.544	18.495	36.528	26.320	220.40	-8.17			
300.0	302.3	18.462	18.408	36.521	26.337	218.20	-10.73			
325.0	327.5	18.371	18.313	36.512	26.353	208.57	-20.76			
350.0	352.7	18.212	18.150	36.492	26.379	208.29	-21.76			
375.0	378.0	18.180	18.113	36.491	26.387	208.40	-21.78			
400.0	403.2	18.014	17.943	36.467	26.412	205.39	-25.55			
425.0	428.4	17.883	17.808	36.448	26.431	200.93	-30.60			
450.0	453.6	17.663	17.584	36.418	26.462	199.02	-33.53			
475.0	478.9	17.448	17.365	36.388	26.493	194.36	-39.18			
500.0	504.1	17.344	17.257	36.370	26.505	192.86	-41.17			
550.0	554.6	16.737	16.643	36.269	26.575	189.81	-47.12			
600.0	605.1	15.799	15.700	36.109	26.670	176.90	-64.64			
650.0	655.6	14.687	14.584	35.924	26.777	170.59	-76.63			
700.0	706.1	13.568	13.463	35.747	26.878	162.02	-91.14			
750.0	756.6	12.590	12.482	35.607	26.967	156.33	-102.24			
800.0	807.2	11.109	11.001	35.413	27.097	148.44	-118.67			
850.0	857.7	9.868	9.760	35.269	27.203	146.52	-128.14			
900.0	908.3	8.594	8.488	35.149	27.317	154.12	-128.62			
950.0	958.9	8.024	7.916	35.145	27.401	169.87	-116.53			
1000.0	1009.4	7.202	7.093	35.110	27.493	187.43	-104.46			
1050.0	1060.0	6.507	6.396	35.078	27.563	202.91	-93.80			
1100.0	1110.7	5.897	5.785	35.061	27.628	218.62	-82.39			
1150.0	1161.3	5.499	5.385	35.057	27.675	230.57	-73.30			
1200.0	1211.9	5.279	5.161	35.057	27.702	236.34	-69.12			
1300.0	1313.2	4.793	4.668	35.020	27.729	247.23	-61.90			

Depth (m)	Pres (db)	Temp (°C)	Pot.T (°C)	CTD Sal (ppt)	Sigma-t (kg/m^3)	CTD 0_2 (μmole/kg)	0_2 Anom (μmole/kg)	BAC (m^{-1})	PAR ($\mu E/m^2/s$)	Fluor (rfu)
1400.0	1414.6	4.521	4.387	35.004	27.748	254.71	-56.49			
1500.0	1516.0	4.395	4.251	35.002	27.761	258.36	-53.80			
1600.0	1617.4	4.199	4.045	34.986	27.771	261.89	-51.80			
1700.0	1718.9	4.077	3.912	34.983	27.782	264.05	-50.58			
1800.0	1820.5	3.997	3.821	34.987	27.795	265.67	-49.56			
1900.0	1922.1	3.903	3.715	34.987	27.805	266.47	-49.50			
2000.0	2023.7	3.821	3.621	34.986	27.814	267.00	-49.60			
2100.0	2125.4	3.753	3.541	34.991	27.826	267.43	-49.69			
2200.0	2227.2	3.642	3.418	34.985	27.833	268.42	-49.58			
2300.0	2328.9	3.521	3.286	34.976	27.839	269.60	-49.38			
2400.0	2430.8	3.370	3.123	34.968	27.848	271.23	-48.96			
2500.0	2532.7	3.268	3.009	34.961	27.853	269.51	-51.51			
2600.0	2634.6	3.167	2.895	34.955	27.859	270.04	-51.80			
2700.0	2736.6	3.064	2.779	34.950	27.865	270.23	-52.45			
2800.0	2838.6	2.929	2.632	34.941	27.871	271.07	-52.72			
2900.0	2940.7	2.827	2.517	34.936	27.877	271.89	-52.74			
3000.0	3042.8	2.725	2.401	34.931	27.884	271.49	-53.99			
3100.0	3144.9	2.647	2.309	34.927	27.888	272.47	-53.66			
3200.0	3247.2	2.556	2.205	34.921	27.892	271.99	-54.89			
3300.0	3349.4	2.483	2.117	34.916	27.895	271.44	-56.06			
3400.0	3451.7	2.416	2.036	34.912	27.898	271.21	-56.86			
3500.0	3554.1	2.367	1.972	34.908	27.901	270.48	-57.99			
3600.0	3656.5	2.326	1.914	34.905	27.902	270.01	-58.82			
3700.0	3758.9	2.295	1.868	34.902	27.904	269.59	-59.50			
3800.0	3861.4	2.273	1.829	34.901	27.906	269.02	-60.26			
3900.0	3964.0	2.250	1.789	34.899	27.907	268.10	-61.38			
4000.0	4066.5	2.238	1.760	34.896	27.907	267.76	-61.82			
4100.0	4169.2	2.229	1.733	34.896	27.909	268.56	-61.10			
4200.0	4271.8	2.230	1.716	34.894	27.909	267.97	-61.68			

BATS 6, CTD Cast 2
25 March, 1989; Start 09:30; End 11:00
Lat: 31.412 N; Long: 63.921 W

Depth (m)	Pres (db)	Temp (°C)	Pot.T (°C)	CTD Sal (ppt)	Sigma-t (kg/m^3)	CTD 0_2 (μmole/kg)	0_2 Anom (μmole/kg)	BAC (m^{-1})	PAR ($\mu E/m^2/s$)	Fluor (rfu)
4.0	4.0	20.793	20.792	36.613	25.781	240.85	21.60	0.512		
10.0	10.1	20.761	20.759	36.596	25.777	242.19	22.79	0.507		
20.0	20.1	20.628	20.624	36.594	25.812	240.59	20.66	0.511		
30.0	30.2	20.452	20.447	36.597	25.862	242.29	21.67	0.517		
40.0	40.3	20.300	20.293	36.579	25.890	243.62	22.38	0.516		
50.0	50.4	20.223	20.214	36.566	25.901	243.52	21.94	0.515		
60.0	60.4	20.066	20.054	36.576	25.951	242.29	20.09	0.518		
70.0	70.5	19.951	19.938	36.597	25.998	243.65	21.02	0.521		
80.0	80.6	19.806	19.791	36.596	26.037	244.01	20.79	0.529		
90.0	90.6	19.670	19.654	36.593	26.070	242.07	18.30	0.540		
100.0	100.7	19.533	19.515	36.593	26.107	239.84	15.51	0.518		
110.0	110.8	19.438	19.418	36.591	26.130	237.56	12.83	0.494		
120.0	120.9	19.397	19.375	36.592	26.143	236.74	11.84	0.480		
130.0	131.0	19.352	19.328	36.584	26.149	236.51	11.41	0.490		
140.0	141.0	19.312	19.286	36.585	26.160	238.77	13.52	0.485		
150.0	151.1	19.294	19.266	36.586	26.166	240.61	15.28	0.485		
160.0	161.2	19.280	19.250	36.588	26.172	239.34	13.95	0.480		

Depth (m)	Pres (db)	Temp (°C)	Pot.T (°C)	CTD Sal (ppt)	Sigma-t (kg/m^3)	CTD 0_2 (µmole/kg)	0_2 Anom (µmole/kg)	BAC (m^{-1})	PAR ($\mu E/m^2/s$)	Fluor (rfu)
170.0	171.3	19.260	19.229	36.586	26.176	237.12	11.65	0.478		
180.0	181.3	19.246	19.213	36.589	26.182	234.44	8.92	0.475		
190.0	191.4	19.224	19.190	36.586	26.186	233.40	7.78	0.475		
200.0	201.5	19.198	19.162	36.584	26.192	233.81	8.08	0.475		
210.0	211.6	19.167	19.129	36.581	26.198	231.91	6.05	0.475		
220.0	221.7	19.140	19.100	36.580	26.205	229.23	3.25	0.475		
230.0	231.7	19.094	19.052	36.577	26.215	227.52	1.34	0.475		
240.0	241.8	18.985	18.941	36.565	26.234	226.99	0.34	0.474		
250.0	251.9	18.848	18.802	36.556	26.263	225.35	-1.89	0.474		
275.0	277.1	18.586	18.537	36.536	26.315	221.26	-7.12	0.472		
300.0	302.3	18.446	18.392	36.524	26.343	217.52	-11.47	0.470		
325.0	327.5	18.366	18.308	36.515	26.357	215.44	-13.90	0.471		
350.0	352.7	18.324	18.261	36.511	26.366	213.27	-16.26	0.471		
375.0	378.0	18.270	18.203	36.508	26.378	211.11	-18.66	0.472		
400.0	403.2	18.168	18.097	36.496	26.395	211.53	-18.69	0.470		
425.0	428.4	17.980	17.904	36.468	26.422	205.20	-25.88	0.471		
450.0	453.6	17.787	17.707	36.440	26.449	203.58	-28.39	0.471		
475.0	478.9	17.657	17.573	36.421	26.467	200.51	-32.06	0.471		
500.0	504.1	17.365	17.278	36.378	26.507	198.37	-35.56	0.470		
550.0	554.6	16.877	16.782	36.297	26.563	191.42	-44.82	0.471		
600.0	605.1	15.719	15.621	36.102	26.683	182.69	-59.24	0.472		
650.0	655.6	14.677	14.575	35.926	26.780	177.00	-70.26	0.473		
700.0	706.1	13.601	13.496	35.766	26.886	170.53	-82.44	0.473		
750.0	756.6	12.341	12.234	35.590	27.003	164.17	-95.77	0.476		
800.0	807.2	11.069	10.961	35.414	27.105	157.41	-109.93	0.477		
850.0	857.7	9.705	9.599	35.258	27.222	151.89	-123.76	0.474		
900.0	908.3	8.661	8.555	35.160	27.314	160.68	-121.62	0.479		
950.0	958.9	7.828	7.721	35.138	27.424	177.43	-110.25	0.480		
1000.0	1009.4	7.144	7.035	35.128	27.515	194.25	-97.99	0.481		

BATS 6, CTD Cast 3
25 March, 1989; Start 08:45
Lat: 31.412 N; Long: 63.921 W

Depth (m)	Pres (db)	Temp (°C)	Pot.T (°C)	CTD Sal (ppt)	Sigma-t (kg/m^3)	CTD 0_2 (µmole/kg)	0_2 Anom (µmole/kg)	BAC (m^{-1})	PAR ($\mu E/m^2/s$)	Fluor (rfu)
6.0	6.0	20.782	20.781	36.603	25.776	252.50	33.19	0.572	448.11	
10.0	10.1	20.775	20.773	36.595	25.772	252.64	33.30	0.568	177.97	
20.0	20.1	20.681	20.678	36.593	25.797	250.88	31.16	0.558	166.98	
30.0	30.2	20.431	20.425	36.591	25.863	250.98	30.26	0.558	107.07	
40.0	40.3	20.315	20.307	36.581	25.887	252.25	31.06	0.557	89.04	
50.0	50.4	20.262	20.253	36.574	25.897	252.77	31.36	0.552	63.63	
60.0	60.4	20.112	20.101	36.596	25.955	253.20	31.23	0.557	44.13	
70.0	70.5	19.982	19.969	36.604	25.996	252.34	29.85	0.560	28.43	
80.0	80.6	19.799	19.784	36.601	26.043	251.85	28.61	0.564	15.45	
90.0	90.6	19.585	19.569	36.592	26.092	251.37	27.24	0.581	10.00	
100.0	100.7	19.458	19.439	36.590	26.124	248.71	24.07	0.549	5.44	
110.0	110.8	19.403	19.382	36.592	26.140	247.84	22.96	0.530	3.39	
120.0	120.9	19.386	19.364	36.595	26.148	247.08	22.14	0.524	2.25	
130.0	131.0	19.341	19.317	36.595	26.160	245.64	20.51	0.518	1.52	
140.0	141.0	19.320	19.294	36.594	26.165	243.40	18.19	0.513	0.54	
150.0	151.1	19.293	19.265	36.593	26.172	242.75	17.42	0.517	0.00	
160.0	161.2	19.277	19.248	36.592	26.176	245.05	19.66	0.517	0.00	

Depth (m)	Pres (db)	Temp (°C)	Pot.T (°C)	CTD Sal (ppt)	Sigma-t (kg/m^3)	CTD 0_2 ($\mu mole/kg$)	0_2 Anom ($\mu mole/kg$)	BAC (m^{-1})	PAR ($\mu E/m^2/s$)	Fluor (rfu)
170.0	171.3	19.263	19.232	36.594	26.181	244.24	18.80	0.508	0.00	
180.0	181.3	19.251	19.218	36.594	26.185	241.15	15.65	0.507	0.00	
190.0	191.4	19.226	19.191	36.592	26.191	240.57	14.97	0.501	0.00	
200.0	201.5	19.198	19.162	36.591	26.197	240.71	14.99	0.501	0.00	
210.0	211.6	19.185	19.146	36.588	26.199	239.89	14.11	0.501	0.00	
220.0	221.7	19.134	19.094	36.584	26.210	238.66	12.66	0.499	0.00	

BATS 6, CTD Cast 4
25 March, 1989; Start:12:00; End 12:05
Lat: 31.417 N; Long: 63.917 W

Depth (m)	Pres (db)	Temp (°C)	Pot.T (°C)	CTD Sal (ppt)	Sigma-t (kg/m^3)	CTD 0_2 ($\mu mole/kg$)	0_2 Anom ($\mu mole/kg$)	BAC (m^{-1})	PAR ($\mu E/m^2/s$)	Fluor (rfu)
7.0	7.0	20.919	20.918	36.619	25.751	252.54	33.79	0.497	655.08	
10.0	10.1	20.884	20.882	36.618	25.760	252.98	34.09	0.497	512.83	
20.0	20.1	20.763	20.759	36.618	25.793	251.50	32.14	0.500	175.90	
30.0	30.2	20.457	20.451	36.617	25.876	253.16	32.59	0.509	117.27	
40.0	40.3	20.333	20.325	36.606	25.902	255.46	34.38	0.510	133.49	
50.0	50.4	20.237	20.228	36.592	25.917	255.37	33.89	0.508	102.14	
60.0	60.4	20.044	20.033	36.605	25.979	254.83	32.59	0.512	78.58	
70.0	70.5	19.850	19.837	36.608	26.034	254.46	31.44	0.515	54.25	
80.0	80.6	19.740	19.725	36.608	26.063	252.53	29.06	0.524	34.25	
90.0	90.6	19.672	19.655	36.610	26.083	251.86	28.11	0.534	19.96	
100.0	100.7	19.565	19.547	36.605	26.108	248.55	24.37	0.532	11.75	
110.0	110.8	19.444	19.423	36.599	26.136	247.69	22.99	0.501	6.97	

BATS 6, CTD Cast 5
25 March, 1989; Start:12:05; End 12:10
Lat: 31.417 N; Long: 63.917 W

Depth (m)	Pres (db)	Temp (°C)	Pot.T (°C)	CTD Sal (ppt)	Sigma-t (kg/m^3)	CTD 0_2 ($\mu mole/kg$)	0_2 Anom ($\mu mole/kg$)	BAC (m^{-1})	PAR ($\mu E/m^2/s$)	Fluor (rfu)
5.0	5.0	20.976	20.975	36.602	25.722	242.78	24.23	0.497	426.96	
10.0	10.1	20.902	20.900	36.602	25.743	244.29	25.45	0.500	129.58	
20.0	20.1	20.772	20.768	36.603	25.780	242.86	23.52	0.503	112.56	
30.0	30.2	20.459	20.453	36.606	25.867	245.83	25.25	0.512	147.47	
40.0	40.3	20.336	20.329	36.595	25.892	247.70	26.61	0.514	129.17	
50.0	50.4	20.247	20.237	36.583	25.908	249.78	28.32	0.512	99.43	
60.0	60.4	20.075	20.064	36.589	25.958	249.63	27.50	0.515	77.68	
70.0	70.5	19.877	19.864	36.603	26.023	248.87	25.96	0.519	53.47	
80.0	80.6	19.739	19.725	36.597	26.055	248.65	25.17	0.526	33.70	
90.0	90.6	19.679	19.662	36.605	26.077	248.62	24.90	0.545	19.54	
100.0	100.7	19.573	19.554	36.601	26.103	248.74	24.58	0.534	11.08	
110.0	110.8	19.471	19.451	36.601	26.130	242.55	17.97	0.498	6.24	
120.0	120.9	19.402	19.379	36.596	26.145	242.68	17.81	0.486	4.22	
130.0	131.0	19.371	19.347	36.596	26.153	244.66	19.66	0.486	2.90	
140.0	141.0	19.343	19.317	36.597	26.161	244.33	19.22	0.480	2.03	
150.0	151.1	19.311	19.284	36.592	26.166	241.10	15.85	0.485	1.42	

BATS 6, CTD Cast 6
25 March, 1989; Start: 12:10; End:12:15
Lat: 31.417 N; Long: 63.917 W

Depth (m)	Pres (db)	Temp (°C)	Pot.T (°C)	CTD Sal (ppt)	Sigma-t (kg/m^3)	CTD O_2 (μmole/kg)	O_2 Anom (μmole/kg)	BAC (m^{-1})	PAR ($\mu E/m^2/s$)	Fluor (rfu)
6.0	6.0	20.955	20.954	36.600	25.727	236.51	17.88	0.501	437.09	
10.0	10.1	20.885	20.883	36.599	25.745	239.95	21.04	0.503	105.99	
20.0	20.1	20.774	20.770	36.600	25.777	242.58	23.24	0.507	125.65	
30.0	30.2	20.488	20.482	36.605	25.859	240.72	20.26	0.517	146.45	
40.0	40.3	20.338	20.330	36.592	25.890	243.05	21.97	0.518	143.61	
50.0	50.4	20.240	20.231	36.580	25.907	241.12	19.64	0.517	101.70	
60.0	60.4	20.107	20.095	36.581	25.944	246.07	24.05	0.519	74.57	
70.0	70.5	19.909	19.896	36.599	26.011	245.12	22.33	0.522	53.59	
80.0	80.6	19.746	19.731	36.598	26.054	245.68	22.23	0.530	34.57	
90.0	90.6	19.656	19.639	36.602	26.081	246.57	22.75	0.551	20.83	
100.0	100.7	19.590	19.572	36.600	26.097	245.31	21.22	0.542	11.36	
110.0	110.8	19.484	19.463	36.600	26.126	241.61	17.08	0.505	6.49	
120.0	120.9	19.421	19.399	36.600	26.143	240.98	16.19	0.482	4.24	
130.0	131.0	19.374	19.350	36.594	26.150	240.91	15.93	0.488	2.99	
140.0	141.0	19.324	19.298	36.590	26.161	241.51	16.31	0.492	2.06	
150.0	151.1	19.299	19.272	36.590	26.168	240.74	15.44	0.487	1.40	

BATS 6, CTD Cast 7
25 March, 1989; Start: 12:15 End: 12:20
Lat: 31.417 N; Long: 63.917 W

Depth (m)	Pres (db)	Temp (°C)	Pot.T (°C)	CTD Sal (ppt)	Sigma-t (kg/m^3)	CTD O_2 (μmole/kg)	O_2 Anom (μmole/kg)	BAC (m^{-1})	PAR ($\mu E/m^2/s$)	Fluor (rfu)
6.0	6.0	20.935	20.934	36.600	25.732	243.57	24.86	0.503	458.88	
10.0	10.1	20.886	20.884	36.600	25.746	245.32	26.42	0.504	128.90	
20.0	20.1	20.763	20.759	36.602	25.781	246.98	27.60	0.508	113.87	
30.0	30.2	20.492	20.487	36.610	25.861	247.18	26.74	0.517	148.85	
40.0	40.3	20.379	20.371	36.601	25.886	247.06	26.15	0.519	125.93	
50.0	50.4	20.247	20.237	36.583	25.908	249.36	27.91	0.518	99.88	
60.0	60.4	20.071	20.060	36.588	25.959	251.08	28.93	0.519	76.18	
70.0	70.5	19.850	19.837	36.596	26.024	250.37	27.34	0.525	51.44	
80.0	80.6	19.758	19.743	36.603	26.054	249.48	26.08	0.532	31.60	
90.0	90.6	19.700	19.683	36.605	26.072	248.64	25.00	0.545	19.31	
100.0	100.7	19.578	19.560	36.602	26.102	247.45	23.32	0.537	10.84	
110.0	110.8	19.477	19.456	36.601	26.128	244.51	19.96	0.497	6.34	
120.0	120.9	19.415	19.393	36.600	26.144	243.50	18.69	0.481	4.36	
130.0	131.0	19.367	19.343	36.594	26.152	242.84	17.82	0.487	3.15	
140.0	141.0	19.338	19.312	36.593	26.160	241.03	15.89	0.481	2.23	
150.0	151.1	19.298	19.271	36.591	26.169	241.44	16.13	0.488	1.59	

BATS 6, CTD Cast 8
26 March, 1989; Start 06:40; End 08:10
Lat: 31.135 N; Long: 63.751 W

Depth (m)	Pres (db)	Temp (°C)	Pot.T (°C)	CTD Sal (ppt)	Sigma-t (kg/m^3)	CTD 0_2 (μmole/kg)	0_2 Anom (μmole/kg)	BAC (m^{-1})	PAR ($\mu E/m^2/s$)	Fluor (rfu)
4.0	4.0	20.925	20.924	36.637	25.763	249.61	30.91			
10.0	10.1	20.927	20.925	36.625	25.753	254.41	35.71			
20.0	20.1	20.602	20.598	36.621	25.839	253.54	33.55			
30.0	30.2	20.397	20.392	36.602	25.881	254.74	33.91			
40.0	40.3	20.407	20.400	36.623	25.895	256.41	35.65			
50.0	50.4	20.365	20.355	36.619	25.903	256.82	35.88			
60.0	60.4	20.161	20.150	36.613	25.954	256.31	34.56			
70.0	70.5	19.949	19.936	36.623	26.018	255.04	32.45			
80.0	80.6	19.869	19.854	36.617	26.036	254.53	31.61			
90.0	90.6	19.710	19.693	36.612	26.075	254.19	30.60			
100.0	100.7	19.560	19.541	36.607	26.110	252.07	27.86			
110.0	110.8	19.451	19.431	36.607	26.139	249.21	24.56			
120.0	120.9	19.406	19.384	36.606	26.151	246.90	22.06			
130.0	131.0	19.360	19.336	36.603	26.161	244.70	19.67			
140.0	141.0	19.338	19.313	36.603	26.168	243.55	18.43			
150.0	151.1	19.308	19.280	36.602	26.175	243.78	18.53			
160.0	161.2	19.304	19.274	36.604	26.178	243.80	18.54			
170.0	171.3	19.285	19.254	36.604	26.183	243.17	17.83			
180.0	181.3	19.266	19.233	36.603	26.188	240.51	15.09			
190.0	191.4	19.236	19.201	36.599	26.193	239.06	13.51			
200.0	201.5	19.214	19.177	36.598	26.199	236.61	10.97			
210.0	211.6	19.179	19.141	36.600	26.210	236.22	10.44			
220.0	221.7	19.112	19.071	36.592	26.221	236.41	10.33			
230.0	231.7	19.065	19.023	36.589	26.231	233.97	7.69			
240.0	241.8	18.965	18.921	36.580	26.251	233.46	6.75			
250.0	251.9	18.851	18.806	36.571	26.274	231.89	4.69			
275.0	277.1	18.562	18.512	36.549	26.332	226.80	-1.65			
300.0	302.3	18.463	18.409	36.542	26.352	223.66	-5.23			
325.0	327.5	18.420	18.362	36.538	26.361	219.22	-9.86			
350.0	352.7	18.407	18.344	36.536	26.364	219.78	-9.36			
375.0	378.0	18.361	18.293	36.531	26.373	217.82	-11.53			
400.0	403.2	18.148	18.077	36.506	26.408	212.70	-17.60			
425.0	428.4	17.999	17.923	36.486	26.431	209.31	-21.66			
450.0	453.6	17.760	17.680	36.456	26.468	205.02	-27.05			
475.0	478.9	17.587	17.504	36.432	26.493	204.49	-28.37			
500.0	504.1	17.360	17.273	36.399	26.524	205.97	-27.95			
550.0	554.6	16.812	16.718	36.306	26.586	196.08	-40.45			
600.0	605.1	15.911	15.812	36.151	26.677	186.20	-54.74			
650.0	655.6	14.869	14.766	35.978	26.779	181.90	-64.33			
700.0	706.1	13.827	13.720	35.821	26.882	176.97	-74.74			
750.0	756.6	12.509	12.401	35.624	26.996	174.42	-84.55			
800.0	807.2	10.894	10.787	35.405	27.130	163.21	-105.15			
850.0	857.7	9.750	9.643	35.282	27.233	162.19	-113.14			
900.0	908.3	8.759	8.652	35.191	27.323	169.24	-112.38			
950.0	958.9	7.638	7.532	35.115	27.434	184.96	-104.02			
1000.0	1009.4	6.944	6.837	35.130	27.544	204.38	-89.22			
1050.0	1060.0	6.033	5.926	35.078	27.624	223.57	-76.44			
1100.0	1110.7	5.697	5.587	35.080	27.669	233.01	-69.39			
1150.0	1161.3	5.387	5.274	35.063	27.693	239.74	-64.93			
1200.0	1211.9	5.137	5.021	35.053	27.715	245.54	-60.97			
1300.0	1313.2	4.772	4.647	35.038	27.746	254.70	-54.54			

Depth (m)	Pres (db)	Temp (°C)	Pot.T (°C)	CTD Sal (ppt)	Sigma-t (kg/m^3)	CTD O_2 (µmole/kg)	O_2 Anom (µmole/kg)	BAC (m^{-1})	PAR ($\mu E/m^2/s$)	Fluor (rfu)
1400.0	1414.6	4.494	4.360	35.024	27.767	258.07	-53.29			
1500.0	1516.0	4.297	4.154	35.014	27.781	263.66	-49.22			
1600.0	1617.4	4.152	3.998	35.007	27.792	265.28	-48.73			
1700.0	1718.9	4.022	3.858	35.000	27.801	266.89	-48.13			
1800.0	1820.5	3.937	3.761	35.000	27.811	268.04	-47.63			

BATS 6, CTD Cast 9
26 March, 1989;Time: Start 12:30; End 13:05
Lat: 31.058 N; Long: 63.723 W

Depth (m)	Pres (db)	Temp (°C)	Pot.T (°C)	CTD Sal (ppt)	Sigma-t (kg/m^3)	CTD O_2 (µmole/kg)	O_2 Anom (µmole/kg)	BAC (m^{-1})	PAR ($\mu E/m^2/s$)	Fluor (rfu)
4.0	4.0	21.039	21.038	36.645	25.738	237.44	19.20	0.500		
10.0	10.1	20.983	20.981	36.642	25.751	239.79	21.33	0.498		
20.0	20.1	20.737	20.733	36.622	25.804	239.26	19.80	0.502		
30.0	30.2	20.470	20.464	36.634	25.886	240.66	20.17	0.509		
40.0	40.3	20.336	20.328	36.616	25.908	242.32	21.27	0.509		
50.0	50.4	20.268	20.258	36.625	25.934	243.25	21.93	0.510		
60.0	60.4	20.052	20.040	36.626	25.993	244.04	21.86	0.513		
70.0	70.5	19.831	19.818	36.625	26.051	244.11	21.04	0.517		
80.0	80.6	19.715	19.700	36.620	26.079	242.62	19.07	0.528		
90.0	90.6	19.577	19.561	36.616	26.113	240.00	15.88	0.531		
100.0	100.7	19.522	19.504	36.620	26.130	237.85	13.52	0.501		
110.0	110.8	19.415	19.395	36.610	26.151	236.21	11.42	0.490		
120.0	120.9	19.395	19.373	36.613	26.159	235.54	10.67	0.477		
130.0	131.0	19.360	19.336	36.611	26.167	235.16	10.14	0.472		
140.0	141.0	19.326	19.301	36.610	26.176	234.62	9.46	0.473		
150.0	151.1	19.316	19.289	36.609	26.178	233.36	8.15	0.472		
160.0	161.2	19.311	19.281	36.608	26.179	232.09	6.87	0.471		
170.0	171.3	19.289	19.258	36.605	26.183	231.86	6.54	0.474		
180.0	181.3	19.250	19.217	36.606	26.194	231.51	6.03	0.471		
190.0	191.4	19.212	19.177	36.602	26.201	230.44	4.79	0.466		
200.0	201.5	19.190	19.154	36.600	26.206	228.53	2.79	0.464		
210.0	211.6	19.134	19.095	36.594	26.217	226.66	0.67	0.465		
220.0	221.7	19.069	19.029	36.588	26.230	223.95	-2.31	0.465		
230.0	231.7	18.981	18.939	36.579	26.246	220.03	-6.61	0.465		
240.0	241.8	18.895	18.851	36.574	26.265	216.87	-10.14	0.465		
250.0	251.9	18.828	18.783	36.571	26.279	212.87	-14.43	0.465		

BATS 6, CTD Cast 10
26 March, 1989; Start: 15:35; End:15:50
Lat: 31.019 N; Long: 63.718 W

Depth (m)	Pres (db)	Temp (°C)	Pot.T (°C)	CTD Sal (ppt)	Sigma-t (kg/m^3)	CTD 0_2 (μmole/kg)	0_2 Anom (μmole/kg)	BAC (m^{-1})	PAR ($\mu E/m^2/s$)	Fluor (rfu)
4.0	4.0	21.099	21.098	36.669	25.740	269.83	51.86	0.495		
10.0	10.1	21.041	21.040	36.667	25.754	264.13	45.93	0.495		
20.0	20.1	20.900	20.896	36.667	25.793	263.11	44.36	0.496		
30.0	30.2	20.464	20.458	36.657	25.905	264.06	43.58	0.502		
40.0	40.3	20.343	20.336	36.644	25.928	264.32	43.33	0.505		
50.0	50.4	20.295	20.285	36.646	25.943	259.75	38.57	0.503		
60.0	60.4	20.164	20.153	36.645	25.978	258.58	36.89	0.509		
70.0	70.5	19.860	19.847	36.648	26.061	260.40	37.48	0.514		
80.0	80.6	19.773	19.758	36.640	26.079	260.48	37.19	0.519		
90.0	90.6	19.707	19.690	36.636	26.093	259.41	35.84	0.527		
100.0	100.7	19.608	19.590	36.631	26.116	257.59	33.62	0.535		

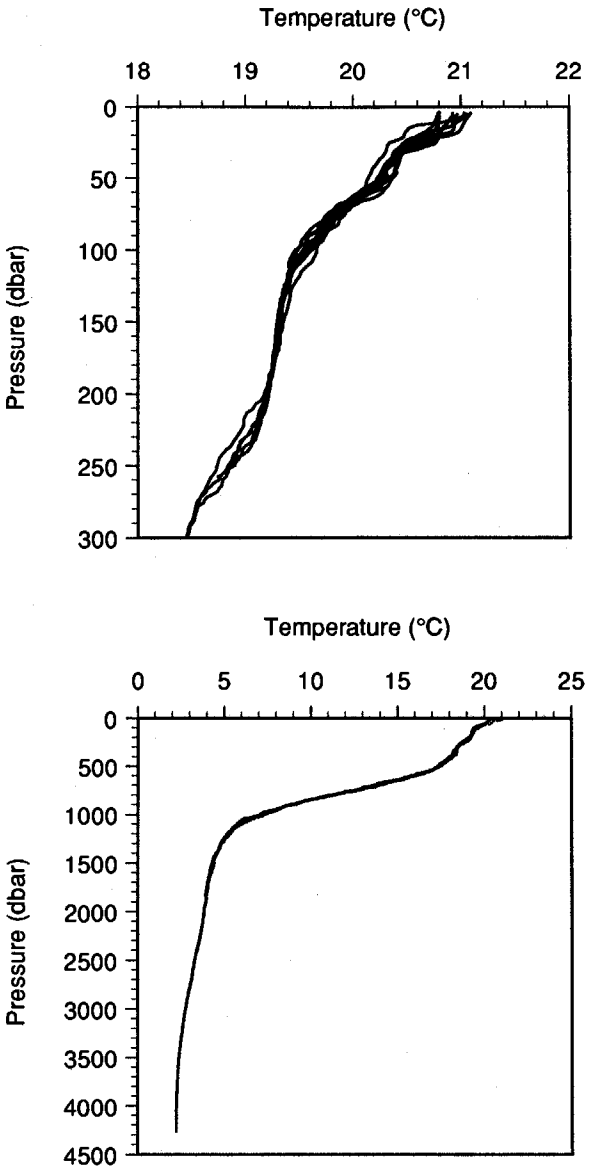
BATS 6, CTD Cast 11
27 March, 1989; Start: 09:20; End:10:00
Lat: 30.862 N; Long: 63.736 W

Depth (m)	Pres (db)	Temp (°C)	Pot.T (°C)	CTD Sal (ppt)	Sigma-t (kg/m^3)	CTD 0_2 (μmole/kg)	0_2 Anom (μmole/kg)	BAC (m^{-1})	PAR ($\mu E/m^2/s$)	Fluor (rfu)
3.0	3.0	20.803	20.802	36.672	25.823	249.87	30.75	0.497		
10.0	10.1	20.801	20.799	36.669	25.822	253.51	34.37	0.497		
20.0	20.1	20.796	20.792	36.666	25.821	257.08	37.92	0.497		
30.0	30.2	20.504	20.498	36.647	25.887	260.12	39.78	0.496		
40.0	40.3	20.426	20.418	36.653	25.913	260.25	39.61	0.497		
50.0	50.4	20.332	20.323	36.657	25.941	259.39	38.38	0.499		
60.0	60.4	20.131	20.120	36.666	26.002	259.20	37.41	0.503		
70.0	70.5	19.956	19.943	36.660	26.045	258.65	36.13	0.509		
80.0	80.6	19.826	19.811	36.659	26.079	258.36	35.32	0.542		
90.0	90.6	19.739	19.722	36.651	26.096	259.18	35.78	0.536		
100.0	100.7	19.663	19.645	36.650	26.116	257.40	33.68	0.528		
110.0	110.8	19.573	19.552	36.649	26.140	254.33	30.24	0.497		
120.0	120.9	19.473	19.450	36.640	26.160	252.22	27.71	0.480		
130.0	131.0	19.420	19.396	36.640	26.174	251.84	27.11	0.472		
140.0	141.0	19.389	19.363	36.640	26.182	251.75	26.89	0.468		
150.0	151.1	19.350	19.322	36.637	26.191	251.04	26.02	0.467		
160.0	161.2	19.325	19.295	36.636	26.197	250.61	25.48	0.466		
170.0	171.3	19.300	19.268	36.632	26.201	249.88	24.64	0.465		
180.0	181.3	19.264	19.231	36.631	26.210	248.84	23.45	0.465		
190.0	191.4	19.235	19.200	36.627	26.215	247.19	21.67	0.465		
200.0	201.5	19.205	19.168	36.625	26.221	245.51	19.86	0.465		
210.0	211.6	19.165	19.126	36.621	26.230	243.79	17.98	0.464		
220.0	221.7	19.092	19.052	36.613	26.242	241.01	14.89	0.463		
230.0	231.7	18.972	18.930	36.604	26.267	238.05	11.41	0.463		
240.0	241.8	18.919	18.875	36.603	26.280	236.34	9.48	0.463		
250.0	251.9	18.835	18.790	36.596	26.297	236.75	9.52	0.464		

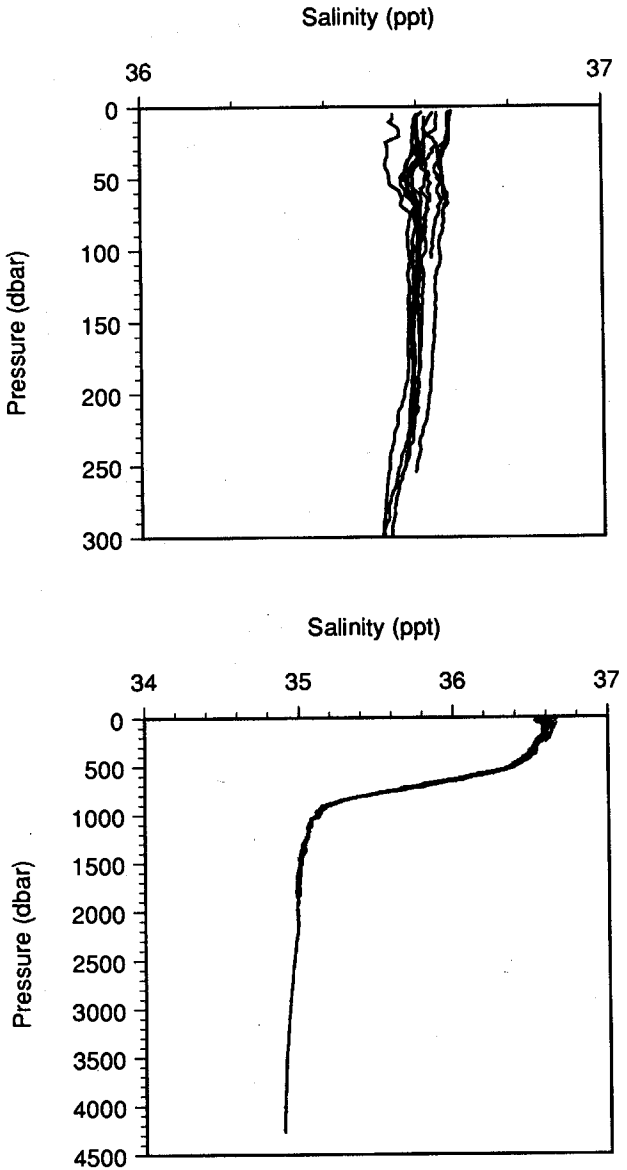
BATS 6, CTD Cast 12
27 March, 1989; Start:10:00; End:10:15
Lat: 30.847 N; Long: 63.741 W

Depth (m)	Pres (db)	Temp (°C)	Pot.T (°C)	CTD Sal (ppt)	Sigma-t (kg/m^3)	CTD O_2 (μmole/kg)	O_2 Anom (μmole/kg)	BAC (m^{-1})	PAR ($\mu E/m^2/s$)	Fluor (rfu)
3.0	3.0	20.801	20.800	36.677	25.827	240.45	21.33	0.492		
10.0	10.1	20.798	20.796	36.673	25.825	237.67	18.53	0.492		
20.0	20.1	20.787	20.783	36.671	25.827	240.96	21.77	0.493		
30.0	30.2	20.583	20.578	36.660	25.874	243.60	23.59	0.495		
40.0	40.3	20.421	20.413	36.649	25.911	243.94	23.28	0.495		
50.0	50.4	20.367	20.358	36.653	25.929	244.80	23.93	0.497		
60.0	60.4	20.269	20.257	36.658	25.960	246.36	25.10	0.497		

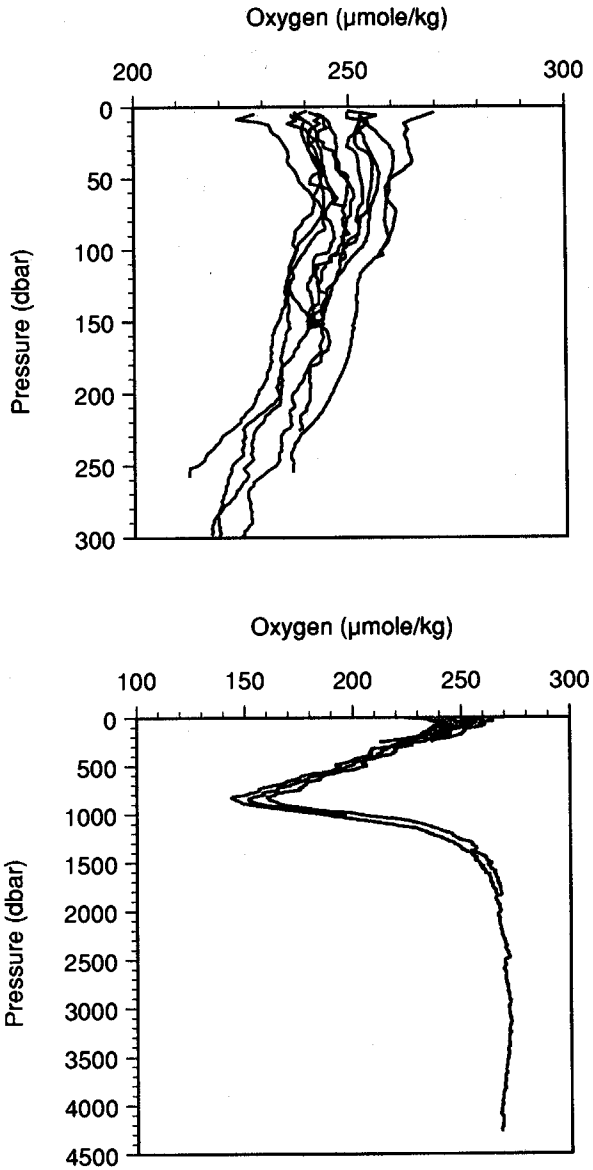
BATS 6—CTD Temperature Profile



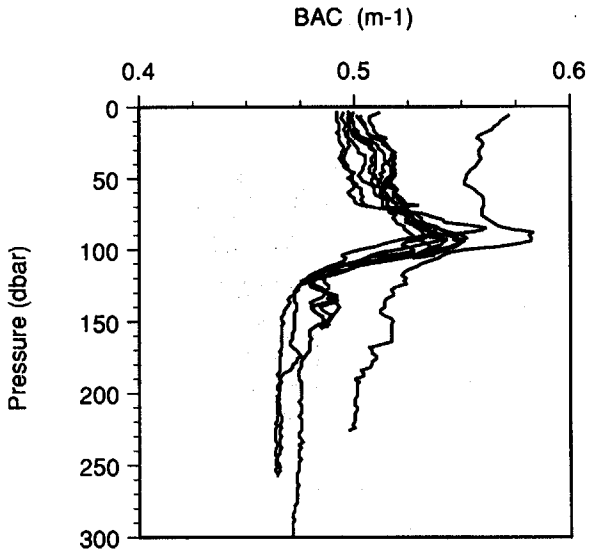
BATS 6—CTD Salinity Profile



BATS 6—CTD Oxygen Profile



BATS 6—CTD BAC Profile



BATS 6—Bottle Data
March 24-28, 1989
Physical Parameters

Bottle ID	Depth (m)	Pressure (db)	Temp (°C)	Pot. Temp (°C)	Salinity (ppt)	Sigma-t (kg/m^3)
G0609N10	6.1	6.1	21.035	21.034	36.624	25.723
G0609N09	17.1	17.2	20.934	20.931	36.626	25.753
G0609N08	27.1	27.3	20.534	20.529	36.625	25.861
G0609N07	37.1	37.4	20.400	20.393	36.614	25.890
G0609G02	54.8	55.2	20.190	20.180	36.615	25.948
G0609N06	69.5	70.0	19.801	19.788	36.615	26.052
G0609N05	81.2	81.8	19.813	19.798	36.614	26.048
G0609G01	102.4	103.1	19.494	19.475	36.616	26.135
G0609N03	150.7	151.8	19.313	19.285	36.607	26.177
G0609N02	199.8	201.3	19.188	19.151	36.599	26.206
G0609N01	249.6	251.5	18.830	18.785	36.572	26.280
G0610N02	15.3	15.4	20.931			
G0610N01	91.1	91.8	19.626	19.609	36.617	26.100
G0611N10	4.5	4.5	20.805			
G0611N09	16.0	16.1	20.792			
G0611N08	26.5	26.7	20.785			
G0611N07	33.0	34.2	20.449			
G0611G02	54.5	54.9	20.320			
G0611N05	81.2	81.8	19.813			
G0611N04	91.3	92.0	19.729			
G0611G01	102.6	103.3	19.638			
G0611N03	150.4	151.5	19.350			
G0611N02	201.2	202.7	19.205			
G0611N01	254.3	256.3	18.805			
G0608N10	5.4	5.4	20.926	20.925	36.624	25.753
G0608N09	15.7	15.8	20.897	20.894	36.627	25.764
G0608N08	25.0	25.2	20.582	20.577	36.656	25.872
G0608N07	37.1	37.4	20.414	20.407	36.616	25.887
G0608G02	52.9	53.3	20.360	20.350	36.673	25.946
G0608N06	71.3	71.8	19.937	19.924	36.626	26.024
G0608N05	90.9	91.6	19.661	19.644	36.617	26.091
G0608N04	103.9	104.7	19.495	19.476	36.682	26.185
G0608G01	1199.4	1211.3	5.147	5.030	35.042	27.705
G0608N03	1402.7	1417.3	4.500	4.366	35.012	27.757
G0608N02	1605.0	1622.5	4.142	3.988	35.000	27.788
G0608N01	1799.9	1820.4	3.934	3.758	34.990	27.803

Bottle ID	Depth (m)	Pressure (db)	Temp (°C)	Pot. Temp (°C)	Salinity (ppt)	Sigma-t (kg/m^3)
G0602N10	307.0	309.4	18.447	18.392	36.540	26.355
G0602N09	306.5	308.9	18.444	18.389	36.540	26.356
G0602N08	405.4	408.6	18.058	17.986	36.498	26.425
G0602N07	504.3	508.4	17.323	17.235	36.393	26.528
G0602G02	505.1	509.2	17.312	17.224	36.391	26.529
G0602N06	606.3	611.4	15.623	15.524	36.104	26.707
G0602N05	757.2	763.9	12.200	12.093	35.587	27.028
G0602N04	755.4	762.1	12.252	12.145	35.586	27.017
G0602G01	808.0	815.2	11.090	10.981	35.434	27.117
G0602N03	906.2	914.5	8.665	8.558	35.168	27.320
G0602N02	1003.8	1013.3	7.044	6.936	35.126	27.527
G0602N01	1006.2	1015.7	7.011	6.902	35.126	27.532
G0601N10	2007.9	2031.7	3.795	3.595	34.991	27.821
G0601N09	2204.3	2231.5	3.628	3.404	34.986	27.836
G0601N08	2404.3	2435.1	3.374	3.126	34.974	27.852
G0601N07	2601.3	2635.9	3.158	2.886	34.971	27.872
G0601G02	2808.5	2847.2	2.915			
G0601N06	3006.3	3049.2	2.731	2.407	34.937	27.888
G0601N05	3208.0	3255.3	2.548	2.196	34.923	27.894
G0601N04	3402.0	3453.7	2.409	2.029	34.913	27.900
G0601G01	3604.0	3660.5	2.321	1.909	34.922	27.917
G0601N03	3805.6	3867.1	2.271	1.826	34.903	27.908
G0601N02	4007.9	4074.6	2.239	1.759	34.905	27.915
G0601N01	4198.2	4269.9	2.229	1.715	34.915	27.926
G0612N01	71.6	72.1	19.880			

BATS 6—Bottle Data
March 24-28, 1989
Gases

Bottle ID	Depth (m)	$O_2(1)$ (µmole/kg)	$O_2(2)$ (µmole/kg)	$O_2(1)$ anomaly (µmole/kg)	$O_2(2)$ anomaly (µmole/kg)	TCO_2 (µmole/kg)
G0609N10	6.1	234.30		15.75		
G0609N09	17.1	233.86		14.87		
G0609N08	27.1	237.74		16.91		
G0609N07	37.1	237.30		15.86		
G0609G02	54.8	242.94		20.59		
G0609N06	69.5	238.57	240.30	14.52	16.26	
G0609N05	81.2		238.57		14.60	
G0609G01	102.4	233.77		8.47		
G0609N03	150.7		230.72		4.76	
G0609N02	199.8	228.98		2.61		
G0609N01	249.6	218.54	216.80	-9.25	-10.99	
G06010N02	15.3					
G06010N01	91.1	235.08		10.32		

Bottle ID	Depth (m)	$O_2(1)$ (µmole/kg)	$O_2(2)$ (µmole/kg)	$O_2(1)$ anomaly (µmole/kg)	$O_2(2)$ anomaly (µmole/kg)	TCO_2 (µmole/kg)
G0611N10	4.5					2034.8
G0611N09	16.0					2023.9
G0611N08	26.5					2026.2
G0611N07	33.0					
G0611G02	54.5					2022.6
G0611N05	81.2					2023.1
G0611N04	91.3					2042.6
G0611G01	102.6					2043.1
G0611N03	150.4					2051.4
G0611N02	201.2					2056.3
G0611N01	254.3					2066.1
G0608N10	5.4	238.21		19.14		
G0608N09	15.7	237.34		18.16		
G0608N08	25.0	239.05		18.47		
G0608N07	37.1	239.48		18.10		
G0608G02	52.9	237.29		15.79		
G0608N06	71.3	232.49		9.07		
G0608N05	90.9	235.08		10.48		
G0608N04	103.9	230.28		5.09		
G0608G01	1199.4	239.61		-43.98		
G0608N03	1402.7	253.05	253.05	-34.38	-34.38	
G0608N02	1605.0		260.85		-28.66	
G0608N01	1799.9	264.32		-26.32		
G0602N10	307.0	208.53		-20.72		
G0602N09	306.5	208.53		-20.74		
G0602N08	405.4	207.65	209.39	-22.97	-21.23	
G0602N07	504.3	201.56		-31.83		
G0602G02	505.1	202.43		-31.00		
G0602N06	606.3	180.26	180.26	-59.58	-59.58	
G0602N05	757.2	159.82		-92.30		
G0602N04	755.4	158.52	159.82	-93.43	-92.13	
G0602G01	808.0	153.30		-102.87		
G0602N03	906.2	154.59	154.59	-111.27	-111.27	
G0602N02	1003.8	190.60		-82.59		
G0602N01	1006.2	189.29	187.56	-84.06	-85.79	
G0601N10	2007.9	266.05		-25.24		
G0601N09	2204.3	265.61	265.61	-26.66	-26.66	
G0601N08	2404.3	266.47		-27.58		
G0601N07	2601.3	269.94	269.94	-25.68	-25.68	
G0601G02	2808.5					
G0601N06	3006.3	271.23	271.23	-27.90	-27.90	
G0601N05	3208.0					
G0601N04	3402.0		270.79		-31.32	
G0601G01	3604.0	269.48		-33.53		
G0601N03	3805.6	271.21	271.65	-32.46	-32.03	
G0601N02	4007.9	270.78	269.48	-33.42	-34.72	
G0601N01	4198.2	267.30	267.30	-37.24	-37.24	
G0612N01	71.6					2024.1

BATS 6—Bottle Data
March 24-28, 1989
Nutrients

Bottle ID	Depth (m)	Nitrate+Nitrite (µmole/kg)	Phosphate (µmole/kg)	Silicate (µmole/kg)
G0609N10	6.1	0.03	0.00	0.91
G0609N09	17.1	0.05	0.00	0.97
G0609N08	27.1	0.03	0.00	0.81
G0609N07	37.1	0.03	0.00	0.77
G0609G02	54.8	0.05	0.00	0.86
G0609N06	69.5	0.01	0.00	0.98
G0609N05	81.2	0.05	0.00	0.85
G0609G01	102.4	0.92	0.00	0.95
G0609N03	150.7	1.11	0.00	0.95
G0609N02	199.8	1.48	0.03	0.98
G0609N01	249.6	2.73	0.04	1.16
G0610N02	15.3			
G0610N01	91.1	0.28	0.00	0.91
G0608N10	5.4	0.18	0.00	1.04
G0608N09	15.7	0.14	0.00	0.61
G0608N08	25.0	0.27	0.00	0.94
G0608N07	37.1	0.20	0.00	1.00
G0608G02	52.9	0.15	0.00	0.80
G0608N06	71.3	0.06	0.00	1.04
G0608N05	90.9	0.05	0.00	1.08
G0608N04	103.9	0.97	0.00	1.28
G0608G01	1199.4	18.90	1.16	11.94
G0608N03	1402.7	18.30	1.10	11.52
G0608N02	1605.0	17.69		11.91
G0608N01	1799.9	17.41	1.11	12.29
G0602N10	307.0	3.42	0.08	1.53
G0602N09	306.5	3.35	0.07	1.38
G0602N08	405.4	4.44	0.13	1.59
G0602N07	504.3	6.50	0.23	2.20
G0602G02	505.1	6.56	0.28	2.44
G0602N06	606.3	10.99	0.53	3.92
G0602N05	757.2	17.99	1.06	8.42
G0602N04	755.4	18.20	1.05	8.36
G0602G01	808.0	20.37	1.25	10.36
G0602N03	906.2	23.08	1.48	13.86
G0602N02	1003.8	21.55	1.38	13.62
G0602N01	1006.2	21.41	1.41	13.38

Bottle ID	Depth (m)	Nitrate+Nitrite (µmole/kg)	Phosphate (µmole/kg)	Silicate (µmole/kg)
G0601N10	2007.9	17.84	1.10	13.49
G0601N09	2204.3	18.23	1.17	15.43
G0601N08	2404.3	18.05	1.17	16.75
G0601N07	2601.3	18.10	1.15	17.53
G0601G02	2808.5			
G0601N06	3006.3	18.02	1.17	20.78
G0601N05	3208.0			22.35
G0601N04	3402.0	18.05	1.20	24.37
G0601G01	3604.0	18.43	1.23	25.86
G0601N03	3805.6	18.69	1.26	28.05
G0601N02	4007.9	18.69	1.28	30.42
G0601N01	4198.2	19.03		31.03

BATS 6—Bottle Data
March 24-28, 1989
Particulates

Bottle ID	Depth (m)	Chl *a* (µg/kg)	POC (µg/kg)	PON (µg/kg)	Bacteria (# x 10^8/kg)
G0609N10	6.1		19.30	2.56	2.83
G0609N09	17.1		20.02	3.11	3.22
G0609N08	27.1		20.94	3.18	3.07
G0609N07	37.1		21.56	3.51	3.34
G0609G02	54.8		34.14	3.96	3.49
G0609N06	69.5		20.95	3.70	4.01
G0609N05	81.2		22.42	4.24	3.06
G0609G01	102.4		13.78	2.72	4.51
G0609N03	150.7		12.01	1.76	1.73
G0609N02	199.8		9.79	1.45	1.43
G0609N01	249.6		22.21	1.86	
G0610N02	15.3				
G0610N01	91.1		26.82	5.36	3.36
G0611N10	4.5	0.051			
G0611N09	16.0	0.057			
G0611N08	26.5	0.057			
G0611N07	33.0	0.058			
G0611G02	54.5	0.095			
G0611N05	81.2	0.437			
G0611N04	91.3	0.496			
G0611G01	102.6	0.477			
G0611N03	150.4	0.048			
G0611N02	201.2	0.020			
G0611N01	254.3	0.012			

Bottle ID	Depth (m)	Chl *a* (μg/kg)	POC (μg/kg)	PON (μg/kg)	Bacteria (# x 10^8/kg)
G0608N10	5.4		24.20	3.72	
G0608N09	15.7		26.38	3.48	
G0608N08	25.0		26.76	3.99	
G0608N07	37.1		21.15	3.38	
G0608G02	52.9		19.78	2.82	
G0608N06	71.3		23.85	3.50	
G0608N05	90.9		31.76	5.19	
G0608N04	103.9		24.54	4.96	
G0608G01	1199.4				
G0608N03	1402.7				0.47
G0608N02	1605.0				
G0608N01	1799.9				
G0602N10	307.0		7.52	1.36	1.49
G0602N09	306.5		8.42	1.23	
G0602N08	405.4				
G0602N07	504.3		9.70	1.55	0.61
G0602G02	505.1		7.75	0.95	
G0602N06	606.3				
G0602N05	757.2		11.01	1.21	0.83
G0602N04	755.4		8.87	1.52	
G0602G01	808.0				
G0602N03	906.2				
G0602N02	1003.8		19.69	1.43	0.69
G0602N01	1006.2		11.47	1.33	
G0601N10	2007.9				0.57
G0601N09	2204.3				
G0601N08	2404.3				
G0601N07	2601.3				0.39
G0601G02	2808.5				
G0601N06	3006.3				0.29
G0601N05	3208.0				
G0601N04	3402.0				
G0601G01	3604.0				
G0601N03	3805.6				
G0601N02	4007.9				
G0601N01	4198.2				
G0611N06	71.6	0.183			

BATS 6, Primary Production Data

R.V. Cape Henlopen

Light Bottles		Dark Bottles		Time-zero Bottles	
Depth (m)	Lt. Prod ($mg/m^2/day$)	Depth (m)	Dk. Prod ($mg/m^2/day$)	Depth (m)	TØ Prod ($mg/m^2/day$)
4.0	4.11	4.0	0.36	4.0	0.30
4.0	4.47				
4.0	4.56				
15.0	3.17	15.0	0.35	15.0	0.32
15.0	3.02				
15.0	3.42				
25.0	4.17	25.0	0.46	25.0	0.29
25.0	4.28				
25.0	4.34				
35.0	4.38	35.0	0.40	35.0	0.37
35.0	3.56				
35.0	3.87				
53.0	3.42	53.0	0.40	53.0	0.33
53.0	3.15				
53.0	3.51				
70.0	0.86	70.0	0.44	70.0	0.35
70.0	0.86				
70.0	0.80				

Sediment Trap Estimated Particle Fluxes

Depth (m)	Sample #	Mass ($mg/m^2/d$)	Total Carbon ($mg\ C/m^2/d$)	Organic Carbon ($mg\ C/m^2/d$)	Nitrogen ($mg\ N/m^2/d$)
150	25	130.8	34.86		5.64
150[1]	25			30.96	5.68
150	26	80.3	17.77		2.21
150[1]	26			12.89	2.46
200	28	100.0	20.39		2.71
200[1]	28			14.73	2.68
200	29	55.6	14.82		1.97
200[1]	29			11.20	1.94
300	31	68.4	14.34		1.51
300[1]	31			10.11	1.60
300	32	74.4	18.56		2.06
300[1]	32			14.73	2.27
400[2]	34,35	53.8	10.35		0.61
400[1,2]	34,35			7.33	0.55

1. Subsample acidified to remove carbonates.
2. Due to low weight, samples from the two traps were combined.

Cruise Report, BATS 7

Cruise dates: April 15, 1989 - April 18, 1989
Personnel: R.L. Sherriff-Dow, R. Johnson, K. Gundersen, M. Tuel, V. Fabrey, E. DeCouto, S. Mundy
R.V. Cape Henlopen

April 15, 1989

Depart St. George at 0900 hrs.

Stop for trap water at 1100.

Deploy sediment traps at 1400. One trap lost from 200 m.
Lat: 31.544 N; Long: 64.257 W

Attempt 4200m cast at 1450.
Lat: 31.635 N; Long: 64.208 W
Wind: E at 15-20 K, seas calm (4')

Lost contact with CTD at 2000 m—new termination.

Attempted CTD cast, contact lost soon after deployment at 1645.

April 16, 1989

Begin 4200m cast at 0700. Still having problems—receiving error messages from CTD.

0915-1000 — **Cast 1**, 300-1000m Lat: 31.583 N; Long: 64.264 W
Sunny, seas 4 ft.
Wind: SSE at 12K

Nominal depths: 300, 300, 400, 500, 500, 600, 750, 750, 800, 900, 1000, 1000 m.

Samples: 12 oxygen - duplicates
12 salinities
12 NO_3, PO_4, SiO_2
8 PON/ POC
3 Bacteria

POC/PON samples mixed up. Steam back to 0930 position for cast just for POC/PON.

1215 - Light casts: Lat: 31.606 N; Long: 64.226 W

CTD **Cast 2**, 0-150m
CTD **Cast 3**, 0-160m
CTD **Cast 4**, 0-150m

1415 - **Cast 5** 0-210m, Lat: 31.605 N; Long:64.229 W

1525-1615 **Cast 6** to 1000m
Wind: S at 21 K, seas 4'.
Lat: 31.582 N; Long: 64° 264 W

1740 - **Cast 7**, 4200m, on deck at 2130.
Wind: S at 15-20K
Lat: 31.603 N Long: 64.243 W

Nominal depths: 2000, 2200, 2400, 2600, 2800, 3000, 3200, 3400, 3600, 3800, 4000, 4200 m.

Samples:

dissolved O_2 -duplicates	12 depths
salinity	12 depths
NO_3, PO_4, SiO_4	12 depths
Bacteria	2000, 2400, 3000m

April 17, 1989

Hydrocast for primary production water at 0300 to 75m. Primary production mooring out.

0910 - **Cast 8**,1800m. On deck at 1030.
Lat: 31.578 N; Long: 64.213 W
Heavy rains and completely overcast, winds 15 K

Nominal depths: 5, 17, 32, 50, 64, 75, 85, 95, 1200, 1400, 1600, 1800 m.

Samples: 12 oxygen - duplicates
12 salinities
12 NO_3, PO_4, SiO_2
8 PON/ POC

1610 - **Cast 9**, 250m
wind: 10-15K
Lat: 31.556 N; Long: 64.236 W

Nominal depths: 5, 17, 32, 50, 70, 81, 90, 106, 115, 150, 200, 250 m.

Samples: 12 oxygen - duplicates
12 salinities
12 NO_3, PO_4, SiO_2
8 PON/ POC
11 $C0_2$ - Brewer (1 surface replicate)

April 18, 1989

0930 - **Cast 10**, 250m for chlorophyll *a* and bacterial abundance.
Lat: 31.515 N; Long: 64.256 W

Pick up sediment traps at 1330—Lat: 31.508 N Long: 64.263W

Leave BATS station at 1400.

Return to BBSR at 1945.

CTD Sensor Corrections to Bottle Data for BATS 7:

On BATS 3 through BATS 7 cruises on the R.V. Cape Henlopen, a Neil Brown Mark-IIIB CTD system was used as per the University of Delaware, normal operating procedures. They applied a single correction factor for salinity on all CTD casts on these cruises. These correction factors are detailed below. They also applied a 7.5 db correction to all pressure measurements to correct a 7.5 db negative offset in the Neil Brown pressure sensor. CTD Oxygen corrections were performed at BBSR using the CTD oxygen and the bottle measurements as per the equation described below. This fitting equation differs from the equation used in BATS 1-6 and in BATS 8 and beyond, however gives a much better fit for this particular cruise R.V. Cape Henlopen cruise. All subsequent cruises use the polynomial regression described in the beginning of this data report. Uncorrected data are available upon request from BBSR.

Salinity:

$$DS = \sum_{i=0}^{n} R_i C^i$$

Where:

DS = Wet Salinity - CTD Salinity
R_i = regression coefficients
C^i = conductivity backcalculated from bottle salinity measurement (milliMohs)
n = order of the polynomial function

R_0 = 0.104304
$R_1^{\emptyset}$ = -0.00623
R_2^1 = 4.2427E-05

Oxygen:

$$DO = R_{\emptyset} + \sum_{i=1}^{l} A_i \left(\frac{P}{4300}\right)^i + \sum_{i=1}^{m} B_i \left(\frac{T}{30}\right)^i + \sum_{i=1}^{n} C_i \left(\frac{OC}{300}\right)^i$$

MO = OC + 300 x DO

Where:

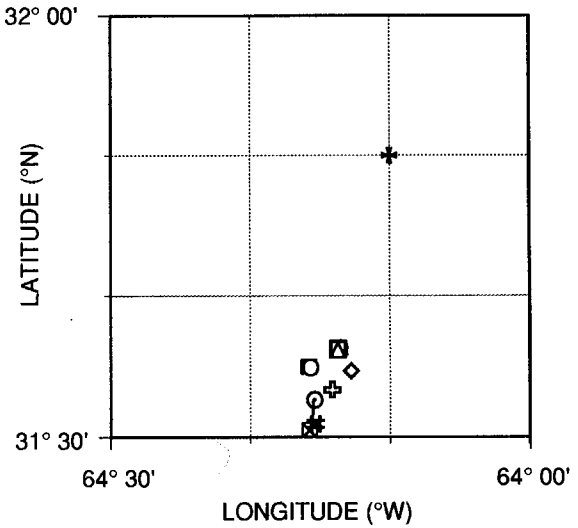
$R_{\emptyset}$ = linear Offset
P = pressure (dbar)
T = temperature (°C)
DO = (wet oxygen - CTD oxygen)/300
OC = uncorrected CTD oxygen

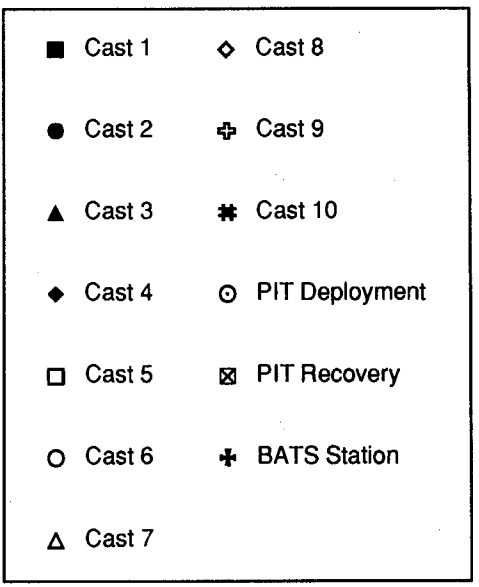
MO = modified oxygen (μmole/kg)
$R_{ø}$, A_i, B_i, C_i = regression coefficients
l, m, n = order of the polynomial functions
l = 4; m = 3; n = 4

$R_{ø}$ = -1.9169021e+00
A_1 = -1.5455103e+00
A_2 = 2.9941261e+00
A_3 = -3.9689816e+00
A_4 = 1.9240572e+00
B_1 = -7.2014966e+00
B_2 = 1.5094512e+01
B_3 = -1.0031418e+01
C_1 = 2.0101386e+01
C_2 = -4.5449226e+01
C_3 = 4.3630150e+01
C_4 = -1.5428335e+01

model correlation coefficient = 9.991e-01
standard deviation of model residuals = 1.504e+00 μmole/kg

BATS 7—Cast Positions:





BATS 7, CTD Cast 1
16 April 1989; Start 09:15; End 10:00
Lat: 31.583 N; Long: 64.264 W

Depth (m)	Pres (db)	Temp (°C)	Pot.T (°C)	CTD Sal (ppt)	Sigma-t (kg/m^3)	CTD 0_2 (μmole/kg)	0_2 Anom (μmole/kg)	BAC (m^{-1})	PAR ($\mu E/m^2/s$)	Fluor (rfu)
3.0	3.0	20.806	20.805	36.590	25.760	245.62	26.39			
10.0	10.1	20.806	20.804	36.588	25.759	245.62	26.38			
20.0	20.1	20.802	20.798	36.587	25.759	243.41	24.16			
30.0	30.2	20.786	20.780	36.591	25.768	241.86	22.55			
40.0	40.3	20.589	20.581	36.632	25.853	243.21	23.18			
50.0	50.4	20.352	20.343	36.641	25.924	244.73	23.78			
60.0	60.4	19.883	19.872	36.627	26.038	246.83	23.97			
70.0	70.5	19.689	19.676	36.626	26.090	246.80	23.16			
80.0	80.6	19.562	19.547	36.623	26.121	245.46	21.29			
90.0	90.6	19.471	19.455	36.622	26.145	243.45	18.91			
100.0	100.7	19.385	19.367	36.612	26.160	240.85	15.94			
110.0	110.8	19.351	19.331	36.622	26.177	237.92	12.88			
120.0	120.9	19.304	19.281	36.622	26.190	236.50	11.26			
130.0	131.0	19.258	19.234	36.620	26.201	235.06	9.63			
140.0	141.0	19.209	19.183	36.617	26.212	233.27	7.64			
150.0	151.1	19.154	19.126	36.613	26.223	231.51	5.63			
160.0	161.2	19.054	19.025	36.603	26.242	230.43	4.13			
170.0	171.3	18.980	18.949	36.594	26.255	228.31	1.68			
180.0	181.3	18.920	18.887	36.593	26.269	225.79	-1.09			
190.0	191.4	18.829	18.795	36.583	26.285	223.76	-3.51			
200.0	201.5	18.727	18.690	36.573	26.305	222.11	-5.61			
210.0	211.6	18.634	18.596	36.568	26.324	220.62	-7.50			
220.0	221.7	18.562	18.523	36.562	26.338	219.31	-9.12			
230.0	231.7	18.499	18.458	36.556	26.351	217.81	-10.90			
240.0	241.8	18.447	18.404	36.552	26.361	216.54	-12.40			
250.0	251.9	18.372	18.328	36.542	26.372	215.32	-13.96			
275.0	277.1	18.226	18.177	36.523	26.396	211.23	-18.70			
300.0	302.3	18.044	17.991	36.501	26.425	208.93	-21.82			
325.0	327.5	17.854	17.797	36.473	26.452	205.13	-26.49			
350.0	352.7	17.639	17.578	36.443	26.483	201.62	-31.00			
375.0	378.0	17.436	17.371	36.413	26.510	198.51	-35.04			
400.0	403.2	17.206	17.137	36.376	26.539	195.63	-39.01			
425.0	428.4	16.944	16.871	36.328	26.566	191.94	-43.95			
450.0	453.6	16.651	16.575	36.275	26.596	187.31	-50.00			
475.0	478.9	16.212	16.133	36.195	26.638	182.56	-56.91			
500.0	504.1	15.786	15.704	36.121	26.679	178.02	-63.56			
550.0	554.6	15.063	14.975	35.996	26.747	168.34	-76.92			
600.0	605.1	13.689	13.599	35.770	26.867	157.92	-94.58			
650.0	655.6	12.577	12.484	35.601	26.963	149.17	-109.48			
700.0	706.1	11.226	11.132	35.414	27.075	142.07	-124.37			
750.0	756.6	9.889	9.795	35.258	27.189	142.95	-131.60			
800.0	807.2	8.702	8.608	35.154	27.301	152.59	-129.46			
850.0	857.7	7.767	7.672	35.104	27.405	167.24	-120.92			
900.0	908.3	7.121	7.025	35.094	27.490	179.74	-112.73			
950.0	958.9	6.455	6.357	35.081	27.570	196.96	-100.09			
1000.0	1009.4	5.903	5.803	35.056	27.622	213.92	-87.06			

BATS 7, CTD Cast 2
16 April 1989: Start 12:15
Lat: 31.606 N; Long: 64.226 W

Depth (m)	Pres (db)	Temp (°C)	Pot.T (°C)	CTD Sal (ppt)	Sigma-t (kg/m^3)	CTD 0_2 (μmole/kg)	0_2 Anom (μmole/kg)	BAC (m^{-1})	PAR ($\mu E/m^2/s$)	Fluor (rfu)
5.0	5.0	20.959	20.958	36.601	25.726	237.75	19.13	0.507	707.18	
10.0	10.1	20.865	20.863	36.597	25.749	238.57	19.58	0.510	382.73	
20.0	20.1	20.802	20.798	36.597	25.767	238.41	19.17	0.513	137.80	
30.0	30.2	20.797	20.791	36.598	25.770	237.01	17.75	0.514	130.53	
40.0	40.3	20.572	20.564	36.634	25.858	238.26	18.17	0.516	126.75	
50.0	50.4	20.330	20.321	36.644	25.932	240.52	19.48	0.522	113.95	
60.0	60.4	19.851	19.839	36.629	26.049	243.47	20.49	0.524	76.43	
70.0	70.5	19.663	19.650	36.624	26.095	243.07	19.31	0.523	46.72	
80.0	80.6	19.548	19.533	36.625	26.126	240.67	16.44	0.526	29.91	
90.0	90.6	19.430	19.414	36.621	26.155	237.82	13.11	0.553	18.60	
100.0	100.7	19.347	19.329	36.617	26.174	235.72	10.65	0.521	10.16	
110.0	110.8	19.270	19.250	36.614	26.192	233.61	8.23	0.493	6.23	
120.0	120.9	19.224	19.202	36.614	26.204	232.21	6.63	0.480	4.13	
130.0	131.0	19.178	19.154	36.613	26.216	230.80	5.03	0.473	2.94	
140.0	141.0	19.155	19.129	36.610	26.220	229.39	3.52	0.470	2.18	
150.0	151.1	19.082	19.055	36.602	26.233	228.01	1.82	0.469	1.67	

BATS 7, CTD Cast 3
16 April 1989: Start: 12:20
Lat: 31.606 N; Long: 64.226 W

Depth (m)	Pres (db)	Temp (°C)	Pot.T (°C)	CTD Sal (ppt)	Sigma-t (kg/m^3)	CTD 0_2 (μmole/kg)	0_2 Anom (μmole/kg)	BAC (m^{-1})	PAR ($\mu E/m^2/s$)	Fluor (rfu)
5.0	5.0	20.971	20.970	36.573	25.702	237.00	18.39	0.507	720.88	
10.0	10.1	20.925	20.923	36.572	25.714	237.68	18.89	0.508	414.16	
20.0	20.1	20.806	20.803	36.573	25.747	238.19	18.94	0.513	161.39	
30.0	30.2	20.802	20.797	36.575	25.751	237.36	18.10	0.514	174.33	
40.0	40.3	20.621	20.614	36.610	25.827	238.29	18.36	0.516	139.44	
50.0	50.4	20.376	20.367	36.632	25.910	240.07	19.20	0.521	111.31	
60.0	60.4	19.939	19.928	36.616	26.015	242.36	19.72	0.523	81.26	
70.0	70.5	19.689	19.676	36.611	26.078	242.29	18.62	0.523	53.76	
80.0	80.6	19.566	19.552	36.613	26.112	240.66	16.49	0.527	34.18	
90.0	90.6	19.465	19.448	36.610	26.137	238.17	13.58	0.548	20.39	
100.0	100.7	19.357	19.339	36.606	26.163	235.71	10.67	0.526	10.94	
110.0	110.8	19.281	19.261	36.605	26.182	232.90	7.55	0.498	6.38	
120.0	120.9	19.230	19.208	36.606	26.197	230.83	5.26	0.481	4.12	
130.0	131.0	19.181	19.157	36.605	26.209	229.77	4.00	0.474	2.94	
140.0	141.0	19.151	19.125	36.604	26.217	228.04	2.15	0.471	2.17	
150.0	151.1	19.092	19.065	36.597	26.227	226.35	0.19	0.470	1.59	
160.0	161.2	18.985	18.956	36.585	26.245	224.64	-1.97	0.469	1.17	

BATS 7, CTD Cast 4
16 April 1989: Start: 12:25
Lat: 31.606 N; Long: 64.226 W

Depth (m)	Pres (db)	Temp (°C)	Pot.T (°C)	CTD Sal (ppt)	Sigma-t (kg/m^3)	CTD 0_2 (μmole/kg)	0_2 Anom (μmole/kg)	BAC (m^{-1})	PAR ($\mu E/m^2/s$)	Fluor (rfu)
6.0	6.0	20.975	20.974	36.572	25.700	236.96	18.36	0.506	678.16	
10.0	10.1	20.958	20.956	36.572	25.705	237.25	18.58	0.506	417.94	
20.0	20.1	20.812	20.808	36.571	25.744	236.91	17.68	0.513	220.48	
30.0	30.2	20.804	20.798	36.575	25.750	236.67	17.41	0.515	138.69	
40.0	40.3	20.619	20.611	36.609	25.827	238.67	18.73	0.517	136.43	
50.0	50.4	20.376	20.367	36.631	25.910	240.26	19.39	0.522	116.93	
60.0	60.4	19.963	19.951	36.616	26.009	242.42	19.87	0.523	81.06	
70.0	70.5	19.704	19.691	36.608	26.072	242.66	19.05	0.525	53.87	
80.0	80.6	19.572	19.558	36.611	26.109	241.22	17.07	0.527	34.59	
90.0	90.6	19.490	19.473	36.611	26.131	238.71	14.22	0.545	21.04	
100.0	100.7	19.374	19.356	36.607	26.159	235.75	10.78	0.534	11.56	
110.0	110.8	19.307	19.287	36.607	26.177	233.42	8.17	0.507	6.70	
120.0	120.9	19.240	19.218	36.605	26.194	231.68	6.15	0.485	4.31	
130.0	131.0	19.186	19.162	36.604	26.207	229.61	3.85	0.476	3.02	
140.0	141.0	19.159	19.134	36.605	26.215	228.38	2.52	0.471	2.26	
150.0	151.1	19.112	19.084	36.599	26.224	228.02	1.95	0.469	1.71	

BATS 7, CTD Cast 5
16 April 1989: Start 14:15
Lat: 31.605 N; Long: 64.229 W

Depth (m)	Pres (db)	Temp (°C)	Pot.T (°C)	CTD Sal (ppt)	Sigma-t (kg/m^3)	CTD 0_2 (μmole/kg)	0_2 Anom (μmole/kg)	BAC (m^{-1})	PAR ($\mu E/m^2/s$)	Fluor (rfu)
4.0	4.0	21.025	21.024	36.598	25.706	238.33	19.97	0.507	309.48	
10.0	10.1	20.981	20.979	36.594	25.715	239.38	20.84	0.507	113.19	
20.0	20.1	20.835	20.831	36.594	25.756	239.81	20.69	0.514	228.08	
30.0	30.2	20.704	20.698	36.621	25.812	239.83	20.25	0.512	199.61	
40.0	40.3	20.443	20.435	36.647	25.904	241.50	20.92	0.520	140.16	
50.0	50.4	20.265	20.256	36.641	25.947	242.24	20.94	0.520	102.30	
60.0	60.4	19.969	19.958	36.629	26.017	243.46	20.95	0.522	70.94	
70.0	70.5	19.650	19.637	36.618	26.094	243.83	20.01	0.522	47.19	
80.0	80.6	19.494	19.479	36.620	26.137	241.90	17.45	0.544	28.65	
90.0	90.6	19.391	19.375	36.615	26.160	238.76	13.88	0.548	15.01	
100.0	100.7	19.320	19.302	36.615	26.179	235.78	10.60	0.508	8.18	
110.0	110.8	19.262	19.242	36.614	26.194	233.58	8.16	0.488	5.18	
120.0	120.9	19.224	19.202	36.612	26.203	232.18	6.60	0.480	3.52	
130.0	131.0	19.179	19.156	36.609	26.213	230.80	5.02	0.472	2.44	
140.0	141.0	19.126	19.101	36.605	26.224	228.90	2.90	0.467	1.79	
150.0	151.1	19.036	19.009	36.594	26.239	226.51	0.12	0.466	1.33	
160.0	161.2	18.958	18.928	36.584	26.252	225.00	-1.73	0.467	0.31	
170.0	171.3	18.903	18.872	36.582	26.265	223.64	-3.33	0.467	0.00	
180.0	181.3	18.802	18.769	36.573	26.284	221.75	-5.66	0.466	0.00	
190.0	191.4	18.732	18.698	36.567	26.298	219.98	-7.73	0.466	0.00	
200.0	201.5	18.659	18.623	36.560	26.312	218.09	4	0.466	0.00	
210.0	211.6	18.572	18.534	36.553	26.329	216.31	-12.10	0.466	0.00	

BATS 7, CTD Cast 6
16 April 1989: Start: 15:25
Lat: 31.582 N; Long: 64.243 W

Depth (m)	Pres (db)	Temp (°C)	Pot.T (°C)	CTD Sal (ppt)	Sigma-t (kg/m^3)	CTD 0_2 (μmole/kg)	0_2 Anom (μmole/kg)	BAC (m^{-1})	PAR ($\mu E/m^2/s$)	Fluor (rfu)
4.0	4.0	21.044	21.043	36.589	25.694	240.49	22.19	0.501	177.68	
10.0	10.1	20.999	20.998	36.586	25.704	237.81	19.33	0.502	115.18	
20.0	20.1	20.829	20.825	36.578	25.745	238.34	19.18	0.507	152.64	
30.0	30.2	20.756	20.750	36.586	25.771	239.35	19.92	0.506	126.49	
40.0	40.3	20.452	20.445	36.629	25.887	242.23	21.66	0.510	91.60	
50.0	50.4	20.333	20.324	36.624	25.916	242.57	21.52	0.510	63.71	
60.0	60.4	19.921	19.910	36.600	26.008	244.72	21.98	0.518	42.45	
70.0	70.5	19.585	19.572	36.596	26.094	244.91	20.80	0.516	26.71	
80.0	80.6	19.483	19.468	36.597	26.122	242.66	18.12	0.515	16.31	
90.0	90.6	19.439	19.422	36.604	26.140	240.22	15.51	0.521	9.08	
100.0	100.7	19.342	19.324	36.599	26.161	237.71	12.60	0.514	5.15	
110.0	110.8	19.247	19.227	36.597	26.185	234.37	8.86	0.485	3.08	
120.0	120.9	19.204	19.182	36.597	26.196	232.05	6.36	0.477	2.02	
130.0	131.0	19.160	19.136	36.598	26.209	230.81	4.94	0.471	1.42	
140.0	141.0	19.122	19.097	36.596	26.218	229.24	3.21	0.468	0.30	
150.0	151.1	19.080	19.053	36.592	26.226	228.03	1.82	0.464	0.00	
160.0	161.2	19.026	18.997	36.587	26.237	226.99	0.55	0.461	0.00	
170.0	171.3	18.969	18.938	36.581	26.248	225.72	-0.97	0.461	0.00	
180.0	181.3	18.909	18.876	36.575	26.259	224.67	-2.29	0.460	0.00	
190.0	191.4	18.840	18.806	36.570	26.273	223.26	-3.99	0.459	0.00	
200.0	201.5	18.733	18.697	36.560	26.293	220.89	-6.83	0.459	0.00	
210.0	211.6	18.619	18.582	36.551	26.315	217.93	-10.28	0.459	0.00	
220.0	221.7	18.506	18.467	36.540	26.336	215.96	-12.75	0.459	0.00	
230.0	231.7	18.431	18.390	36.535	26.352	214.88	-14.16	0.459	0.00	
240.0	241.8	18.362	18.319	36.529	26.365	214.07	-15.27	0.459	0.00	
250.0	251.9	18.315	18.270	36.522	26.372	213.00	-16.55	0.459	0.00	
275.0	277.1	18.145	18.096	36.501	26.399	208.74	-21.58	0.459	0.00	
300.0	302.3	17.983	17.930	36.479	26.424	205.65	-25.40	0.459	0.00	
325.0	327.5	17.803	17.746	36.452	26.448	201.94	-29.94	0.458	0.00	
350.0	352.7	17.614	17.553	36.426	26.476	199.41	-33.35	0.459	0.00	
375.0	378.0	17.441	17.376	36.402	26.501	196.42	-37.14	0.459	0.00	
400.0	403.2	17.228	17.159	36.368	26.528	193.71	-40.84	0.459	0.00	
425.0	428.4	16.988	16.915	36.326	26.553	190.68	-45.02	0.459	0.00	
450.0	453.6	16.811	16.735	36.293	26.572	186.46	-50.09	0.459	0.00	
475.0	478.9	16.430	16.351	36.222	26.608	182.42	-55.99	0.459	0.00	
500.0	504.1	15.998	15.916	36.147	26.651	177.15	-63.39	0.461	0.00	
550.0	554.6	15.071	14.983	35.988	26.738	168.22	-77.01	0.461	0.00	
600.0	605.1	14.092	14.000	35.825	26.826	158.02	-92.34	0.461	0.00	
650.0	655.6	13.035	12.940	35.660	26.917	149.26	-106.85	0.462	0.00	
700.0	706.1	11.785	11.688	35.485	27.026	140.68	-122.50	0.462	0.00	
750.0	756.6	10.294	10.198	35.292	27.147	138.00	-134.07	0.463	0.00	
800.0	807.2	9.127	9.031	35.181	27.255	145.43	-133.90	0.466	0.00	
850.0	857.7	8.393	8.294	35.130	27.331	153.55	-130.51	0.470	0.00	
900.0	908.3	7.552	7.453	35.090	27.425	167.75	-121.86	0.475	0.00	
950.0	958.9	6.885	6.784	35.083	27.515	181.54	-112.56	0.482	0.00	
1000.0	1009.4	6.318	6.215	35.071	27.581	196.84	-101.19	0.490	0.00	

BATS 7, CTD Cast 7
16 April 1989: Start 17:40; End: 21:30
Lat: 31.603 N; Long: 64.229 W

Depth (m)	Pres (db)	Temp (°C)	Pot.T (°C)	CTD Sal (ppt)	Sigma-t (kg/m^3)	CTD θ_2 (μmole/kg)	θ_2 Anom (μmole/kg)	BAC (m^{-1})	PAR ($\mu E/m^2/s$)	Fluor (rfu)
4.0	4.0	21.076	21.075	36.580	25.678	239.66	21.47			
10.0	10.1	21.060	21.058	36.581	25.684	238.38	20.13			
20.0	20.1	20.900	20.896	36.582	25.729	238.17	19.30			
30.0	30.2	20.818	20.812	36.591	25.758	238.47	19.29			
40.0	40.3	20.546	20.538	36.630	25.863	240.93	20.73			
50.0	50.4	20.306	20.297	36.627	25.926	242.62	21.46			
60.0	60.4	19.806	19.795	36.607	26.044	244.76	21.56			
70.0	70.5	19.587	19.574	36.605	26.101	244.25	20.16			
80.0	80.6	19.459	19.445	36.607	26.136	242.41	17.79			
90.0	90.6	19.353	19.336	36.606	26.163	239.15	14.09			
100.0	100.7	19.300	19.282	36.605	26.177	236.15	10.87			
110.0	110.8	19.254	19.234	36.603	26.188	234.29	8.82			
120.0	120.9	19.237	19.215	36.603	26.193	233.59	8.05			
130.0	131.0	19.198	19.174	36.600	26.200	232.03	6.32			
140.0	141.0	19.165	19.140	36.600	26.210	230.09	4.25			
150.0	151.1	19.112	19.085	36.594	26.220	228.86	2.78			
160.0	161.2	19.054	19.025	36.588	26.231	227.12	0.79			
170.0	171.3	18.959	18.928	36.578	26.248	225.06	-1.68			
180.0	181.3	18.919	18.886	36.574	26.255	223.34	-3.58			
190.0	191.4	18.878	18.844	36.569	26.262	221.95	-5.14			
200.0	201.5	18.840	18.804	36.566	26.270	220.25	-7.00			
210.0	211.6	18.739	18.701	36.559	26.291	218.01	-9.68			
220.0	221.7	18.631	18.592	36.550	26.312	216.28	-11.88			
230.0	231.7	18.537	18.496	36.542	26.331	214.91	-13.66			
240.0	241.8	18.464	18.421	36.536	26.345	214.11	-14.79			
250.0	251.9	18.387	18.342	36.529	26.359	213.33	-15.90			
275.0	277.1	18.247	18.198	36.512	26.382	210.51	-19.35			
300.0	302.3	18.036	17.983	36.482	26.413	207.04	-23.78			
325.0	327.5	17.878	17.821	36.460	26.437	203.56	-27.98			
350.0	352.7	17.670	17.609	36.431	26.466	200.53	-31.97			
375.0	378.0	17.548	17.483	36.413	26.483	197.59	-35.47			
400.0	403.2	17.355	17.286	36.383	26.508	194.56	-39.40			
425.0	428.4	17.171	17.098	36.354	26.531	191.54	-43.29			
450.0	453.6	16.942	16.865	36.312	26.555	187.73	-48.20			
475.0	478.9	16.530	16.450	36.234	26.594	183.11	-54.82			
500.0	504.1	15.995	15.912	36.142	26.648	178.38	-62.18			
550.0	554.6	14.994	14.907	35.970	26.742	167.24	-78.40			
600.0	605.1	13.910	13.819	35.791	26.838	157.53	-93.81			
650.0	655.6	12.739	12.646	35.608	26.935	148.29	-109.48			
700.0	706.1	11.397	11.303	35.429	27.054	141.30	-124.15			
750.0	756.6	10.106	10.011	35.269	27.161	140.29	-132.94			
800.0	807.2	9.041	8.945	35.166	27.258	146.62	-133.29			
850.0	857.7	8.274	8.176	35.115	27.338	156.04	-128.81			
900.0	908.3	7.419	7.321	35.098	27.451	171.83	-118.64			
950.0	958.9	6.661	6.562	35.073	27.537	188.98	-106.67			
1000.0	1009.4	6.025	5.925	35.044	27.597	208.55	-91.59			
1050.0	1060.0	5.557	5.454	35.032	27.647	224.80	-78.71			
1100.0	1110.7	5.305	5.199	35.033	27.678	234.03	-71.29			
1150.0	1161.3	5.119	5.008	35.027	27.696	239.47	-67.23			
1200.0	1211.9	4.978	4.863	35.036	27.720	244.17	-63.56			
1300.0	1313.2	4.638	4.515	35.010	27.739	255.26	-55.05			

Depth (m)	Pres (db)	Temp (°C)	Pot.T (°C)	CTD Sal (ppt)	Sigma-t (kg/m^3)	CTD 0_2 (μmole/kg)	0_2 Anom (μmole/kg)	BAC (m^{-1})	PAR ($\mu E/m^2/s$)	Fluor (rfu)
1400.0	1414.6	4.374	4.241	34.989	27.752	262.26	-50.10			
1500.0	1516.0	4.204	4.062	34.984	27.767	265.37	-48.29			
1600.0	1617.4	4.049	3.896	34.974	27.776	267.75	-47.12			
1700.0	1718.9	3.963	3.800	34.973	27.786	266.80	-48.73			
1800.0	1820.5	3.922	3.746	34.981	27.797	263.84	-52.00			
1900.0	1922.1	3.828	3.641	34.980	27.807	263.28	-53.29			
2000.0	2023.7	3.720	3.522	34.977	27.817	263.43	-53.99			
2100.0	2125.4	3.614	3.404	34.973	27.825	263.61	-54.64			
2200.0	2227.2	3.480	3.259	34.967	27.834	265.50	-53.83			
2300.0	2328.9	3.385	3.152	34.963	27.842	265.16	-54.92			
2400.0	2430.8	3.276	3.030	34.962	27.852	265.62	-55.34			
2500.0	2532.7	3.175	2.917	34.956	27.858	265.88	-55.89			
2600.0	2634.6	3.030	2.761	34.948	27.865	268.76	-54.20			
2700.0	2736.6	2.904	2.622	34.941	27.872	270.87	-53.12			
2800.0	2838.6	2.808	2.513	34.935	27.877	271.39	-53.40			
2900.0	2940.7	2.712	2.404	34.931	27.883	271.96	-53.62			
3000.0	3042.8	2.628	2.306	34.926	27.887	272.01	-54.27			
3100.0	3144.9	2.549	2.214	34.922	27.891	272.15	-54.79			
3200.0	3247.2	2.457	2.108	34.916	27.896	273.12	-54.60			
3300.0	3349.4	2.382	2.019	34.912	27.900	273.60	-54.74			
3400.0	3451.7	2.329	1.951	34.907	27.901	272.88	-55.92			
3500.0	3554.1	2.288	1.894	34.904	27.903	271.75	-57.40			
3600.0	3656.5	2.258	1.848	34.901	27.904	270.68	-58.73			
3700.0	3758.9	2.235	1.809	34.899	27.906	269.42	-60.17			
3800.0	3861.4	2.216	1.774	34.897	27.907	268.43	-61.33			
3900.0	3964.0	2.204	1.744	34.894	27.907	267.41	-62.46			
4000.0	4066.5	2.199	1.722	34.893	27.908	266.92	-62.99			
4100.0	4169.2	2.203	1.707	34.892	27.908	266.63	-63.25			
4200.0	4271.8	2.204	1.690	34.892	27.909	267.22	-62.66			

BATS 7, CTD Cast 8
17 April 1989: Start 09:10; End: 10:30
Lat: 31.578 N; Long: 64.213 W

Depth (m)	Pres (db)	Temp (°C)	Pot.T (°C)	CTD Sal (ppt)	Sigma-t (kg/m^3)	CTD 0_2 (μmole/kg)	0_2 Anom (μmole/kg)	BAC (m^{-1})	PAR ($\mu E/m^2/s$)	Fluor (rfu)
4.0	4.0	20.906	20.905	36.568	25.716	243.50	24.63	0.490		
10.0	10.1	20.960	20.958	36.568	25.701	241.66	23.00	0.491		
20.0	20.1	20.951	20.947	36.567	25.703	240.63	21.93	0.491		
30.0	30.2	20.749	20.743	36.586	25.773	241.64	22.18	0.491		
40.0	40.3	20.459	20.451	36.621	25.879	244.58	24.02	0.496		
50.0	50.4	20.055	20.046	36.609	25.979	247.42	25.24	0.502		
60.0	60.4	19.693	19.682	36.597	26.066	247.79	24.12	0.502		
70.0	70.5	19.511	19.498	36.598	26.115	246.46	22.05	0.507		
80.0	80.6	19.433	19.418	36.598	26.136	243.82	19.08	0.535		
90.0	90.6	19.357	19.340	36.596	26.155	240.63	15.58	0.531		
100.0	100.7	19.309	19.291	36.595	26.167	237.72	12.47	0.501		
110.0	110.8	19.273	19.253	36.596	26.177	235.72	10.32	0.482		
120.0	120.9	19.254	19.232	36.596	26.183	234.15	8.67	0.475		
130.0	131.0	19.207	19.183	36.592	26.192	232.73	7.05	0.465		
140.0	141.0	19.180	19.155	36.592	26.200	231.49	5.70	0.458		
150.0	151.1	19.139	19.112	36.590	26.209	230.25	4.28	0.453		
160.0	161.2	19.084	19.055	36.584	26.220	228.14	1.94	0.453		

Depth (m)	Pres (db)	Temp (°C)	Pot.T (°C)	CTD Sal (ppt)	Sigma-t (kg/m^3)	CTD 0_2 (μmole/kg)	0_2 Anom (μmole/kg)	BAC (m^{-1})	PAR ($\mu E/m^2/s$)	Fluor (rfu)
170.0	171.3	18.932	18.901	36.570	26.248	225.73	-1.13	0.452		
180.0	181.3	18.803	18.770	36.557	26.272	223.57	-3.86	0.451		
190.0	191.4	18.641	18.607	36.546	26.305	221.63	-6.50	0.451		
200.0	201.5	18.568	18.532	36.541	26.320	219.92	-8.53	0.450		
210.0	211.6	18.460	18.422	36.531	26.341	218.51	-10.40	0.450		
220.0	221.7	18.440	18.400	36.531	26.346	216.84	-12.17	0.450		
230.0	231.7	18.384	18.342	36.525	26.356	215.46	-13.79	0.450		
240.0	241.8	18.348	18.305	36.521	26.362	214.07	-15.35	0.450		
250.0	251.9	18.317	18.273	36.517	26.367	213.30	-16.25	0.450		
275.0	277.1	18.181	18.133	36.500	26.389	210.92	-19.24	0.450		
300.0	302.3	18.023	17.970	36.477	26.412	206.47	-24.41	0.450		
325.0	327.5	17.815	17.758	36.448	26.442	203.50	-28.33	0.450		
350.0	352.7	17.656	17.594	36.425	26.465	200.68	-31.89	0.451		
375.0	378.0	17.483	17.418	36.399	26.489	197.51	-35.86	0.450		
400.0	403.2	17.347	17.278	36.379	26.507	194.81	-39.20	0.451		
425.0	428.4	17.096	17.023	36.335	26.535	191.12	-44.08	0.451		
450.0	453.6	16.721	16.645	36.268	26.574	186.53	-50.47	0.451		
475.0	478.9	16.342	16.262	36.199	26.611	181.84	-57.01	0.452		
500.0	504.1	15.943	15.861	36.130	26.650	177.78	-63.05	0.451		
550.0	554.6	14.850	14.763	35.943	26.752	166.64	-79.75	0.453		
600.0	605.1	13.638	13.548	35.746	26.860	156.31	-96.51	0.453		
650.0	655.6	12.539	12.446	35.581	26.955	147.79	-111.10	0.455		
700.0	706.1	11.108	11.015	35.386	27.074	141.13	-126.04	0.453		
750.0	756.6	9.840	9.747	35.236	27.180	142.29	-132.60	0.455		
800.0	807.2	8.944	8.849	35.155	27.264	148.00	-132.53	0.457		
850.0	857.7	7.910	7.815	35.094	27.376	163.28	-123.96	0.460		
900.0	908.3	7.139	7.042	35.072	27.470	177.68	-114.72	0.461		
950.0	958.9	6.557	6.458	35.062	27.542	192.57	-103.82	0.465		
1000.0	1009.4	5.926	5.827	35.040	27.606	211.53	-89.32	0.468		
1050.0	1060.0	5.494	5.392	35.034	27.656	227.06	-76.90	0.468		
1100.0	1110.7	5.209	5.103	35.026	27.684	237.55	-68.49	0.469		
1150.0	1161.3	5.079	4.969	35.034	27.706	240.53	-66.45	0.468		
1200.0	1211.9	4.910	4.796	35.022	27.717	246.97	-61.28	0.468		
1300.0	1313.2	4.517	4.395	34.996	27.741	260.11	-51.14	0.468		
1400.0	1414.6	4.319	4.187	34.983	27.753	264.31	-48.48	0.468		
1500.0	1516.0	4.159	4.017	34.975	27.765	266.96	-47.07	0.466		
1600.0	1617.4	4.019	3.867	34.968	27.775	268.50	-46.61	0.464		
1700.0	1718.9	3.960	3.796	34.971	27.784	266.64	-48.92	0.462		
1800.0	1820.5	3.909	3.733	34.977	27.796	263.62	-52.33	0.459		

BATS 7, CTD Cast 9
17 April 1989: Start 16:10
Lat: 31.556 N; Long: 64.236 W

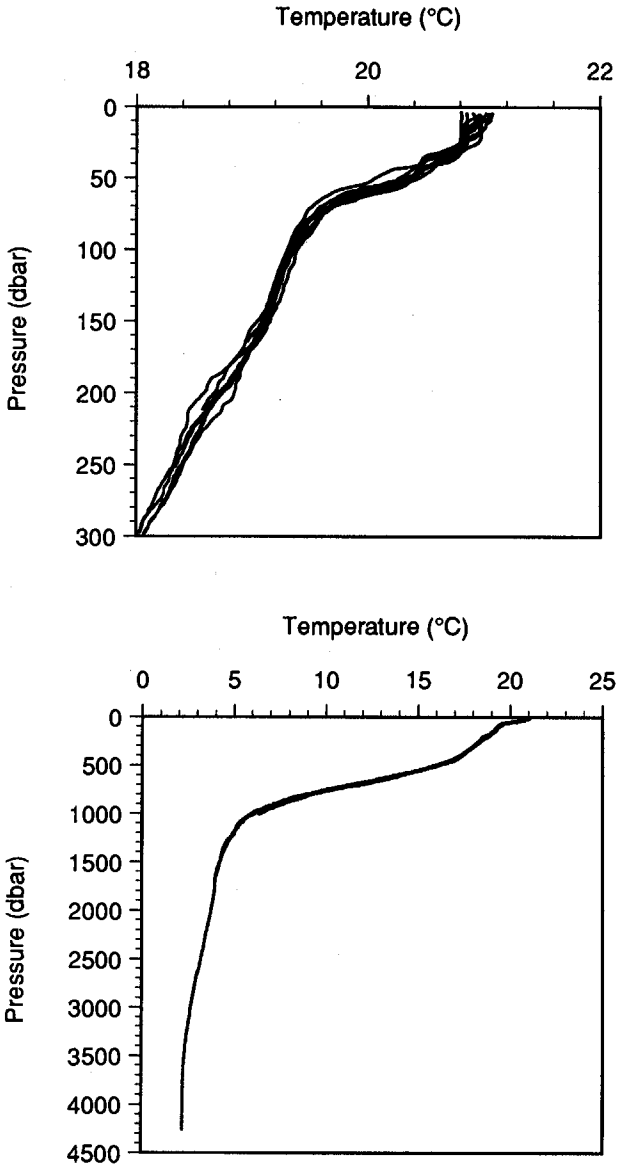
Depth (m)	Pres (db)	Temp (°C)	Pot.T (°C)	CTD Sal (ppt)	Sigma-t (kg/m^3)	CTD 0_2 (μmole/kg)	0_2 Anom (μmole/kg)	BAC (m^{-1})	PAR ($\mu E/m^2/s$)	Fluor (rfu)
5.0	5.0	20.964	20.963	36.502	25.649	239.57	20.83	0.457	194.08	
10.0	10.1	20.971	20.969	36.518	25.660	238.29	19.60	0.457	116.41	
20.0	20.1	20.981	20.978	36.578	25.703	238.33	19.76	0.458	88.14	
30.0	30.2	20.833	20.828	36.585	25.750	239.73	20.60	0.455	69.76	
40.0	40.3	20.611	20.603	36.623	25.839	240.80	20.85	0.460	51.78	
50.0	50.4	20.433	20.424	36.633	25.895	241.58	20.94	0.461	37.49	
60.0	60.4	20.105	20.094	36.614	25.970	243.45	21.47	0.464	25.93	

Depth (m)	Pres (db)	Temp (°C)	Pot.T (°C)	CTD Sal (ppt)	Sigma-t (kg/m^3)	CTD 0_2 (μmole/kg)	0_2 Anom (μmole/kg)	BAC (m^{-1})	PAR ($\mu E/m^2/s$)	Fluor (rfu)
70.0	70.5	19.660	19.647	36.601	26.078	244.20	20.39	0.463	16.45	
80.0	80.6	19.461	19.446	36.601	26.131	241.93	17.31	0.498	9.58	
90.0	90.6	19.389	19.373	36.601	26.150	238.65	13.73	0.487	4.99	
100.0	100.7	19.317	19.298	36.600	26.169	236.09	10.87	0.456	2.67	
110.0	110.8	19.292	19.271	36.602	26.177	233.64	8.32	0.444	1.62	
120.0	120.9	19.261	19.239	36.600	26.184	231.50	6.05	0.433	0.23	
130.0	131.0	19.217	19.193	36.597	26.194	229.42	3.79	0.424	0.00	
140.0	141.0	19.172	19.146	36.592	26.202	227.71	1.88	0.421	0.00	
150.0	151.1	19.136	19.108	36.593	26.213	226.98	1.00	0.415	0.00	
160.0	161.2	19.073	19.044	36.587	26.225	225.96	-0.29	0.415	0.00	
170.0	171.3	18.979	18.948	36.575	26.240	224.89	-1.77	0.413	0.00	
180.0	181.3	18.904	18.871	36.567	26.254	223.18	-3.80	0.412	0.00	
190.0	191.4	18.833	18.799	36.563	26.269	220.84	-6.45	0.412	0.00	
200.0	201.5	18.711	18.675	36.552	26.293	218.54	-9.28	0.411	0.00	
210.0	211.6	18.635	18.597	36.547	26.308	216.67	-11.48	0.411	0.00	
220.0	221.7	18.577	18.538	36.542	26.319	215.53	-12.88	0.411	0.00	
230.0	231.7	18.510	18.469	36.537	26.333	214.57	-14.13	0.410	0.00	
240.0	241.8	18.468	18.425	36.533	26.341	213.69	-15.19	0.411	0.00	
250.0	251.9	18.399	18.355	36.527	26.354	212.75	-16.44	0.409	0.00	

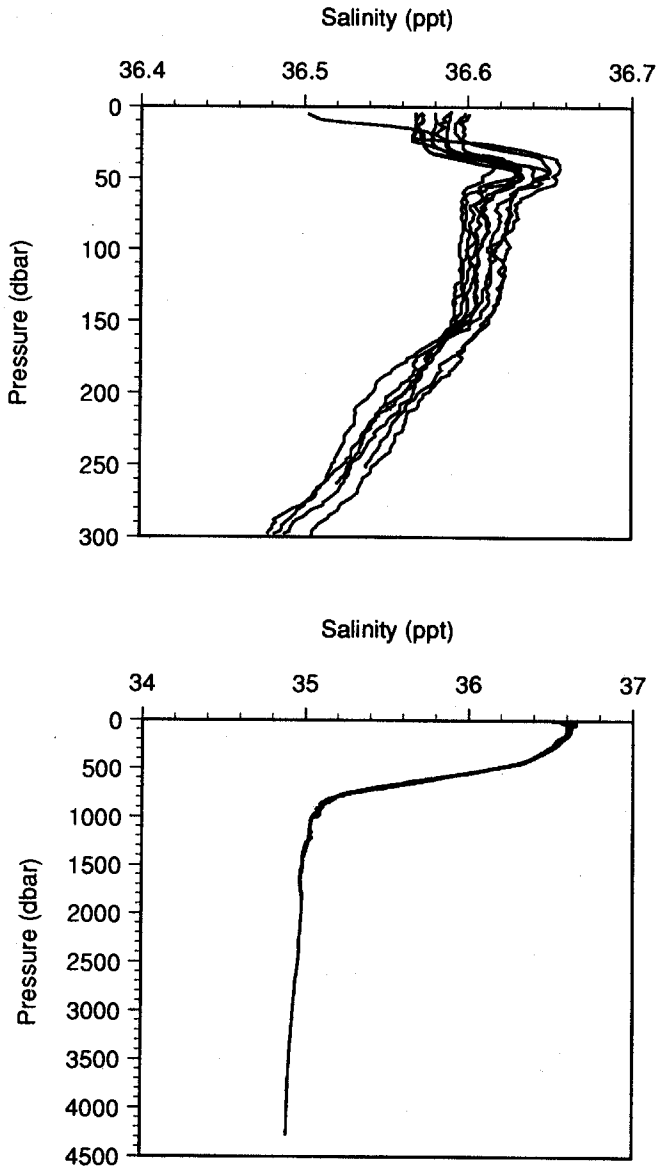
BATS 7, CTD Cast 10
18 April 1989: Start 09:30
Lat: 31.515 N; Long: 64.256 W

Depth (m)	Pres (db)	Temp (°C)	Pot.T (°C)	CTD Sal (ppt)	Sigma-t (kg/m^3)	CTD 0_2 (μmole/kg)	0_2 Anom (μmole/kg)	BAC (m^{-1})	PAR ($\mu E/m^2/s$)	Fluor (rfu)
4.0	4.0	20.854	20.853	36.572	25.733	247.36	28.29	0.456	174.65	
10.0	10.1	20.859	20.857	36.568	25.729	245.62	26.56	0.454	106.70	
20.0	20.1	20.859	20.855	36.566	25.728	243.46	24.40	0.454	102.35	
30.0	30.2	20.671	20.665	36.635	25.832	244.78	25.08	0.456	83.02	
40.0	40.3	20.470	20.462	36.656	25.903	245.95	25.49	0.461	60.60	
50.0	50.4	20.307	20.298	36.654	25.946	246.29	25.18	0.464	41.72	
60.0	60.4	20.014	20.002	36.639	26.014	247.23	24.92	0.463	28.47	
70.0	70.5	19.651	19.638	36.630	26.103	248.32	24.53	0.463	17.96	
80.0	80.6	19.495	19.480	36.628	26.143	246.52	22.08	0.486	10.61	
90.0	90.6	19.403	19.387	36.622	26.163	244.36	19.54	0.488	5.66	
100.0	100.7	19.328	19.310	36.624	26.184	242.56	17.43	0.470	3.00	
110.0	110.8	19.287	19.267	36.622	26.194	240.74	15.44	0.447	1.78	
120.0	120.9	19.249	19.227	36.622	26.204	239.30	13.84	0.433	1.14	
130.0	131.0	19.216	19.192	36.620	26.211	237.85	12.25	0.427	0.00	
140.0	141.0	19.175	19.149	36.616	26.220	235.86	10.08	0.420	0.00	
150.0	151.1	19.122	19.095	36.609	26.228	233.86	7.85	0.418	0.00	
160.0	161.2	19.056	19.026	36.604	26.242	232.06	5.76	0.416	0.00	
170.0	171.3	18.984	18.953	36.597	26.256	230.62	4.01	0.415	0.00	
180.0	181.3	18.882	18.850	36.583	26.272	228.47	1.42	0.415	0.00	
190.0	191.4	18.806	18.771	36.579	26.289	226.57	-0.81	0.415	0.00	
200.0	201.5	18.690	18.654	36.569	26.311	225.24	-2.65	0.414	0.00	
210.0	211.6	18.608	18.570	36.562	26.327	223.45	-4.79	0.414	0.00	
220.0	221.7	18.523	18.484	36.554	26.343	221.95	-6.66	0.413	0.00	
230.0	231.7	18.452	18.411	36.549	26.357	220.91	-8.02	0.413	0.00	
240.0	241.8	18.400	18.357	36.543	26.366	220.12	-9.04	0.412	0.00	
250.0	251.9	18.336	18.291	36.538	26.379	219.02	-10.42	0.412	0.00	

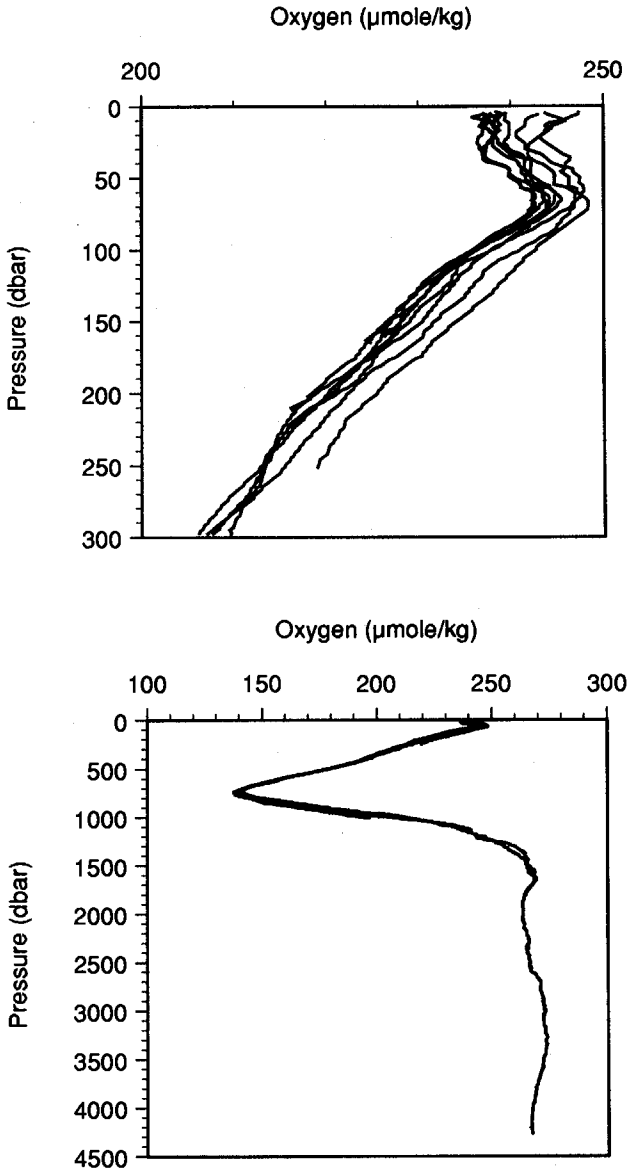
BATS 7—CTD Temperature Profile



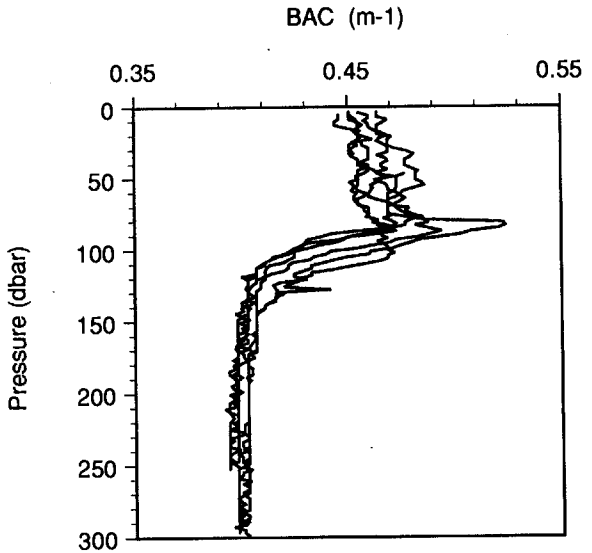
BATS 7—CTD Salinity Profile



BATS 7—CTD Oxygen Profile



BATS 7—CTD BAC Profile



BATS 7—Bottle Data
April 15-18, 1989
Physical Parameters

Bottle ID	Depth (m)	Pressure (db)	Temp (°C)	Pot. Temp (°C)	Salinity (ppt)	Sigma-t (kg/m^3)
G0709N11	4.6	4.6	20.965	20.964	36.487	25.638
G0709N10	17.2	17.3	20.983	20.980	36.560	25.689
G0709N09	30.9	31.1	20.812	20.806	36.575	25.748
G0709N08	48.8	49.1	20.492	20.483	36.620	25.870
G0709N07	69.4	69.9	19.784	19.771	36.607	26.050
G0709N06	79.7	80.3	19.453	19.438	36.605	26.136
G0709N05	89.2	89.8	19.354	19.338	36.604	26.162
G0709N04	106.9	107.7	19.288	19.268	36.602	26.178
G0709G01	113.7	114.5	19.261	19.240	36.601	26.184
G0709N03	148.7	149.8	19.112	19.085	36.596	26.221
G0709N02	199.2	200.7	18.707	18.671	36.562	26.301
G0709N01	248.6	250.5	18.383	18.339	36.535	26.365
G0708N11	5.1	5.1	20.961	20.960	36.453	25.613
G0708N10	17.2	17.3	20.976	20.973	36.565	25.695
G0708N09	31.5	31.7	20.744	20.738	36.587	25.776
G0708N08	50.8	51.2	20.039	20.029	36.610	25.984
G0708N07	65.3	65.8	19.677	19.665	36.607	26.078
G0708N06	73.4	73.9	19.514	19.500	36.605	26.120
G0708N05	86.1	86.7	19.456	19.440	36.604	26.135
G0708N04	96.1	96.8	19.380	19.362	36.617	26.165
G0708G01	1200.2	1212.1	4.956	4.841	35.049	27.733
G0708N03	1401.3	1415.9	4.319	4.187	34.998	27.765
G0708N02	1600.5	1617.9	4.001	3.849	34.979	27.785
G0708N01	1804.3	1824.8	3.905	3.729	34.991	27.807
G0701N11	300.1	302.4	18.006	17.953	36.490	26.427
G0701N10	301.2	303.5	18.006	17.953	36.487	26.424
G0701N09	401.9	405.1	17.115	17.046	36.361	26.549
G0701N08	502.4	506.5	15.771	15.689	36.128	26.688
G0701N07	502.7	506.8	15.776	15.694	36.127	26.686
G0701N06	601.4	606.5	13.660	13.570	35.787	26.887
G0701N05	752.8	759.5	9.853			
G0701N04	753.0	759.7	9.877	9.783	35.277	27.206
G0701G01	802.0	809.2	8.627	8.533	35.173	27.328
G0701N03	902.9	911.2	7.051	6.955	35.104	27.507
G0701N02	1004.6	1014.1	5.854	5.754	35.062	27.633
G0701N01	1006.2	1015.7	5.857	5.757	35.064	27.634
G0707N11	1999.5	2023.2	3.703	3.505	34.984	27.824
G0707N10	2201.3	2228.5	3.467	3.246	34.973	27.840
G0707N09	2400.9	2431.7	3.289	3.043	34.968	27.856
G0707N08	2601.0	2635.6	3.063	2.793	34.963	27.875
G0707N07	2799.8	2838.4	2.814	2.519	34.940	27.880
G0707N06	2999.1	3041.9	2.620	2.299	34.929	27.890
G0707N05	3198.5	3245.6	2.460	2.111	34.917	27.896
G0707N04	3397.8	3449.5	2.335	1.957	34.908	27.901
G0707G01	3598.7	3655.1	2.263			
G0707N03	3800.0	3861.4	2.211	1.768	34.896	27.907
G0707N02	4000.6	4067.2	2.201	1.723	34.894	27.908
G0707N01	4198.2	4270.0	2.204			

Bottle ID	Depth (m)	Pressure (db)	Temp (°C)	Pot. Temp (°C)	Salinity (ppt)	Sigma-t (kg/m^3)
G0710N11	6.3	6.3	20.864			
G0710N10	18.9	19.0	20.861			
G0710N09	33.3	33.5	20.714			
G0710N08	49.9	50.3	20.300			
G0710N07	70.3	70.8	19.640			
G0710N06	80.7	81.3	19.490			
G0710N05	88.3	88.9	19.410			
G0710N04	105.8	106.6	19.297			
G0710G01	115.0	115.8	19.253			
G0710N03	149.8	150.9	19.113			
G0710N02	199.8	201.3	18.691			
G0710N01	249.7	251.6	18.331			

BATS 7—Bottle Data
April 15-18, 1989
Gases

Bottle ID	Depth (m)	$O_2(1)$ (μmole/kg)	$O_2(2)$ (μmole/kg)	$O_2(1)$ anomaly (μmole/kg)	$O_2(2)$ anomaly (μmole/kg)	TCO_2 (μmole/kg)
G0709N11	4.6	239.10	237.36	19.79	18.06	2039.4
G0709N10	17.2	235.18		16.10		2044.8
G0709N09	30.9	237.34	238.64	17.51	18.81	2043.3
G0709N08	48.8	239.04		17.84		2046.2
G0709N07	69.4	245.08	244.65	20.71	20.28	2049.4
G0709N06	79.7	240.28	239.85	14.49	14.05	2062.7
G0709N05	89.2		233.76		7.56	2062.2
G0709N04	106.9		230.28		3.85	2062.0
G0709G01	113.7		230.28		3.75	2059.4
G0709N03	148.7		228.53		1.46	2065.9
G0709N02	199.2		216.35		-12.33	
G0709N01	248.6	213.30	214.17	-16.62	-15.75	2077.7
G0708N11	5.1		238.24		18.86	
G0708N10	17.2		236.91		17.81	
G0708N09	31.5		236.89		16.76	
G0708N08	50.8	244.66		21.38		
G0708N07	65.3	245.07		20.22		
G0708N06	73.4	235.50	235.07	9.96	9.52	
G0708N05	86.1	235.07	235.07	9.30	9.30	
G0708N04	96.1	232.89		6.84		
G0708G01	1200.2	248.28	246.54	-36.90	-38.63	
G0708N03	1401.3		264.76		-24.35	
G0708N02	1600.5		268.22		-22.76	
G0708N01	1804.3		267.35		-23.87	

Bottle ID	Depth (m)	$O_2(1)$ (µmole/kg)	$O_2(2)$ (µmole/kg)	$O_2(1)$ anomaly (µmole/kg)	$O_2(2)$ anomaly (µmole/kg)	TCO_2 (µmole/kg)
G0701N11	300.1	202.43		-28.94		
G0701N10	301.2	205.91	205.91	-25.46	-25.46	
G0701N09	401.9		198.07		-36.68	
G0701N08	502.4	178.52		-61.29		
G0701N07	502.7	178.52	179.82	-61.28	-59.97	
G0701N06	601.4		162.87		-84.60	
G0701N05	752.8					
G0701N04	753.0	148.95	149.39	-112.51	-112.08	
G0701G01	802.0	155.45	156.76	-111.18	-109.88	
G0701N03	902.9	185.82	187.12	-88.01	-86.71	
G0701N02	1004.6	217.05		-63.09		
G0701N01	1006.2		218.79		-61.32	
G0707N11	1999.5	266.48	266.05	-25.93	-26.37	
G0707N10	2201.3	267.78	267.78	-26.19	-26.19	
G0707N09	2400.9		266.47		-28.68	
G0707N08	2601.0	267.76	267.76	-29.07	-29.07	
G0707N07	2799.8	270.80	271.66	-28.09	-27.22	
G0707N06	2999.1	272.53	272.53	-28.02	-28.02	
G0707N05	3198.5	273.82	274.26	-28.18	-27.75	
G0707N04	3397.8	272.52	270.78	-30.71	-32.44	
G0707G01	3598.7					
G0707N03	3800.0	270.34	270.34	-34.33	-34.33	
G0707N02	4000.6	268.17		-36.82		
G0707N01	4198.2	266.00	266.44			

BATS 7—Bottle Data
April 15-18, 1989
Nutrients

Bottle ID	Depth (m)	Nitrate+Nitrite (µmole/kg)	Phosphate (µmole/kg)	Silicate (µmole/kg)
G0709N11	4.6	0.06	0.00	1.18
G0709N10	17.2	0.05	0.00	0.92
G0709N09	30.9	0.06	0.00	0.85
G0709N08	48.8	0.06	0.00	0.90
G0709N07	69.4	0.05	0.00	0.84
G0709N06	79.7	0.19	0.00	0.98
G0709N05	89.2	0.73	0.00	0.98
G0709N04	106.9	1.37	0.00	1.07
G0709G01	113.7	1.51	0.00	1.27
G0709N03	148.7	1.67	0.00	1.14
G0709N02	199.2	2.88	0.06	1.31
G0709N01	248.6	3.42	0.10	1.36

Bottle ID	Depth (m)	Nitrate+Nitrite (µmole/kg)	Phosphate (µmole/kg)	Silicate (µmole/kg)
G0708N11	5.1	0.00	0.00	0.85
G0708N10	17.2	0.00	0.00	0.78
G0708N09	31.5	0.00	0.00	0.74
G0708N08	50.8	0.00	0.00	0.85
G0708N07	65.3	0.00	0.00	0.86
G0708N06	73.4	0.05	0.00	0.85
G0708N05	86.1	0.11	0.00	0.87
G0708N04	96.1	0.52	0.00	0.96
G0708G01	1200.2	18.58		12.08
G0708N03	1401.3	17.69		12.02
G0708N02	1600.5	17.71		12.19
G0708N01	1804.3	17.57		13.25
G0701N11	300.1	4.63	0.13	1.63
G0701N10	301.2	4.76	0.12	1.62
G0701N09	401.9	6.99	0.27	2.43
G0701N08	502.4	10.76	0.50	3.86
G0701N07	502.7	10.67	0.46	3.87
G0701N06	601.4	15.47	0.79	6.53
G0701N05	752.8			
G0701N04	753.0	22.19	1.35	11.50
G0701G01	802.0	23.23	1.42	10.61
G0701N03	902.9	21.58	1.32	10.51
G0701N02	1004.6	20.18		
G0701N01	1006.2	20.24	1.28	11.68
G0707N11	1999.5	17.99	1.13	
G0707N10	2201.3	18.14		
G0707N09	2400.9	18.19	1.16	
G0707N08	2601.0	18.27	1.15	
G0707N07	2799.8	18.01	1.18	
G0707N06	2999.1	17.75	1.15	
G0707N05	3198.5	18.07	1.12	
G0707N04	3397.8	17.99	1.20	
G0707G01	3598.7	18.69	1.19	
G0707N03	3800.0	18.80	1.25	
G0707N02	4000.6	18.75	1.33	
G0707N01	4198.2	19.14	1.33	

BATS 7—Bottle Data
April 15-18, 1989
Particulates

Bottle ID	Depth (m)	Chl *a* (µg/kg)	POC (µg/kg)	PON (µg/kg)	Bacteria (# x 10^8/kg)
G0709N11	4.6		19.91	3.44	
G0709N10	17.2		18.17	3.09	
G0709N09	30.9		23.84	3.82	
G0709N08	48.8		23.30	3.93	
G0709N07	69.4		34.82	3.93	
G0709N06	79.7		21.32	4.31	
G0709N05	89.2		22.26	4.50	
G0709N04	106.9		13.54	2.32	
G0709G01	113.7		14.19	1.80	
G0709N03	148.7		6.94	1.27	
G0709N02	199.2		3.59	0.98	
G0709N01	248.6		14.17	1.34	
G0708N11	5.1		21.96	3.61	
G0708N10	17.2		18.20	3.17	
G0708N09	31.5		26.39	4.16	
G0708N08	50.8		19.48	3.40	
G0708N07	65.3		21.15	3.86	
G0708N06	73.4		24.51	5.23	
G0708N05	86.1		31.38		
G0708N04	96.1		24.23		
G0708G01	1200.2				
G0708N03	1401.3				0.18
G0708N02	1600.5				
G0708N01	1804.3				
G0701N11	300.1		8.85		
G0701N10	301.2		10.52		
G0701N09	401.9				0.44
G0701N08	502.4		8.34		
G0701N07	502.7		9.69		
G0701N06	601.4				0.25
G0701N05	752.8				
G0701N04	753.0		1.14	0.49	
G0701G01	802.0				0.25
G0701N03	902.9				
G0701N02	1004.6		1.42	0.46	
G0701N01	1006.2		4.94	0.73	
G0707N11	1999.5				0.15
G0707N10	2201.3				
G0707N09	2400.9				0.13
G0707N08	2601.0				
G0707N07	2799.8				
G0707N06	2999.1				0.17
G0707N05	3198.5				
G0707N04	3397.8				
G0707G01	3598.7				
G0707N03	3800.0				
G0707N02	4000.6				
G0707N01	4198.2				

Bottle ID	Depth (m)	Chl *a* (µg/kg)	POC (µg/kg)	PON (µg/kg)	Bacteria (# x 10^6/kg)
G0710N11	6.3	0.065			2.38
G0710N10	18.9	0.066			2.52
G0710N09	33.3	0.075			3.31
G0710N08	49.9	0.109			2.89
G0710N07	70.3	0.199			2.95
G0710N06	80.7	0.436			2.93
G0710N05	88.3	0.560			3.12
G0710N04	105.8	0.356			1.76
G0710G01	115.0	0.217			1.33
G0710N03	149.8	0.038			1.03
G0710N02	199.8	0.011			0.79
G0710N01	249.7	0.008			

BATS 7, Primary Production Data

R.V. Cape Henlopen

Light Bottles		Dark Bottles		Time-zero Bottles	
Depth (m)	Lt. Prod ($mg/m^2/day$)	Depth (m)	Dk. Prod ($mg/m^2/day$)	Depth (m)	$T_{\emptyset}$ Prod ($mg/m^2/day$)
5.0	4.08	5.0	0.39	5.0	0.24
5.0	3.91				
5.0	3.89				
17.0	4.07	17.0	0.40	17.0	0.22
17.0	3.88				
17.0	3.76				
32.0	2.69	32.0	0.39	32.0	0.34
32.0	2.85				
32.0	3.09				
50.0	2.75	50.0	0.49	50.0	0.35
50.0	3.04				
50.0	3.04				
64.0	2.43	64.0	0.36	64.0	0.23
64.0	2.58				
64.0	2.49				
75.0	3.57	75.0	0.37	75.0	0.28
75.0	3.60				
75.0	3.43				

Sediment Trap Estimated Particle Fluxes

Depth (m)	Sample #	Mass (mg/m2/d)	Total Carbon (mg $C/m^2/d$)	Organic Carbon (mg $C/m^2/d$)	Nitrogen (mg $N/m^2/d$)
150	45	83.16	28.91		5.00
150[1]	45			28.13	4.84
150	46	63.24	20.62		1.85
150[1]	46			24.76	2.41
200	47				
200[1]	47				
200	48	126.50	41.99		7.80
200[1]	48			42.18	7.71
300[2]	49+50	91.39	27.83		2.90
300[1,2]	49+50			26.05	3.23
400[2]	51+52	75.36	21.59		2.22
400[1,2]	51+52			20.85	2.50

1. Subsample acidified to remove carbonates.
2. Due to low weight, samples from two traps were combined.

Cruise Report, BATS 8

Cruise dates: May 15, 1989 - May 18, 1989
Personnel: R.L. Sherriff-Dow, R. Johnson, K. Gundersen, V. Asper, S. Lohrenz
R.V. Weatherbird

May 15, 1989

0720 - Depart BBSR

1125 - Test light cast to 300 m - light not plotting. Data not reported.
Lat: 31.044 N; Long: 64.342 W

Arrive at BATS Station at 1330.

CTD **Cast 1:** 1352 Lat: 31.868 N; Long: 64.183 W
Light cast to 200m
Winds from the South at 10-12 K, partly cloudy

1510 - Deploy traps and V. Asper's current meter.
Lat: 31.884 N; Long: 64.157 W

CTD **Cast 2**: 1600-2120 Lat: 31.784 N Long: 64.197 W
Wind: 12-15K and rising, seas 3-4 ft.

Nominal depths: 2000, 2200, 2400, 2600, 2800, 3000, 3200, 3400, 3600, 3800, 4000, 4200 m.

Samples:

dissolved O_2 -duplicates	2000-4200m
salinity	2000-4200m
NO_3, PO_4, SiO_4,	2000-4200m
3 Bacteria	2000, 2400, 3000 m

May 16, 1989

Primary Production cast - 0300.

0920-1010: CTD **Cast 3**, Lat: 31.963 N; Long: 64.033 W
Winds 20-25K, seas 5-7'

Nominal depths: 3, 14, 25, 39, 67, 85, 97, 105, 140, 175, 225, 250 m.

Samples:

dissolved O_2 -duplicates	12 depths
salinity	12 depths
NO_3, PO_4, SiO_4,	12 depths
POC/PON	12 depths
CO_2 - Brewer	11 depths, 1 surface replicate

May 17, 1989

0935-1130: **Cast 4**, Lat: 32.033 N; Long: 63.784 W
Winds decrease to 10-15 K, westerly.
Niskin 12 came up empty.
Nominal depths: (3), 14, 25, 39, 67, 85, 97, 120, 1200, 1400, 1600, 1800 m.

Samples:

dissolved O_2 -duplicates	11 depths
salinity	11 depths
NO_3, PO_4, SiO_4,	11 depths
Bacteria	1400 m
POC/PON	3,14,25,39,67,85,97,120 m

Cast 5: 1630-1820, Lat: 32.050 N; Long: 63.717 W
Winds from the west at 10-15K.
Nominal depths: 300, 300, 400, 500, 500, 600, 750, 750, 800, 900, 1000, 1000 m.

Samples:

dissolved O_2 -duplicates	12 samples
salinity	12 samples
NO_3, PO_4, SiO_4,	12 samples
Bacteria	400, 600, 900 m
POC/PON	300,400,500,750,1000 m

Cast 6: 2040-2315, Lat: 32.068 N; Long: 63.667 W
Nominal depths: 3, 14, 25, 39, 67, 85, 90, 97, 105, 120, 175, 225 m.

Samples taken:

Bacteria	12 depths
Chlorophyll	12 depths

May 18, 1989

Recover traps at 1150
Lat: 32.050 N; Long: 63.607 W

Return to BBSR

** Note on BATS 8: Silicate values are low—apparent standard problem.

CTD Sensor Corrections to Bottle Data for BATS 8:

Salinity:

$$DS = R_{\emptyset} + \sum_{i=1}^{l} A_i \left(\frac{P}{4300}\right)^i + \sum_{i=1}^{m} B_i \left(\frac{T}{30}\right)^i + \sum_{i=1}^{n} C_i \left(\frac{SC}{37}\right)^i$$

MS = SC + DS

Where:

DS = Model (Wet Salinity - CTD Salinity)
MS = modified salinity
SC = uncorrected CTD salinity
$R_{\emptyset}$ = Linear Offset
P = pressure (dbar)
T = temperature (°C)
A_i, B_i, C_i = Regression coefficients
l, m, n = order of the polynomial functions
l = 4, m = 4, n = 4

$R_{\emptyset}$	= -179000.0	B_3	= 3.398
A_1	= -0.5593	B_4	= -4.534
A_2	= 1.367	C_1	= 743000.0
A_3	= -1.511	C_2	= -1156000.0
A_4	= 0.5935	C_3	= 799400.0
B_1	= -0.2397	C_4	= -207200.0
B_2	= 0.7792		

model correlation coefficient = 0.9169
standard deviation of model residuals = 0.0021 ppt

Oxygen:

$$MO = R_{\emptyset} + \sum_{i=1}^{l} A_i \left(\frac{P}{4300}\right)^i + \sum_{i=1}^{m} B_i \left(\frac{T}{30}\right)^i$$

$$+ \sum_{i=1}^{n} C_i (OC)^i + \sum_{i=1}^{o} D_i \left(\frac{OT}{30}\right)^i + \sum_{i=1}^{p} E_i \left(\frac{OS}{300}\right)^i$$

Mol = MO x 300

Where:

P = pressure (dbar)
T = temperature (°C)

MO = (CTD modeled oxygen (µmole/kg))/300
Mol = modeled oxygen (µmole/kg)
OC = Oxygen sensor current (µamps)
OT = Oxygen sensor temperature from internal thermistor (°C)
OS(t,p,s) = Oxygen saturation value at measured temperature, salinity and pressure (µmole/kg)
R_{ϕ}, A_i, B_i, C_i, D_i, E_i = Regression coefficients
l, m, n, o, p = order of the polynomial functions
l = 4; m=n=o=p=2

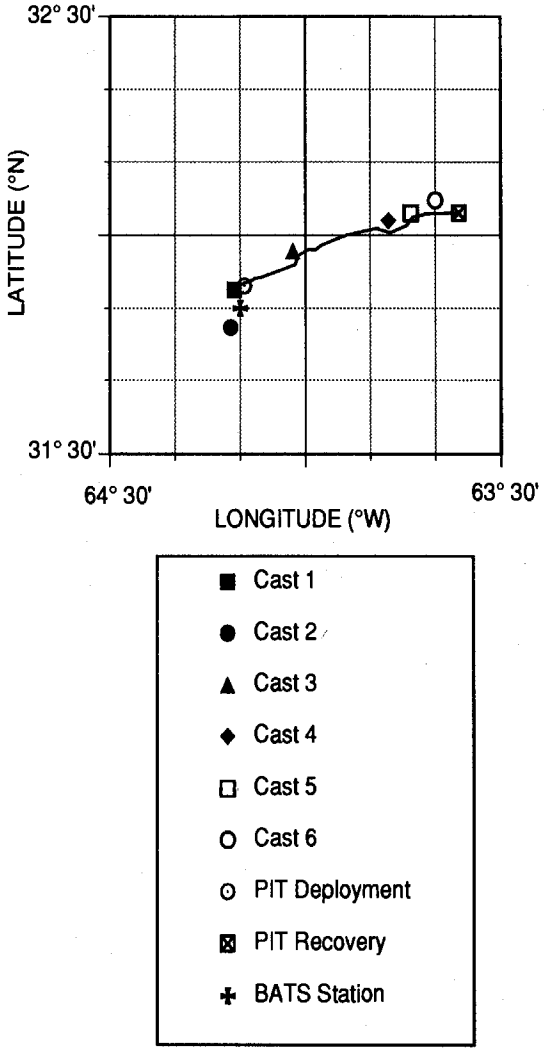
R_{ϕ}	= -2.4761578E+00	C_1	= 9.2596034E-01
A_1	= 1.6136780E-01	C_2	= 3.1101891E-01
A_2	= 2.1394045E-01	D_1	= -4.0867063E-02
A_3	= -1.7334804E+00	D_2	= -3.2201656E-01
A_4	= 1.2261246E+00	E_1	= -1.7215009E+01
B_1	= 1.4310706E+01	E_2	= 1.7609416E+01
B_2	= -8.1569337E+00		

model correlation coefficient = 9.993E-01
standard deviation of model residuals = 1.232E+00 µmole/kg

Beam Attenuation Coefficient:

BAC offset = 0.364 - 0.347 = 0.017 m^{-1}

BATS 8—Cast Positions:



BATS 8, CTD Cast 1
15 May 1989: Start 13:40; End 13:52
Lat: 31.868 N; Long: 64.183 W

Depth (m)	Pres (db)	Temp (°C)	Pot.T (°C)	CTD Sal (ppt)	Sigma-t (kg/m^3)	CTD 0_2 (μmole/kg)	0_2 Anom (μmole/kg)	BAC (m^{-1})	PAR ($\mu E/m^2/s$)	Fluor (rfu)
4.0	4.0	22.670	22.669	36.509	25.176	224.62	12.36	0.455	1209.66	
10.0	10.1	22.081	22.079	36.557	25.381	228.06	13.68	0.458	788.07	
20.0	20.1	21.431	21.427	36.617	25.609	230.65	13.88	0.469	599.50	
30.0	30.2	20.831	20.825	36.632	25.786	233.66	14.58	0.469	387.31	
40.0	40.3	20.500	20.492	36.630	25.875	234.90	14.52	0.466	259.47	
50.0	50.4	20.209	20.199	36.635	25.957	234.97	13.44	0.466	179.66	
60.0	60.4	19.874	19.863	36.623	26.038	234.80	11.90	0.473	111.60	
70.0	70.5	19.667	19.654	36.619	26.090	233.93	10.18	0.469	63.26	
80.0	80.6	19.573	19.558	36.615	26.112	232.44	8.31	0.472	34.49	
90.0	90.6	19.452	19.435	36.613	26.143	230.41	5.77	0.467	18.72	
100.0	100.7	19.353	19.335	36.609	26.166	227.94	2.89	0.470	10.06	
110.0	110.8	19.239	19.219	36.607	26.194	224.60	-0.92	0.455	5.29	
120.0	120.9	19.126	19.104	36.601	26.220	220.06	-5.95	0.428	3.06	
130.0	131.0	19.065	19.041	36.594	26.231	217.65	-8.63	0.417	2.01	
140.0	141.0	18.955	18.929	36.588	26.255	215.64	-11.10	0.410	1.43	
150.0	151.1	18.862	18.835	36.580	26.273	214.19	-12.95	0.407	1.07	
160.0	161.2	18.754	18.725	36.573	26.296	212.67	-14.94	0.407	0.77	
170.0	171.3	18.643	18.612	36.565	26.318	211.19	-16.90	0.405	0.55	
180.0	181.3	18.595	18.563	36.562	26.329	209.85	-18.45	0.403	0.41	
190.0	191.4	18.553	18.519	36.560	26.338	210.23	-18.24	0.403	0.30	
200.0	201.5	18.456	18.421	36.551	26.356	209.32	-19.59	0.403	0.27	
210.0	211.6	18.388	18.350	36.543	26.368	207.44	-21.77	0.403	0.26	
220.0	221.7	18.312	18.272	36.534	26.381	206.61	-22.94	0.401	0.25	
230.0	231.7	18.257	18.217	36.525	26.388	205.51	-24.28	0.403	0.24	
240.0	241.8	18.212	18.169	36.520	26.396	204.47	-25.53	0.398	0.24	
250.0	251.9	18.133	18.088	36.510	26.408	203.39	-26.97	0.398	0.24	

BATS 8, CTD Cast 2
15 May 1989: Start 16:00; End 21:20
Lat: 31.784 N; Long: 64.197 W

Depth (m)	Pres (db)	Temp (°C)	Pot.T (°C)	CTD Sal (ppt)	Sigma-t (kg/m^3)	CTD 0_2 (μmole/kg)	0_2 Anom (μmole/kg)	BAC (m^{-1})	PAR ($\mu E/m^2/s$)	Fluor (rfu)
3.0	3.0	22.721	22.720	36.505	25.158	225.65	13.58	0.464		
10.0	10.1	22.155	22.153	36.528	25.337	229.68	15.53	0.468		
20.0	20.1	21.634	21.630	36.603	25.542	230.91	14.90	0.468		
30.0	30.2	20.792	20.786	36.636	25.800	235.29	16.07	0.476		
40.0	40.3	20.463	20.456	36.631	25.886	237.20	16.68	0.477		
50.0	50.4	20.219	20.210	36.628	25.950	237.81	16.31	0.482		
60.0	60.4	19.833	19.821	36.624	26.049	236.98	13.91	0.475		
70.0	70.5	19.576	19.563	36.619	26.114	234.66	10.54	0.469		
80.0	80.6	19.403	19.388	36.615	26.157	231.55	6.72	0.515		
90.0	90.6	19.310	19.293	36.611	26.178	227.18	1.95	0.496		
100.0	100.7	19.268	19.250	36.609	26.188	223.01	-2.39	0.462		
110.0	110.8	19.177	19.157	36.605	26.209	220.27	-5.51	0.434		
120.0	120.9	19.098	19.076	36.599	26.225	218.52	-7.60	0.431		
130.0	131.0	19.028	19.005	36.593	26.239	217.20	-9.23	0.420		

Depth (m)	Pres (db)	Temp (°C)	Pot.T (°C)	CTD Sal (ppt)	Sigma-t (kg/m^3)	CTD 0_2 (µmole/kg)	0_2 Anom (µmole/kg)	BAC (m^{-1})	PAR ($\mu E/m^2/s$)	Fluor (rfu)
140.0	141.0	18.888	18.863	36.584	26.269	215.91	-11.12	0.411		
150.0	151.1	18.830	18.802	36.578	26.280	214.20	-13.08	0.407		
160.0	161.2	18.793	18.764	36.575	26.287	213.12	-14.32	0.407		
170.0	171.3	18.652	18.622	36.568	26.318	212.22	-15.82	0.405		
180.0	181.3	18.584	18.552	36.564	26.333	212.43	-15.91	0.403		
190.0	191.4	18.560	18.526	36.563	26.339	212.29	-16.16	0.403		
200.0	201.5	18.511	18.475	36.559	26.348	211.82	-16.84	0.403		
210.0	211.6	18.413	18.376	36.547	26.364	210.59	-18.50	0.403		
220.0	221.7	18.351	18.312	36.540	26.375	209.24	-20.13	0.403		
230.0	231.7	18.303	18.262	36.532	26.381	208.38	-21.21	0.403		
240.0	241.8	18.231	18.189	36.522	26.392	206.17	-23.74	0.403		
250.0	251.9	18.199	18.155	36.518	26.397	205.06	-24.99	0.402		
275.0	277.1	18.089	18.041	36.502	26.414	203.32	-27.24	0.401		
300.0	302.3	17.968	17.915	36.486	26.433	201.65	-29.45	0.399		
325.0	327.5	17.849	17.791	36.469	26.451	201.36	-30.29	0.398		
350.0	352.7	17.680	17.619	36.448	26.477	200.36	-32.06	0.398		
375.0	378.0	17.487	17.422	36.423	26.506	199.06	-34.26	0.398		
400.0	403.2	17.307	17.237	36.395	26.529	197.18	-36.98	0.398		
425.0	428.4	17.079	17.006	36.361	26.559	195.54	-39.69	0.398		
450.0	453.6	16.709	16.633	36.298	26.600	195.33	-41.67	0.396		
475.0	478.9	16.255	16.176	36.218	26.645	187.43	-51.80	0.394		
500.0	504.1	15.937	15.854	36.159	26.674	180.82	-59.99	0.393		
550.0	554.6	14.802	14.716	35.977	26.789	179.23	-67.33	0.394		
600.0	605.1	14.043	13.951	35.849	26.854	177.38	-73.19	0.392		
650.0	655.6	12.785	12.691	35.671	26.975	167.57	-89.84	0.392		
700.0	706.1	11.652	11.556	35.515	27.075	158.46	-105.41	0.390		
750.0	756.6	10.299	10.202	35.349	27.190	152.46	-119.48	0.392		
800.0	807.2	9.039	8.943	35.232	27.310	157.42	-122.36	0.390		
850.0	857.7	8.063	7.966	35.163	27.408	170.14	-115.97	0.387		
900.0	908.3	7.099	7.002	35.116	27.510	187.14	-105.44	0.385		
950.0	958.9	6.322	6.225	35.090	27.595	203.36	-94.59	0.385		
1000.0	1009.4	5.862	5.762	35.077	27.644	215.38	-85.85	0.385		
1050.0	1060.0	5.448	5.346	35.061	27.683	226.86	-77.37	0.382		
1100.0	1110.7	5.216	5.110	35.053	27.705	234.09	-71.84	0.381		
1150.0	1161.3	5.031	4.921	35.046	27.721	239.71	-67.60	0.381		
1200.0	1211.9	5.087	4.971	35.065	27.730	237.69	-69.16	0.377		
1300.0	1313.2	4.537	4.414	35.019	27.757	254.36	-56.69	0.377		
1400.0	1414.6	4.330	4.198	35.005	27.769	260.48	-52.17	0.377		
1500.0	1516.0	4.179	4.036	34.998	27.781	263.90	-49.92	0.375		
1600.0	1617.4	4.064	3.911	34.992	27.789	266.27	-48.44	0.373		
1700.0	1718.9	3.961	3.797	34.988	27.798	267.46	-48.06	0.372		
1800.0	1820.5	3.896	3.721	34.989	27.807	267.18	-48.83	0.372		
1900.0	1922.1	3.891	3.703	35.000	27.817	263.52	-52.51	0.368		
2000.0	2023.7	3.750	3.551	34.991	27.825	265.59	-51.56	0.372		
2100.0	2125.4	3.651	3.440	34.990	27.835	265.77	-52.16	0.368		
2200.0	2227.2	3.530	3.308	34.985	27.844	267.48	-51.40	0.368		
2300.0	2328.9	3.458	3.223	34.983	27.851	265.92	-53.54	0.368		
2400.0	2430.8	3.345	3.099	34.978	27.858	266.57	-53.79	0.368		
2500.0	2532.7	3.215	2.957	34.968	27.864	268.69	-52.74	0.367		
2600.0	2634.6	3.103	2.832	34.962	27.870	269.61	-52.73	0.366		
2700.0	2736.6	3.004	2.721	34.957	27.876	269.82	-53.33	0.368		
2800.0	2838.6	2.913	2.617	34.951	27.881	271.06	-52.83	0.364		
2900.0	2940.7	2.829	2.519	34.946	27.885	270.72	-53.86	0.364		
3000.0	3042.8	2.714	2.391	34.939	27.891	272.58	-52.96	0.364		
3100.0	3144.9	2.613	2.277	34.934	27.896	273.99	-52.39	0.364		
3200.0	3247.2	2.542	2.191	34.929	27.899	273.54	-53.44	0.366		
3300.0	3349.4	2.467	2.102	34.924	27.903	274.13	-53.49	0.364		

Depth (m)	Pres (db)	Temp (°C)	Pot.T (°C)	CTD Sal (ppt)	Sigma-t (kg/m^3)	CTD 0_2 (μmole/kg)	0_2 Anom (μmole/kg)	BAC (m^{-1})	PAR ($\mu E/m^2/s$)	Fluor (rfu)
3400.0	3451.7	2.403	2.023	34.919	27.905	273.82	-54.33	0.365		
3500.0	3554.1	2.357	1.962	34.915	27.907	273.52	-55.02	0.364		
3600.0	3656.5	2.320	1.909	34.911	27.908	272.84	-56.02	0.365		
3700.0	3758.9	2.291	1.864	34.907	27.908	272.12	-56.99	0.365		
3800.0	3861.4	2.274	1.830	34.905	27.909	271.53	-57.73	0.367		
3900.0	3964.0	2.263	1.801	34.902	27.909	271.16	-58.20	0.368		
4000.0	4066.5	2.250	1.771	34.900	27.910	270.48	-58.99	0.372		
4100.0	4169.2	2.245	1.748	34.898	27.910	271.00	-58.51	0.372		
4200.0	4271.8	2.245	1.730	34.897	27.910	271.20	-58.32	0.376		

BATS 8, CTD Cast 3
16 May 1989: Start 09:20; End 10:10
Lat: 31.963 N; Long: 64.033 W

Depth (m)	Pres (db)	Temp (°C)	Pot.T (°C)	CTD Sal (ppt)	Sigma-t (kg/m^3)	CTD 0_2 (μmole/kg)	0_2 Anom (μmole/kg)	BAC (m^{-1})	PAR ($\mu E/m^2/s$)	Fluor (rfu)
5.0	5.0	22.502	22.501	36.538	25.246	223.72	10.88	0.446		
10.0	10.1	22.493	22.491	36.541	25.251	223.14	10.27	0.445		
20.0	20.1	21.560	21.556	36.616	25.573	227.85	11.57	0.455		
30.0	30.2	20.950	20.944	36.632	25.754	231.41	12.80	0.452		
40.0	40.3	20.646	20.639	36.627	25.833	233.17	13.36	0.455		
50.0	50.4	20.328	20.319	36.626	25.919	233.51	12.44	0.455		
60.0	60.4	19.658	19.647	36.618	26.091	232.63	8.85	0.458		
70.0	70.5	19.548	19.536	36.613	26.117	230.04	5.80	0.457		
80.0	80.6	19.373	19.358	36.611	26.161	226.32	1.35	0.464		
90.0	90.6	19.218	19.201	36.605	26.198	221.49	-4.12	0.453		
100.0	100.7	19.120	19.101	36.600	26.220	218.29	-7.75	0.426		
110.0	110.8	18.989	18.969	36.591	26.247	215.59	-11.00	0.411		
120.0	120.9	18.826	18.804	36.580	26.281	213.75	-13.54	0.403		
130.0	131.0	18.738	18.715	36.574	26.299	211.86	-15.82	0.403		
140.0	141.0	18.646	18.621	36.567	26.318	211.37	-16.71	0.400		
150.0	151.1	18.555	18.529	36.561	26.336	209.70	-18.77	0.398		
160.0	161.2	18.494	18.465	36.556	26.349	208.57	-20.17	0.398		
170.0	171.3	18.444	18.413	36.550	26.357	207.18	-21.78	0.398		
180.0	181.3	18.402	18.370	36.545	26.364	206.14	-23.01	0.396		
190.0	191.4	18.324	18.290	36.536	26.377	205.90	-23.60	0.397		
200.0	201.5	18.264	18.229	36.530	26.388	204.71	-25.05	0.395		
210.0	211.6	18.194	18.156	36.520	26.399	203.62	-26.46	0.394		
220.0	221.7	18.133	18.094	36.512	26.408	203.37	-26.99	0.394		
230.0	231.7	18.082	18.042	36.505	26.416	202.37	-28.21	0.394		
240.0	241.8	17.988	17.946	36.493	26.431	201.23	-29.78	0.394		
250.0	251.9	17.902	17.858	36.483	26.445	200.33	-31.07	0.394		

BATS 8, CTD Cast 4
17 May 1989: Start 09:35; End 11:30
Lat: 32.033 N; Long: 63.784 W

Depth (m)	Pres (db)	Temp (°C)	Pot.T (°C)	CTD Sal (ppt)	Sigma-t (kg/m^3)	CTD O_2 (µmole/kg)	O_2 Anom (µmole/kg)	BAC (m^{-1})	PAR (µE/m^2/s)	Fluor (rfu)
3.0	3.0	22.349	22.348	36.509	25.268	226.72	13.27	0.451		
10.0	10.1	22.298	22.296	36.521	25.291	226.20	12.58	0.455		
20.0	20.1	21.518	21.514	36.621	25.588	230.55	14.12	0.456		
30.0	30.2	20.754	20.748	36.639	25.813	235.17	15.80	0.451		
40.0	40.3	20.442	20.434	36.632	25.893	236.71	16.10	0.455		
50.0	50.4	19.870	19.861	36.627	26.042	236.73	13.83	0.455		
60.0	60.4	19.599	19.588	36.619	26.108	234.56	10.53	0.453		
70.0	70.5	19.502	19.489	36.615	26.130	232.19	7.76	0.459		
80.0	80.6	19.365	19.351	36.612	26.164	229.34	4.34	0.462		
90.0	90.6	19.210	19.194	36.607	26.201	225.01	-0.64	0.451		
100.0	100.7	19.133	19.115	36.603	26.219	220.04	-5.93	0.426		
110.0	110.8	19.022	19.002	36.594	26.241	217.92	-8.53	0.414		
120.0	120.9	18.931	18.909	36.588	26.260	215.87	-10.97	0.407		
130.0	131.0	18.810	18.787	36.579	26.285	214.10	-13.26	0.404		
140.0	141.0	18.724	18.699	36.573	26.302	213.12	-14.62	0.403		
150.0	151.1	18.657	18.631	36.567	26.315	212.57	-15.46	0.403		
160.0	161.2	18.617	18.588	36.564	26.324	211.42	-16.78	0.401		
170.0	171.3	18.559	18.528	36.561	26.336	210.56	-17.90	0.399		
180.0	181.3	18.481	18.449	36.552	26.350	209.09	-19.70	0.398		
190.0	191.4	18.421	18.387	36.547	26.361	208.12	-20.95	0.398		
200.0	201.5	18.369	18.333	36.541	26.370	207.32	-21.97	0.398		
210.0	211.6	18.312	18.275	36.534	26.380	206.77	-22.78	0.398		
220.0	221.7	18.215	18.176	36.523	26.396	206.26	-23.72	0.398		
230.0	231.7	18.159	18.118	36.514	26.404	204.61	-25.62	0.398		
240.0	241.8	18.097	18.055	36.507	26.414	203.87	-26.65	0.398		
250.0	251.9	18.022	17.978	36.498	26.427	202.86	-27.99	0.398		
275.0	277.1	17.833	17.785	36.473	26.455	200.64	-31.08	0.398		
300.0	302.3	17.662	17.610	36.450	26.480	198.54	-33.96	0.398		
325.0	327.5	17.482	17.426	36.425	26.507	198.35	-34.98	0.397		
350.0	352.7	17.311	17.250	36.403	26.533	197.89	-36.24	0.397		
375.0	378.0	17.089	17.025	36.367	26.559	198.42	-36.76	0.396		
400.0	403.2	16.769	16.701	36.311	26.593	193.35	-43.37	0.394		
425.0	428.4	16.550	16.478	36.269	26.613	187.74	-50.04	0.394		
450.0	453.6	16.024	15.950	36.182	26.670	183.14	-57.22	0.394		
475.0	478.9	15.507	15.430	36.092	26.719	181.15	-61.80	0.394		
500.0	504.1	15.236	15.156	36.047	26.746	178.98	-65.35	0.394		
550.0	554.6	14.340	14.255	35.900	26.830	173.53	-75.45	0.392		
600.0	605.1	13.726	13.636	35.799	26.882	170.56	-81.71	0.392		
650.0	655.6	13.057	12.961	35.701	26.945	167.64	-88.28	0.390		
700.0	706.1	11.621	11.525	35.517	27.082	161.58	-102.45	0.390		
750.0	756.6	10.377	10.280	35.361	27.186	155.81	-115.64	0.390		
800.0	807.2	9.438	9.340	35.288	27.289	159.29	-117.93	0.390		
850.0	857.7	8.439	8.341	35.218	27.393	168.74	-114.84	0.390		
900.0	908.3	7.685	7.585	35.184	27.481	177.91	-110.61	0.388		
950.0	958.9	6.696	6.597	35.117	27.567	193.62	-101.69	0.385		
1000.0	1009.4	6.279	6.177	35.112	27.618	203.42	-94.79	0.383		
1050.0	1060.0	5.923	5.818	35.108	27.662	212.15	-88.57	0.381		
1100.0	1110.7	5.623	5.514	35.101	27.694	219.75	-83.12	0.381		
1150.0	1161.3	5.463	5.349	35.094	27.708	224.90	-79.15	0.381		
1200.0	1211.9	4.974	4.859	35.043	27.726	239.93	-67.80	0.378		
1300.0	1313.2	4.685	4.561	35.026	27.746	248.85	-61.08	0.377		

Depth (m)	Pres (db)	Temp (°C)	Pot.T (°C)	CTD Sal (ppt)	Sigma-t (kg/m^3)	CTD O_2 ($\mu mole/kg$)	O_2 Anom ($\mu mole/kg$)	BAC (m^{-1})	PAR ($\mu E/m^2/s$)	Fluor (rfu)
1400.0	1414.6	4.371	4.239	35.007	27.767	258.04	-54.29	0.377		
1500.0	1516.0	4.161	4.019	34.998	27.783	263.86	-50.09	0.377		
1600.0	1617.4	4.005	3.853	34.991	27.794	267.72	-47.45	0.372		
1700.0	1718.9	3.923	3.760	34.992	27.805	267.95	-47.85	0.371		
1800.0	1820.5	3.836	3.662	34.990	27.813	267.88	-48.60	0.369		

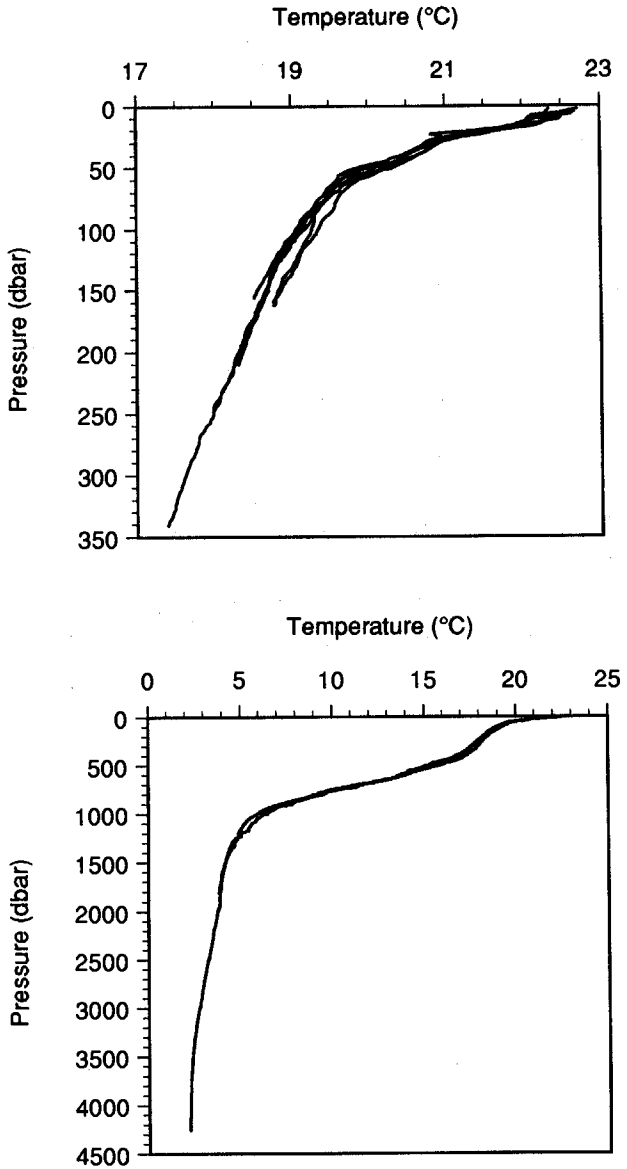
BATS 8, CTD Cast 5
17 May 1989: Start 16:30; End 18:20
Lat: 32.050 N; Long: 63.717 W

Depth (m)	Pres (db)	Temp (°C)	Pot.T (°C)	CTD Sal (ppt)	Sigma-t (kg/m^3)	CTD O_2 ($\mu mole/kg$)	O_2 Anom ($\mu mole/kg$)	BAC (m^{-1})	PAR ($\mu E/m^2/s$)	Fluor (rfu)
47.0	47.0	20.247	20.238	36.627	25.941	242.82	21.43	0.477		
50.0	50.4	20.091	20.082	36.626	25.982	242.22	20.20	0.473		
60.0	60.4	19.746	19.734	36.620	26.070	242.05	18.62	0.470		
70.0	70.5	19.513	19.500	36.616	26.128	238.64	14.26	0.473		
80.0	80.6	19.394	19.379	36.612	26.157	235.58	10.70	0.488		
90.0	90.6	19.283	19.266	36.609	26.184	231.01	5.67	0.484		
100.0	100.7	19.171	19.152	36.604	26.210	226.81	1.00	0.444		
110.0	110.8	19.012	18.992	36.595	26.244	223.79	-2.70	0.422		
120.0	120.9	18.886	18.865	36.585	26.269	220.71	-6.33	0.411		
130.0	131.0	18.800	18.777	36.579	26.287	218.60	-8.80	0.407		
140.0	141.0	18.743	18.718	36.574	26.298	217.23	-10.42	0.407		
150.0	151.1	18.707	18.680	36.570	26.305	216.46	-11.35	0.407		
160.0	161.2	18.623	18.595	36.566	26.324	216.10	-12.08	0.407		
170.0	171.3	18.546	18.515	36.560	26.339	214.71	-13.80	0.407		
180.0	181.3	18.422	18.390	36.547	26.361	212.22	-16.84	0.403		
190.0	191.4	18.376	18.342	36.541	26.368	210.05	-19.22	0.404		
200.0	201.5	18.333	18.297	36.536	26.376	209.30	-20.16	0.403		
210.0	211.6	18.262	18.224	36.528	26.388	208.55	-21.23	0.403		
220.0	221.7	18.197	18.158	36.520	26.398	207.67	-22.39	0.403		
230.0	231.7	18.108	18.067	36.509	26.413	206.84	-23.62	0.403		
240.0	241.8	18.008	17.966	36.497	26.429	205.96	-24.96	0.403		
250.0	251.9	17.982	17.938	36.492	26.431	205.23	-25.80	0.402		
275.0	277.1	17.777	17.729	36.466	26.464	203.12	-28.85	0.403		
300.0	302.3	17.612	17.560	36.443	26.488	200.88	-31.85	0.402		
325.0	327.5	17.485	17.428	36.425	26.506	201.14	-32.18	0.398		
350.0	352.7	17.293	17.233	36.396	26.531	199.23	-34.99	0.398		
375.0	378.0	17.107	17.042	36.369	26.556	198.54	-36.55	0.397		
400.0	403.2	16.850	16.782	36.325	26.585	197.41	-38.92	0.396		
425.0	428.4	16.534	16.463	36.267	26.616	190.67	-47.19	0.396		
450.0	453.6	16.138	16.063	36.198	26.656	186.38	-53.43	0.394		
475.0	478.9	15.593	15.516	36.105	26.709	182.33	-60.19	0.394		
500.0	504.1	15.268	15.188	36.050	26.741	182.06	-62.11	0.392		
550.0	554.6	14.644	14.558	35.944	26.798	182.05	-65.35	0.392		
600.0	605.1	13.771	13.681	35.805	26.877	173.75	-78.27	0.390		
650.0	655.6	12.890	12.795	35.671	26.955	165.34	-91.52	0.391		
700.0	706.1	11.271	11.177	35.462	27.104	156.19	-109.91	0.387		
750.0	756.6	9.902	9.809	35.308	27.226	159.30	-115.06	0.387		
800.0	807.2	9.078	8.982	35.255	27.321	165.15	-114.34	0.384		
850.0	857.7	8.176	8.079	35.193	27.414	174.89	-110.43	0.381		
900.0	908.3	7.413	7.315	35.163	27.503	183.89	-106.49	0.379		
950.0	958.9	6.805	6.705	35.121	27.555	193.30	-101.25	0.377		
999.6	1009.0	6.374	6.271	35.114	27.608	201.96	-95.58	0.377		

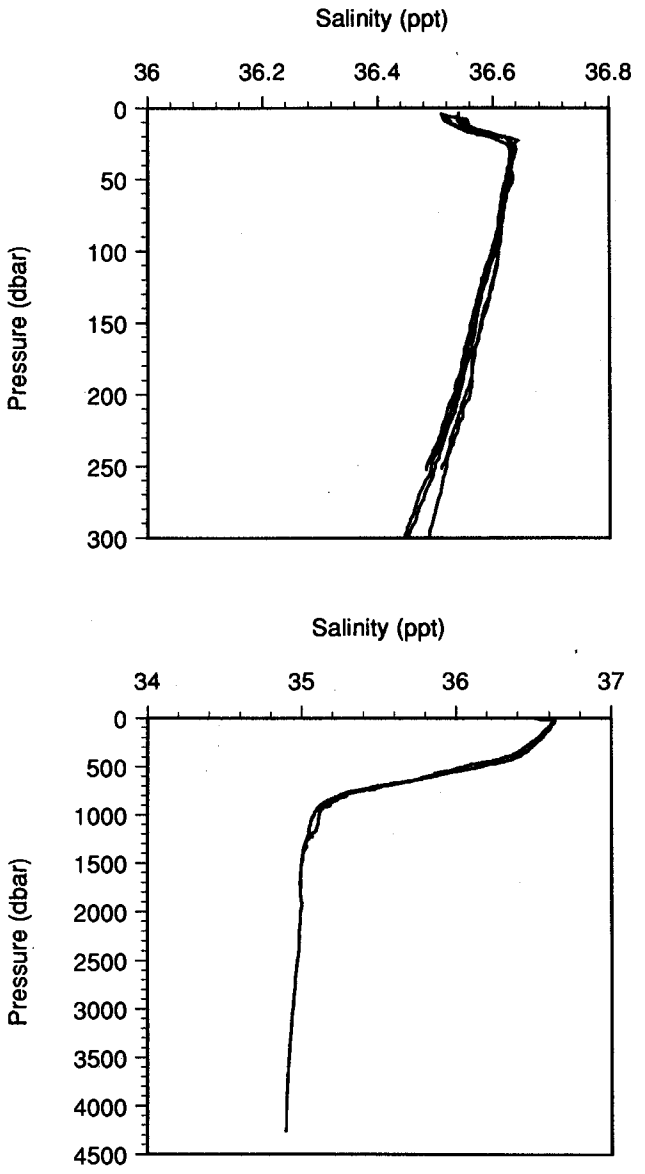
BATS 8, CTD Cast 6
17 May 1989: Start 20:40; End 21:15
Lat: 32.068 N; Long: 63.667 W

Depth (m)	Pres (db)	Temp (°C)	Pot.T (°C)	CTD Sal (ppt)	Sigma-t (kg/m^3)	CTD O_2 (µmole/kg)	O_2 Anom (µmole/kg)	BAC (m^{-1})	PAR ($\mu E/m^2/s$)	Fluor (rfu)
3.0	3.0	22.667	22.666	36.541	25.201	232.65	20.43	0.451		
10.0	10.1	22.271	22.269	36.550	25.322	235.52	21.84	0.453		
20.0	20.1	21.720	21.716	36.593	25.510	238.78	23.09	0.456		
30.0	30.2	20.883	20.877	36.629	25.770	243.64	24.76	0.460		
40.0	40.3	20.645	20.637	36.628	25.834	245.49	25.69	0.459		
50.0	50.4	20.025	20.016	36.622	25.997	245.81	23.52	0.466		
60.0	60.4	19.618	19.607	36.615	26.100	243.08	19.13	0.460		
70.0	70.5	19.445	19.432	36.612	26.143	239.10	14.43	0.477		
80.0	80.6	19.313	19.298	36.609	26.176	234.83	9.61	0.478		
90.0	90.6	19.160	19.143	36.604	26.212	230.37	4.51	0.438		
100.0	100.7	19.061	19.043	36.597	26.233	227.06	0.78	0.423		
110.0	110.8	18.925	18.905	36.587	26.260	224.61	-2.26	0.409		
120.0	120.9	18.866	18.844	36.581	26.271	223.18	-3.94	0.403		
130.0	131.0	18.788	18.764	36.576	26.288	221.86	-5.60	0.403		
140.0	141.0	18.727	18.702	36.572	26.301	220.37	-7.35	0.404		
150.0	151.1	18.693	18.666	36.569	26.308	220.14	-7.73	0.399		
160.0	161.2	18.580	18.552	36.560	26.330	217.55	-10.81	0.398		
170.0	171.3	18.526	18.495	36.555	26.340	215.31	-13.29	0.398		
180.0	181.3	18.458	18.425	36.549	26.353	213.84	-15.06	0.398		
190.0	191.4	18.383	18.349	36.542	26.368	212.85	-16.38	0.397		
200.0	201.5	18.303	18.267	36.534	26.381	212.54	-17.05	0.398		
210.0	211.6	18.255	18.218	36.527	26.389	212.38	-17.43	0.393		
220.0	221.7	18.186	18.147	36.517	26.399	211.24	-18.87	0.397		
230.0	231.7	18.099	18.059	36.507	26.413	209.64	-20.87	0.395		
240.0	241.8	18.053	18.011	36.500	26.420	208.58	-22.14	0.395		

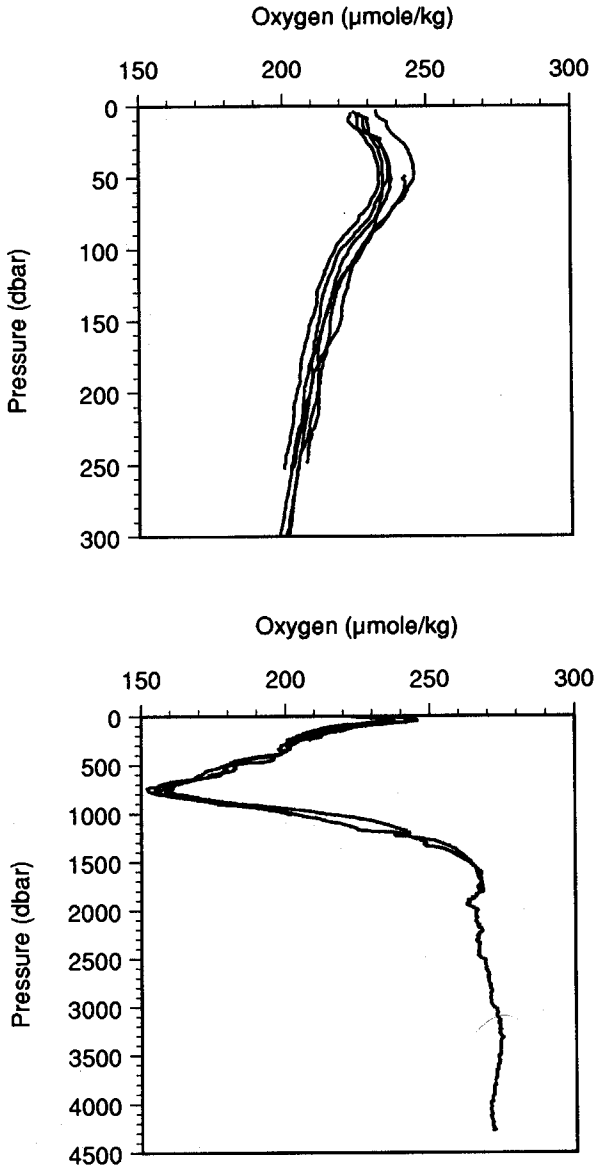
BATS 8—CTD Temperature Profile



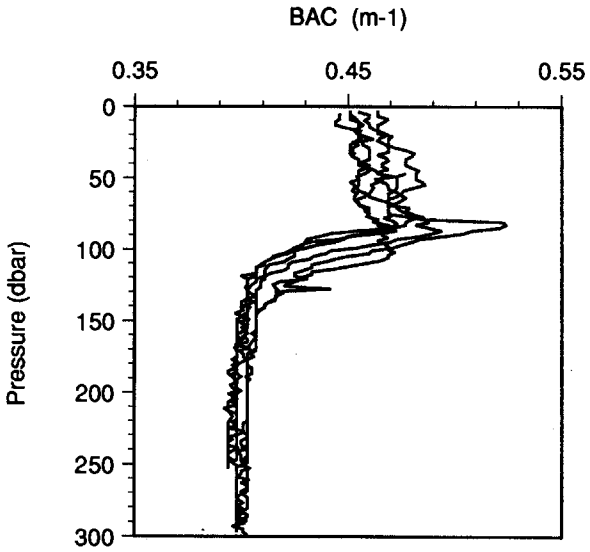
BATS 8—CTD Salinity Profile



BATS 8—CTD Oxygen Profile



BATS 8—CTD BAC Profile



BATS 8—Bottle Data
May 15-18, 1989
Physical Parameters

Bottle ID	Depth (m)	Pressure (db)	Temp (°C)	Pot. Temp (°C)	Salinity (ppt)	Sigma-t (kg/m^3)
G0803N12	4.0	4.0	22.487	22.486	36.534	25.248
G0803N11	13.7	13.8	21.666	21.664	36.595	25.526
G0803N10	24.3	24.5	21.046	21.041	36.627	25.723
G0803N09	38.4	38.7	20.724	20.716	36.624	25.810
G0803N08	66.9	67.4	19.532	19.520	36.602	26.112
G0803N07	84.7	85.3	19.247	19.232	36.598	26.184
G0803N06	96.2	96.9	19.159	19.141	36.594	26.205
G0803N05	104.6	105.4	19.099	19.080	36.589	26.217
G0803N04	140.1	141.2	18.718	18.692	36.562	26.296
G0803N03	175.8	177.1	18.440	18.408	36.544	26.354
G0803N02	223.8	225.4	18.090	18.050	36.497	26.408
G0803N01	248.6	250.5	17.906	17.862	36.472	26.435
G0804N12	3.4	3.4	22.544			
G0804N11	14.4	14.5	22.287	22.284	36.534	25.305
G0804N10	26.1	26.2	21.380	21.375	36.604	25.614
G0804N09	39.3	39.5	20.710	20.703	36.627	25.816
G0804N08	66.5	67.0	19.539	19.527	36.607	26.114
G0804N07	85.2	85.8	19.313	19.298	36.604	26.172
G0804N06	96.7	97.4	19.215	19.197	36.603	26.197
G0804N05	119.8	120.7	18.973	18.952	36.586	26.248
G0804N04	1202.5	1214.5	4.978	4.862	35.040	27.723
G0804N03	1400.4	1414.9	4.382	4.249	35.001	27.761
G0804N02	1601.8	1619.2	4.002	3.850	34.983	27.788
G0804N01	1801.0	1821.5	3.836	3.661	34.985	27.809
G0805N12	300.8	303.2	17.739			
G0805N11	298.0	300.3	17.749			
G0805N10	401.3	404.5	16.858	16.790	36.318	26.578
G0805N09	498.8	502.9	15.157	15.078	36.029	26.749
G0805N08	497.4	501.5	15.166	15.087	36.026	26.745
G0805N07	600.4	605.5	13.690	13.600	35.791	26.883
G0805N06	753.1	759.7	10.181	10.085	35.334	27.198
G0805N05	749.9	756.5	10.240	10.145	35.344	27.196
G0805N04	800.9	808.0	9.017	8.921	35.227	27.309
G0805N03	900.9	909.1	7.354	7.256	35.148	27.500
G0805N02	999.7	1009.1	6.360	6.257	35.109	27.606
G0805N01	999.7	1009.1	6.360	6.257	35.108	27.605
G0802N12	1998.2	2021.8	3.742	3.543	34.987	27.823
G0802N11	2198.1	2225.2	3.503	3.281	34.976	27.839
G0802N10	2402.4	2433.2	3.322	3.075	34.971	27.855
G0802N09	2597.5	2632.0	3.108	2.837	34.955	27.864
G0802N08	2800.9	2839.5	2.913	2.616	34.943	27.874
G0802N07	3001.1	3043.9	2.698	2.375	34.934	27.888
G0802N06	3199.5	3246.6	2.532	2.182	34.923	27.895
G0802N05	3398.8	3450.4	2.405	2.025	34.910	27.898
G0802N04	3599.8	3656.3	2.318	1.907	34.903	27.901
G0802N03	3799.8	3861.1	2.274	1.830	34.900	27.905
G0802N02	4000.4	4066.9	2.250	1.771	34.894	27.905
G0802N01	4200.9	4272.7	2.246	1.731	34.890	27.905

Bottle ID	Depth (m)	Pressure (db)	Temp (°C)	Pot. Temp (°C)	Salinity (ppt)	Sigma-t (kg/m^3)
G0806N12	1.6	1.6	22.660			
G0806N11	12.2	12.3	22.129			
G0806N10	21.5	21.6	21.438			
G0806N09	39.4	39.6	20.529			
G0806N08	66.9	67.3	19.553			
G0806N07	85.1	85.7	19.266			
G0806N06	97.7	98.4	19.109			
G0806N05	107.7	108.5	19.026			
G0806N04	141.1	142.2	18.735			
G0806N03	174.9	176.2	18.494			
G0806N02	222.9	224.6	18.095			
G0806N01	248.5	250.4	17.938			

BATS 8—Bottle Data
May 15-18, 1989
Gases

Bottle ID	Depth (m)	$O_2(1)$ (µmole/kg)	$O_2(2)$ (µmole/kg)	$O_2(1)$ anomaly (µmole/kg)	$O_2(2)$ anomaly (µmole/kg)	TCO_2 (µmole/kg)
G0803N12	4.0	223.14		12.27		2041.9
G0803N11	13.7	226.11		11.24		2052.5
G0803N10	24.3	229.97		12.18		2044.0
G0803N09	38.4	231.25	231.25	11.99	11.99	2044.6
G0803N08	66.9		229.87		5.32	2052.3
G0803N07	84.7	224.21		-1.53		2063.2
G0803N06	96.2	218.12		-7.96		2051.4
G0803N05	104.6	216.38	215.08	4	-11.24	2054.7
G0803N04	140.1	212.89	214.19	-14.96	-13.66	2063.9
G0803N03	175.8	208.10		-20.81		2070.1
G0803N02	223.8	201.14		-29.12		
G0803N01	248.6	200.27	199.83	-30.69	-31.12	2078.2
G0804N12	3.4					
G0804N11	14.4	227.04		15.18		
G0804N10	26.1	231.74	233.48	15.52	17.25	
G0804N09	39.3	236.90	238.20	17.58	18.89	
G0804N08	66.5	235.08		10.57		
G0804N07	85.2	226.38		0.94		
G0804N06	96.7	221.60		-4.23		
G0804N05	119.8	217.68		-9.13		
G0804N04	1202.5		238.30		-45.29	
G0804N03	1400.4	257.39		-29.79		
G0804N02	1601.8	267.36	266.50	-22.10	-22.97	
G0804N01	1801.0	264.75	265.19	-25.51	-25.08	

Bottle ID	Depth (m)	$O_2(1)$ (µmole/kg)	$O_2(2)$ (µmole/kg)	$O_2(1)$ anomaly (µmole/kg)	$O_2(2)$ anomaly (µmole/kg)	TCO_2 (µmole/kg)
G0805N12	300.8					
G0805N11	298.0					
G0805N10	401.3	196.34		-38.44		
G0805N09	498.8	182.86		-58.23		
G0805N08	497.4					
G0805N07	600.4	172.43	178.51	-73.82	-67.74	
G0805N06	753.1	158.95		-100.02		
G0805N05	749.9	160.68		-98.05		
G0805N04	800.9	164.15		-99.47		
G0805N03	900.9	185.39		-85.52		
G0805N02	999.7	201.00		-74.80		
G0805N01	999.7	202.74		-73.07		
G0802N12	1998.2	266.49	265.19	-24.11	-25.41	
G0802N11	2198.1	267.78		-24.36		
G0802N10	2402.4	266.91	265.61	-26.42	-27.72	
G0802N09	2597.5	266.91	267.34	-28.01	-27.58	
G0802N08	2800.9	269.94	268.64	-26.50	-27.80	
G0802N07	3001.1	272.54	271.67	-25.70	-26.57	
G0802N06	3199.5	272.96	273.83	-26.75	-25.89	
G0802N05	3398.8	272.96	272.96	-27.99	-27.99	
G0802N04	3599.8	272.52	272.52	-29.33	-29.33	
G0802N03	3799.8	269.49		-32.95		
G0802N02	4000.4	270.35	270.35	-32.54	-32.54	
G0802N01	4200.9	270.35	269.48	-32.86	-33.73	

BATS 8—Bottle Data
May 15-18, 1989
Nutrients

Bottle ID	Depth (m)	Nitrate+Nitrite (µmole/kg)	Phosphate (µmole/kg)	Silicate (µmole/kg)
G0803N12	4.0	0.06	0.00	0.75
G0803N11	13.7	0.08	0.00	0.75
G0803N10	24.3	0.00	0.00	0.67
G0803N09	38.4	0.07	0.00	0.67
G0803N08	66.9	0.05	0.00	0.69
G0803N07	84.7	0.58	0.00	0.74
G0803N06	96.2	1.22	0.00	0.97
G0803N05	104.6	1.49	0.00	0.94
G0803N04	140.1	2.37	0.06	1.13
G0803N03	175.8	3.11	0.11	1.17
G0803N02	223.8	4.18	0.16	1.34
G0803N01	248.6	4.80	0.20	1.50

Bottle ID	Depth (m)	Nitrate+Nitrite (µmole/kg)	Phosphate (µmole/kg)	Silicate (µmole/kg)
G0804N12	3.4			
G0804N11	14.4	0.05	0.00	0.55
G0804N10	26.1	0.07	0.00	0.63
G0804N09	39.3	0.06	0.00	0.67
G0804N08	66.5	0.05	0.00	0.69
G0804N07	85.2	0.17	0.00	0.58
G0804N06	96.7	0.86	0.00	0.84
G0804N05	119.8	1.72	0.06	1.06
G0804N04	1202.5	18.23	1.18	10.87
G0804N03	1400.4	17.61	1.12	10.61
G0804N02	1601.8	17.33		11.14
G0804N01	1801.0	17.37	1.14	12.21
G0805N12	300.8			
G0805N11	298.0			
G0805N10	401.3	7.01	0.31	2.19
G0805N09	498.8	10.96	0.56	3.67
G0805N08	497.4	10.95	0.58	3.82
G0805N07	600.4	13.93	0.67	5.34
G0805N06	753.1	20.13	1.25	10.16
G0805N05	749.9	19.79	1.25	10.16
G0805N04	800.9	21.02	1.36	11.04
G0805N03	900.9	21.06	1.36	12.03
G0805N02	999.7	20.43	1.29	12.46
G0805N01	999.7	20.41	1.32	12.47
G0802N12	1998.2	17.48	1.14	13.18
G0802N11	2198.1	17.56		14.88
G0802N10	2402.4	18.00	1.21	17.02
G0802N09	2597.5	17.77	1.19	17.65
G0802N08	2800.9	17.71	1.23	18.62
G0802N07	3001.1	17.52	1.17	18.89
G0802N06	3199.5	17.43	1.17	20.24
G0802N05	3398.8	17.58	1.21	22.54
G0802N04	3599.8	17.86	1.24	24.07
G0802N03	3799.8	18.03	1.25	26.02
G0802N02	4000.4	18.32	1.32	27.81
G0802N01	4200.9	18.43	1.34	28.61

BATS 8—Bottle Data
May 15-18, 1989
Particulates

Bottle ID	Depth (m)	Chl *a* (μg/kg)	POC (μg/kg)	PON (μg/kg)	Bacteria (# x 10^8/kg)
G0803N12	4.0		38.31	4.37	
G0803N11	13.7		53.34	6.71	
G0803N10	24.3		33.97	4.15	
G0803N09	38.4		37.03	4.26	
G0803N08	66.9		36.52	5.06	
G0803N07	84.7		34.42	4.73	
G0803N06	96.2		25.77	3.26	
G0803N05	104.6		15.49	2.36	
G0803N04	140.1		10.04	1.20	
G0803N03	175.8		4.58	1.07	
G0803N02	223.8		4.48	1.07	
G0803N01	248.6		3.15	0.70	
G0804N12	3.4				
G0804N11	14.4		58.50	5.37	
G0804N10	26.1		25.80	3.92	
G0804N09	39.3		27.35	4.26	
G0804N08	66.5		25.08	4.77	
G0804N07	85.2		25.26	4.84	
G0804N06	96.7		22.37	4.39	
G0804N05	119.8		8.02	1.53	
G0804N04	1202.5				
G0804N03	1400.4				0.20
G0804N02	1601.8				
G0804N01	1801.0				
G0805N12	300.8		31.20	4.12	
G0805N11	298.0				
G0805N10	401.3		3.51	0.87	0.38
G0805N09	498.8		2.13	0.94	
G0805N08	497.4		1.54	0.80	
G0805N07	600.4				0.33
G0805N06	753.1		5.23	0.81	
G0805N05	749.9		3.80	0.93	
G0805N04	800.9				
G0805N03	900.9				0.25
G0805N02	999.7		3.86	0.82	
G0805N01	999.7		2.28	1.04	
G0802N12	1998.2				0.17
G0802N11	2198.1				
G0802N10	2402.4				
G0802N09	2597.5				
G0802N08	2800.9				
G0802N07	3001.1				0.10
G0802N06	3199.5				
G0802N05	3398.8				
G0802N04	3599.8				
G0802N03	3799.8				
G0802N02	4000.4				0.12
G0802N01	4200.9				

Bottle ID	Depth (m)	Chl *a* (μg/kg)	POC (μg/kg)	PON (μg/kg)	Bacteria (# x 10^8/kg)
G0806N12	1.6	0.038			3.10
G0806N11	12.2	0.039			3.60
G0806N10	21.5	0.045			3.89
G0806N09	39.4	0.061			4.07
G0806N08	66.9	0.160			3.64
G0806N07	85.1	0.468			3.27
G0806N06	97.7	0.180			1.75
G0806N05	107.7	0.098			1.29
G0806N04	141.1	0.021			0.92
G0806N03	174.9	0.009			0.92
G0806N02	222.9	0.008			0.65
G0806N01	248.5	0.008			

BATS 8, Primary Production Data

R.V. Weatherbird

Light Bottles		Dark Bottles		Time-zero Bottles	
Depth (m)	Lt. Prod ($mg/m^2/day$)	Depth (m)	Dk. Prod ($mg/m^2/day$)	Depth (m)	$T_{\emptyset}$ Prod ($mg/m^2/day$)
3.3		3.3	0.88	3.3	0.47
3.3	2.46				
3.3	4.13				
14.3	3.63	14.3	2.34[1]	14.3	0.80
14.3	4.54				
14.3	4.01				
24.8	1.60	24.8	0.72	24.8	0.42
24.8	1.40				
24.8	1.73				
39.0	3.04	39.0	1.15	39.0	0.26
39.0	4.07				
39.0	2.86				
67.3	2.68	67.3	0.86	67.3	1.17
67.3					
67.3	2.69				
97.0	0.81	97.0	0.37	97.0	0.42
97.0	1.32				
97.0	1.00				

1. Incubator value used in further calculations

Sediment Trap Estimated Particle Fluxes

Depth (m)	Sample #	Mass ($mg/m^2/d$)	Total Carbon ($mg\ C/m^2/d$)	Organic Carbon ($mg\ C/m^2/d$)	Nitrogen ($mg\ N/m^2/d$)
150	53	74.30	21.54		2.93
150[1]	53			18.76	2.66
150	54	35.34[2]			
150[1]	54				
200	55	77.92	19.42		2.29
200[1]	55			16.45	2.14
200	56	101.48	22.51		3.10
200[1]	56			17.67	2.66
300[3]	57+58	33.07	7.59		0.73
300[1,3]	57+58			5.81	0.69
400[4]	59				
400[4]	59				
400	60	96.04	23.19		3.83
400[1]	60			22.14	4.94

1. Subsample acidified to remove carbonates.
2. Some material was lost on the filter frit.
3. Due to low weight, samples from the two traps were combined.
4. Filter dropped at sea.

Cruise Report, BATS 9

Cruise dates: June 20, 1989 - June 23, 1989
Personnel: R.L. Sherriff-Dow, R. Johnson, M. Tuel, K. Simmons
R.V. Weatherbird

June 20, 1989

1330 - Depart BBSR

1550 - Stop for PIT water. Lat: 32.086 N; Long: 64.463 W

Deploy traps at 2000. Lat: 31.745 N; Long: 64.202 W
Seas: Calm, seas 2'
Wind: E by NE at 10 knots

CTD **Cast 1**: in water at 2053. Lat: 31.746 N; Long: 64.200 W
Wind: 6 knots from the east.

Nominal depths: 2000, 2200, 2400, 2600, 2800, 3000, 3200, 3400, 3600, 3800, 4000, 4200 m.

Samples:

dissolved O_2 -duplicates	12 depths
salinity	12 depths
NO_3, PO_4, SiO_4,	12 depths
Bacteria	3000, 4000m

June 21, 1989

0145 - 4200m cast on deck.

Cast 2: 0836-0935 Lat: 31.758 N; Long: 64.167 W
Wind: 10 knots N by NE

Nominal depths: 300, 300, 400, 500, 500, 600, 750, 750, 800, 900, 1000, 1000 m

Samples:

dissolved O_2 -duplicates	12 samples
salinity	12 samples
NO_3, PO_4, SiO_4,	12 samples
POC/PON	300,500,750,1000 m
Bacteria	400, 600, 900 m

1407-1417—CTD **Cast 3**: Light cast to 170m
Lat: 31.765 N Long: 64.173 W

Cast 4: 1545-1735 Lat: 31.770 N; Long: 64.164 W

Wind: E by NE at 5 knots, seas 2-3'.

Nominal depths: 3, 16, 24, 39, 53, 66, 75, 85, 1200, 1400, 1600, 1800 m.

Samples:

dissolved O_2 -duplicates	12 depths
salinity	12 depths
NO_3, PO_4, SiO_4,	12 depths
POC/PON	3,16,24,39,53,66,75,85 m
Bacteria	1400 m

2050 - Power off until 2200.

June 22, 1989

0545 - Primary production array deployed

1251-1323: **Cast 5**: Lat: 31.797 N; Long: 64.084 W

Nominal depths: 3, 16, 24, 39, 53, 66, 85, 100, 119, 150, 200, 250 m.

Samples:

dissolved O_2 -duplicates	12 depths
salinity	12 depths
NO_3, PO_4, SiO_4,	12 depths
POC/PON	12 depths
CO_2 - Brewer	11 depths, 1 surface replicate

CTD **Cast 6**: 1849-1917 Lat: 31.801 N; Long: 64.058 W

Nominal depths: 3, 16, 24, 39, 53, 66, 85, 100, 119, 150, 200, 250 m.

Samples:

Chlorophyll	12 depths
Bacteria	12 depths

June 23, 1989

Return to BBSR

CTD Sensor Corrections to Bottle Data for BATS 9:

Salinity:

$$DS = R_{\varnothing} + \sum_{i=1}^{l} A_i \left(\frac{P}{4300}\right)^i + \sum_{i=1}^{m} B_i \left(\frac{T}{30}\right)^i + \sum_{i=1}^{n} C_i \left(\frac{SC}{37}\right)^i$$

MS = SC + DS

Where:

DS = Model (Wet Salinity - CTD Salinity)
MS = modified salinity
SC = uncorrected CTD salinity
$R_{\varnothing}$ = linear Offset
P = pressure (dbar)
T = temperature (°C)
A_i, B_i, C_i = Regression coefficients
l, m, n = order of the polynomial functions

$R_{\varnothing}$ = 463000.0	B_3 = -1.077
A_1 = 0.9889	B_4 = 1.911
A_2 = -2.315	C_1 = -1916000.0
A_3 = 2.425	C_2 = 2975000.0
A_4 = -0.9425	C_3 = -2053000.0
B_1 = 1.101	C_4 = 531100.0
B_2 = -1.771	

model correlation coefficient = 0.9567
standard deviation of model residuals = 0.0039 ppt

Oxygen:

$$MO = R_{\varnothing} + \sum_{i=1}^{l} A_i \left(\frac{P}{4300}\right)^i + \sum_{i=1}^{m} B_i \left(\frac{T}{30}\right)^i$$

$$+ \sum_{i=1}^{n} C_i (OC)^i + \sum_{i=1}^{o} D_i \left(\frac{OT}{30}\right)^i + \sum_{i=1}^{p} E_i \left(\frac{OS}{300}\right)^i$$

Mol = MO x 300

Where:

P = pressure (dbar)
T = temperature (°C)
MO = (CTD modeled oxygen (µmole/kg))/300
Mol = modeled oxygen (µmole/kg)

OC = Oxygen sensor current (μamps)
OT = Oxygen sensor temperature from internal thermistor (°C)
OS(t,p,s) = Oxygen saturation value at measured temperature, salinity and pressure (μmole/kg)
R_{ϕ}, A_i, B_i, C_i, D_i, E_i = Regression coefficients
l, m, n, o, p = order of the polynomial functions
l = 4; m=n=o=p=2

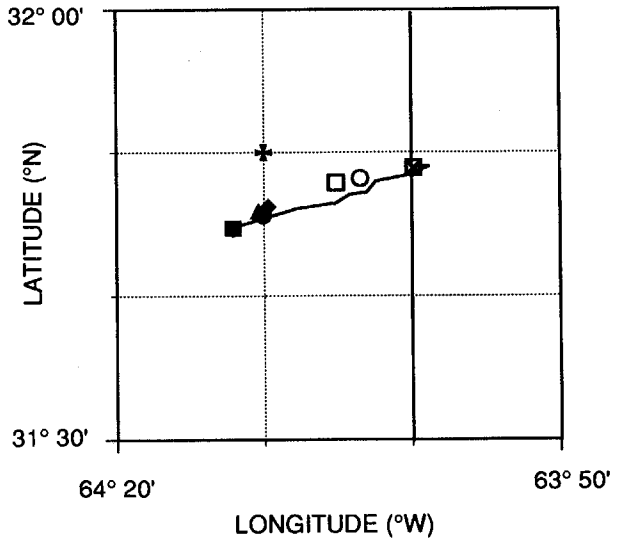
R_{ϕ}	= 1.9479909E+00	C_1	= 2.4404288E+00
A_1	= 4.5955025E-01	C_2	= -1.1222078E+00
A_2	= -7.2183019E-01	D_1	= -1.2465238E+00
A_3	= 9.6084126E-01	D_2	= 5.5476598E-01
A_4	= -4.9235044E-01	E_1	= -2.2276390E+00
B_1	= -2.4613453E-01	E_2	= 7.6494687E-01
B_2	= -3.9040516E-01		

model correlation coefficient = 9.994E-01
standard deviation of model residuals = 1.289E+00 μmole/kg

Beam Attenuation Coefficient:

BAC offset = 0.364 - 0.325 = 0.039 m^{-1}

BATS 9—Cast Positions:



BATS 9, CTD Cast 1
20 June 1989: Start 20:53; End 01:45
Lat: 31.746 N; Long: 64.200 W

Depth (m)	Pres (db)	Temp (°C)	Pot.T (°C)	CTD Sal (ppt)	Sigma-t (kg/m3)	CTD 02 (µmole/kg)	02 Anom (µmole/kg)	BAC (m-1)	PAR (µE/m2/s)	Fluor (rfu)
3.0	3.0	26.189	26.188	36.732	24.283	199.94	0.20	0.436		
10.0	10.1	25.744	25.742	36.696	24.396	201.57	0.32	0.436		
20.0	20.1	24.696	24.692	36.673	24.702	207.26	2.44	0.444		
30.0	30.2	22.276	22.270	36.638	25.388	220.09	6.56	0.441		
40.0	40.3	21.443	21.435	36.663	25.642	224.80	8.15	0.456		
50.0	50.4	20.887	20.877	36.681	25.809	227.34	8.56	0.461		
60.0	60.4	20.492	20.480	36.679	25.916	227.96	7.62	0.477		
70.0	70.5	20.020	20.007	36.679	26.042	227.32	5.09	0.485		
80.0	80.6	19.733	19.718	36.682	26.121	225.77	2.39	0.491		
90.0	90.6	19.522	19.505	36.682	26.177	222.85	-1.39	0.496		
100.0	100.7	19.375	19.357	36.700	26.230	219.71	-5.11	0.509		
110.0	110.8	19.154	19.133	36.685	26.276	214.78	-10.98	0.508		
120.0	120.9	19.066	19.044	36.676	26.293	210.86	-15.28	0.494		
130.0	131.0	18.993	18.969	36.679	26.314	208.04	-18.40	0.495		
140.0	141.0	18.904	18.878	36.680	26.338	207.58	-19.24	0.494		
150.0	151.1	18.806	18.779	36.669	26.355	206.10	-21.14	0.494		
160.0	161.2	18.734	18.705	36.675	26.379	205.57	-21.96	0.493		
170.0	171.3	18.656	18.626	36.668	26.394	205.88	-22.00	0.493		
180.0	181.3	18.612	18.579	36.675	26.411	206.65	-21.40	0.490		
190.0	191.4	18.576	18.541	36.677	26.422	207.60	-20.61	0.488		
200.0	201.5	18.539	18.503	36.673	26.429	207.38	-20.99	0.490		
210.0	211.6	18.497	18.459	36.668	26.436	207.07	-21.49	0.493		
220.0	221.7	18.455	18.416	36.662	26.442	206.03	-22.71	0.490		
230.0	231.7	18.393	18.352	36.650	26.449	204.70	-24.32	0.488		
240.0	241.8	18.314	18.271	36.637	26.460	203.09	-26.29	0.487		
250.0	251.9	18.254	18.209	36.626	26.467	201.86	-27.79	0.488		
275.0	277.1	18.073	18.024	36.599	26.492	198.93	-31.55	0.487		
300.0	302.3	17.884	17.832	36.570	26.518	197.16	-34.18	0.482		
325.0	327.5	17.708	17.651	36.545	26.543	196.24	-35.91	0.481		
350.0	352.7	17.530	17.469	36.520	26.569	195.52	-37.45	0.476		
375.0	378.0	17.327	17.262	36.492	26.597	195.70	-38.22	0.473		
400.0	403.2	17.133	17.064	36.458	26.619	195.04	-39.80	0.471		
425.0	428.4	16.866	16.794	36.410	26.647	194.09	-42.02	0.468		
450.0	453.6	16.518	16.442	36.347	26.682	189.48	-48.32	0.468		
475.0	478.9	16.146	16.067	36.282	26.720	183.82	-55.81	0.462		
500.0	504.1	15.817	15.735	36.230	26.756	181.46	-59.79	0.457		
550.0	554.6	14.832	14.745	36.076	26.859	177.92	-68.32	0.455		
600.0	605.1	13.850	13.759	35.927	26.955	175.41	-76.00	0.446		
650.0	655.6	12.731	12.637	35.759	27.055	166.88	-90.66	0.440		
700.0	706.1	11.756	11.659	35.614	27.132	158.93	-104.17	0.435		
750.0	756.6	10.589	10.491	35.458	27.224	152.85	-117.18	0.429		
800.0	807.2	9.165	9.068	35.314	27.353	155.48	-123.36	0.426		
850.0	857.7	8.390	8.291	35.260	27.434	162.61	-121.21	0.421		
900.0	908.3	7.710	7.610	35.219	27.505	168.57	-119.72	0.424		
950.0	958.9	7.043	6.941	35.195	27.581	178.73	-114.06	0.418		
1000.0	1009.4	6.586	6.481	35.189	27.639	191.30	-104.62	0.421		
1050.0	1060.0	6.039	5.932	35.170	27.696	202.67	-97.09	0.417		
1100.0	1110.7	5.614	5.505	35.157	27.739	212.83	-89.98	0.417		
1150.0	1161.3	5.338	5.226	35.144	27.763	221.48	-83.36	0.413		
1200.0	1211.9	5.067	4.951	35.139	27.791	229.06	-77.77	0.412		
1300.0	1313.2	4.863	4.737	35.138	27.815	239.10	-69.24	0.406		

Depth (m)	Pres (db)	Temp (°C)	Pot.T (°C)	CTD Sal (ppt)	Sigma-t (kg/m3)	CTD 02 (µmole/kg)	02 Anom (µmole/kg)	BAC (m-1)	PAR (µE/m2/s)	Fluor (rfu)
1400.0	1414.6	4.490	4.356	35.107	27.833	247.52	-63.69	0.406		
1500.0	1516.0	4.352	4.208	35.106	27.849	252.47	-59.78	0.400		
1600.0	1617.4	4.187	4.032	35.098	27.861	255.94	-57.59	0.401		
1700.0	1718.9	4.114	3.948	35.099	27.871	258.38	-55.70	0.399		
1800.0	1820.5	4.059	3.882	35.104	27.882	258.99	-55.50	0.395		
1900.0	1922.1	3.947	3.759	35.100	27.891	259.35	-56.01	0.395		
2000.0	2023.7	3.755	3.556	35.081	27.896	260.81	-56.09	0.394		
2100.0	2125.4	3.674	3.463	35.083	27.907	261.45	-56.08	0.390		
2200.0	2227.2	3.531	3.308	35.070	27.912	262.90	-55.78	0.388		
2300.0	2328.9	3.435	3.201	35.065	27.918	264.64	-54.80	0.387		
2400.0	2430.8	3.330	3.084	35.060	27.925	264.94	-55.34	0.388		
2500.0	2532.7	3.236	2.976	35.054	27.931	266.22	-54.84	0.386		
2600.0	2634.6	3.126	2.855	35.048	27.937	266.35	-55.59	0.382		
2700.0	2736.6	3.038	2.754	35.043	27.942	267.52	-55.15	0.381		
2800.0	2838.6	2.952	2.654	35.037	27.946	268.85	-54.53	0.377		
2900.0	2940.7	2.853	2.542	35.031	27.951	270.00	-54.19	0.375		
3000.0	3042.8	2.753	2.429	35.025	27.956	271.02	-53.99	0.373		
3100.0	3144.9	2.667	2.329	35.020	27.961	270.82	-54.91	0.373		
3200.0	3247.2	2.578	2.226	35.015	27.965	272.19	-54.28	0.372		
3300.0	3349.4	2.512	2.145	35.011	27.969	271.30	-55.72	0.371		
3400.0	3451.7	2.435	2.054	35.006	27.972	271.93	-55.74	0.365		
3500.0	3554.1	2.379	1.983	35.002	27.975	272.49	-55.66	0.365		
3600.0	3656.5	2.341	1.929	34.999	27.977	271.49	-56.99	0.365		
3700.0	3758.9	2.312	1.884	34.996	27.978	271.47	-57.25	0.364		
3800.0	3861.4	2.281	1.836	34.993	27.979	269.43	-59.55	0.365		
3900.0	3964.0	2.254	1.792	34.989	27.979	268.51	-60.71	0.368		
4000.0	4066.5	2.239	1.760	34.986	27.979	267.10	-62.25	0.373		
4100.0	4169.2	2.233	1.736	34.983	27.979	266.13	-63.28	0.377		
4200.0	4271.8	2.239	1.724	34.980	27.977	265.80	-63.56	0.377		

BATS 9, CTD Cast 2
21 June 1989: Start 08:36; End: 09:35
Lat: 31.758 N; Long: 64.167 W

Depth (m)	Pres (db)	Temp (°C)	Pot.T (°C)	CTD Sal (ppt)	Sigma-t (kg/m3)	CTD 02 (µmole/kg)	02 Anom (µmole/kg)	BAC (m-1)	PAR (µE/m2/s)	Fluor (rfu)
3.0	3.0	25.936	25.935	36.720	24.354	204.72	4.14	0.435		
10.0	10.1	25.905	25.903	36.718	24.363	204.69	4.00	0.439		
20.0	20.1	24.941	24.937	36.677	24.631	209.17	5.19	0.442		
30.0	30.2	22.757	22.750	36.629	25.243	220.71	8.93	0.435		
40.0	40.3	21.660	21.652	36.675	25.591	227.82	12.01	0.444		
50.0	50.4	21.108	21.099	36.680	25.748	231.76	13.84	0.453		
60.0	60.4	20.596	20.585	36.689	25.895	233.08	13.17	0.476		
70.0	70.5	20.086	20.073	36.688	26.032	233.10	11.16	0.485		
80.0	80.6	19.787	19.772	36.678	26.104	231.38	8.21	0.491		
90.0	90.6	19.552	19.535	36.687	26.173	228.91	4.79	0.491		
100.0	100.7	19.398	19.380	36.692	26.218	225.43	0.69	0.503		
110.0	110.8	19.207	19.187	36.684	26.262	221.50	-4.04	0.508		
120.0	120.9	19.086	19.064	36.680	26.291	217.07	-8.98	0.499		
130.0	131.0	18.979	18.955	36.680	26.319	213.35	-13.15	0.493		
140.0	141.0	18.869	18.843	36.676	26.344	211.55	-15.42	0.493		
150.0	151.1	18.775	18.748	36.670	26.364	209.76	-17.61	0.498		
160.0	161.2	18.693	18.665	36.669	26.384	208.47	-19.25	0.493		

Depth (m)	Pres (db)	Temp (°C)	Pot.T (°C)	CTD Sal (ppt)	Sigma-t (kg/m3)	CTD 02 (µmole/kg)	02 Anom (µmole/kg)	BAC (m-1)	PAR (µE/m2/s)	Fluor (rfu)
170.0	171.3	18.628	18.597	36.663	26.397	207.83	-20.17	0.494		
180.0	181.3	18.592	18.560	36.670	26.412	208.46	-19.68	0.497		
190.0	191.4	18.571	18.537	36.675	26.422	209.62	-18.61	0.494		
200.0	201.5	18.546	18.510	36.677	26.430	210.23	-18.10	0.495		
210.0	211.6	18.495	18.457	36.669	26.438	210.65	-17.91	0.494		
220.0	221.7	18.436	18.396	36.662	26.448	210.34	-18.48	0.495		
230.0	231.7	18.403	18.362	36.659	26.454	210.03	-18.94	0.494		
240.0	241.8	18.331	18.288	36.650	26.466	209.50	-19.79	0.494		
250.0	251.9	18.244	18.200	36.633	26.474	207.98	-21.70	0.493		
275.0	277.1	18.047	17.999	36.597	26.497	203.38	-27.21	0.490		
300.0	302.3	17.898	17.845	36.573	26.517	199.76	-31.51	0.489		
325.0	327.5	17.768	17.711	36.556	26.537	198.32	-33.55	0.490		
350.0	352.7	17.594	17.532	36.531	26.562	197.61	-35.07	0.483		
375.0	378.0	17.449	17.384	36.513	26.584	198.11	-35.23	0.481		
400.0	403.2	17.292	17.223	36.489	26.605	198.06	-36.01	0.480		
425.0	428.4	17.072	16.999	36.451	26.630	197.36	-37.77	0.480		
450.0	453.6	16.798	16.722	36.402	26.658	195.06	-41.38	0.471		
475.0	478.9	16.480	16.400	36.349	26.693	190.22	-47.76	0.468		
500.0	504.1	15.986	15.904	36.261	26.741	184.68	-55.73	0.466		
550.0	554.6	15.119	15.031	36.122	26.831	178.83	-65.94	0.462		
600.0	605.1	14.200	14.107	35.981	26.923	177.20	-72.35	0.457		
650.0	655.6	13.042	12.946	35.808	27.031	168.65	-87.16	0.450		
700.0	706.1	11.615	11.519	35.597	27.145	156.22	-107.69	0.446		
750.0	756.6	10.306	10.210	35.423	27.246	149.06	-122.68	0.442		
800.0	807.2	9.248	9.151	35.306	27.334	149.97	-128.37	0.442		
850.0	857.7	8.270	8.172	35.251	27.445	157.25	-127.35	0.443		
900.0	908.3	7.588	7.488	35.213	27.517	166.29	-122.82	0.439		
950.0	958.9	7.029	6.927	35.197	27.585	176.15	-116.73	0.442		
999.6	1009.0	6.571	6.466	35.184	27.637	193.93	-102.10	0.435		

BATS 9, CTD Cast 3
21 June 1989: Start 14:07; End 14:17
Lat: 31.765 N; Long: 64.173 W

Depth (m)	Pres (db)	Temp (°C)	Pot.T (°C)	CTD Sal (ppt)	Sigma-t (kg/m3)	CTD 02 (µmole/kg)	02 Anom (µmole/kg)	BAC (m-1)	PAR (µE/m2/s)	Fluor (rfu)
3.0	3.0	26.306	26.305	36.737	24.250	213.10	13.75		1481.61	
10.0	10.1	25.944	25.942	36.727	24.357	214.87	14.32		872.66	
20.0	20.1	24.815	24.810	36.673	24.666	220.29	15.87		593.04	
30.0	30.2	22.355	22.349	36.621	25.352	232.26	18.99		434.41	
40.0	40.3	21.418	21.410	36.675	25.658	237.92	21.19		297.21	
50.0	50.4	20.914	20.905	36.697	25.814	240.00	21.35		208.69	
60.0	60.4	20.451	20.440	36.686	25.932	240.45	19.96		140.56	
70.0	70.5	20.021	20.008	36.680	26.043	239.19	16.97		89.21	
80.0	80.6	19.690	19.675	36.680	26.131	236.34	12.78		54.05	
90.0	90.6	19.514	19.498	36.680	26.178	233.25	8.97		32.25	
100.0	100.7	19.369	19.351	36.698	26.230	231.52	6.67		18.82	
110.0	110.8	19.200	19.180	36.692	26.270	228.25	2.69		10.58	
120.0	120.9	19.117	19.095	36.695	26.294	222.59	-3.31		5.71	
130.0	131.0	19.005	18.982	36.687	26.317	218.67	-7.71		3.37	
140.0	141.0	18.918	18.892	36.683	26.337	216.06	-10.69		2.10	
150.0	151.1	18.818	18.791	36.678	26.359	215.03	-12.15		1.35	
160.0	161.2	18.727	18.698	36.666	26.374	213.22	-14.36		0.91	
170.0	171.3	18.660	18.629	36.666	26.391	212.39	-15.48		0.63	

BATS 9, CTD Cast 4
21 June 1989 Time: Start 15:45; End 17:35
Lat: 31.770 N; Long: 64.164 W

Depth (m)	Pres (db)	Temp (°C)	Pot.T (°C)	CTD Sal (ppt)	Sigma-t (kg/m3)	CTD 02 (µmole/kg)	02 Anom (µmole/kg)	BAC (m-1)	PAR (µE/m2/s)	Fluor (rfu)
3.0	3.0	26.374	26.373	36.758	24.245	212.40	13.30	0.439		
10.0	10.1	25.912	25.910	36.727	24.367	215.77	15.11	0.444		
20.0	20.1	24.414	24.410	36.667	24.783	220.94	15.14	0.449		
30.0	30.2	22.271	22.265	36.642	25.392	230.50	16.95	0.448		
40.0	40.3	21.460	21.452	36.684	25.653	235.82	19.26	0.460		
50.0	50.4	20.904	20.894	36.697	25.817	238.81	20.12	0.470		
60.0	60.4	20.458	20.447	36.691	25.934	240.02	19.56	0.485		
70.0	70.5	20.097	20.084	36.683	26.025	239.29	17.38	0.491		
80.0	80.6	19.785	19.770	36.680	26.106	237.24	14.06	0.496		
90.0	90.6	19.575	19.558	36.676	26.159	235.00	10.96	0.498		
100.0	100.7	19.395	19.376	36.687	26.215	232.30	7.53	0.503		
110.0	110.8	19.207	19.187	36.683	26.261	228.78	3.23	0.514		
120.0	120.9	19.141	19.119	36.694	26.287	224.46	-1.35	0.510		
130.0	131.0	19.036	19.013	36.689	26.311	220.70	-5.54	0.503		
140.0	141.0	18.939	18.913	36.685	26.333	217.84	-8.82	0.499		
150.0	151.1	18.846	18.819	36.679	26.353	215.42	-11.64	0.500		
160.0	161.2	18.749	18.720	36.671	26.372	214.42	-13.07	0.503		
170.0	171.3	18.664	18.634	36.667	26.391	213.32	-14.53	0.501		
180.0	181.3	18.613	18.580	36.669	26.406	213.06	-15.00	0.498		
190.0	191.4	18.595	18.560	36.676	26.417	213.87	-14.25	0.497		
200.0	201.5	18.567	18.531	36.678	26.425	215.10	-13.14	0.498		
210.0	211.6	18.516	18.478	36.674	26.436	215.66	-12.80	0.497		
220.0	221.7	18.474	18.435	36.668	26.443	214.57	-14.07	0.498		
230.0	231.7	18.403	18.362	36.651	26.447	213.81	-15.17	0.498		
240.0	241.8	18.357	18.315	36.645	26.455	211.38	-17.80	0.497		
250.0	251.9	18.297	18.253	36.634	26.462	210.16	-19.30	0.497		
275.0	277.1	18.125	18.077	36.612	26.489	208.13	-22.10	0.492		
300.0	302.3	17.916	17.864	36.578	26.516	205.59	-25.60	0.490		
325.0	327.5	17.754	17.697	36.554	26.539	203.36	-28.58	0.487		
350.0	352.7	17.573	17.512	36.528	26.565	201.72	-31.05	0.487		
375.0	378.0	17.394	17.329	36.507	26.593	202.62	-30.98	0.481		
400.0	403.2	17.234	17.165	36.485	26.616	204.02	-30.32	0.477		
425.0	428.4	16.886	16.813	36.416	26.648	200.65	-35.36	0.476		
450.0	453.6	16.486	16.411	36.344	26.687	194.63	-43.32	0.472		
475.0	478.9	16.128	16.049	36.282	26.724	189.31	-50.41	0.469		
500.0	504.1	15.710	15.629	36.211	26.766	185.54	-56.25	0.471		
550.0	554.6	14.844	14.757	36.079	26.858	181.30	-64.89	0.462		
600.0	605.1	13.912	13.821	35.937	26.950	179.42	-71.65	0.453		
650.0	655.6	12.940	12.845	35.793	27.040	170.04	-86.32	0.450		
700.0	706.1	11.838	11.741	35.628	27.127	159.97	-102.65	0.444		
750.0	756.6	10.407	10.310	35.433	27.237	151.20	-119.94	0.544		
800.0	807.2	9.140	9.044	35.309	27.353	153.06	-125.95	0.442		
850.0	857.7	8.285	8.187	35.254	27.445	159.68	-124.82	0.438		
900.0	908.3	7.558	7.459	35.211	27.520	169.24	-120.07	0.436		
950.0	958.9	6.966	6.864	35.194	27.591	181.58	-111.73	0.433		
1000.0	1009.4	6.436	6.332	35.182	27.653	195.49	-101.47	0.431		
1050.0	1060.0	5.982	5.876	35.166	27.700	208.36	-91.81	0.430		
1100.0	1110.7	5.611	5.502	35.155	27.738	217.82	-85.02	0.429		
1150.0	1161.3	5.298	5.186	35.140	27.764	227.03	-78.11	0.423		
1200.0	1211.9	5.240	5.122	35.161	27.789	234.23	-71.29	0.417		
1300.0	1313.2	4.968	4.841	35.158	27.819	243.40	-64.12	0.413		

Depth (m)	Pres (db)	Temp (°C)	Pot.T (°C)	CTD Sal (ppt)	Sigma-t (kg/m3)	CTD 02 (µmole/kg)	02 Anom (µmole/kg)	BAC (m-1)	PAR (µE/m2/s)	Fluor (rfu)
1400.0	1414.6	4.525	4.391	35.111	27.833	251.06	-59.86	0.410		
1500.0	1516.0	4.389	4.244	35.111	27.848	255.89	-56.06	0.407		
1600.0	1617.4	4.253	4.098	35.107	27.861	259.34	-53.66	0.404		
1700.0	1718.9	4.111	3.945	35.099	27.871	262.08	-52.02	0.401		
1800.0	1820.5	3.993	3.816	35.093	27.880	263.40	-51.63	0.401		

BATS 9, CTD Cast 5
22 June 1989: Start 12:51; End 13:23
Lat: 31.797 N; Long: 64.084 W

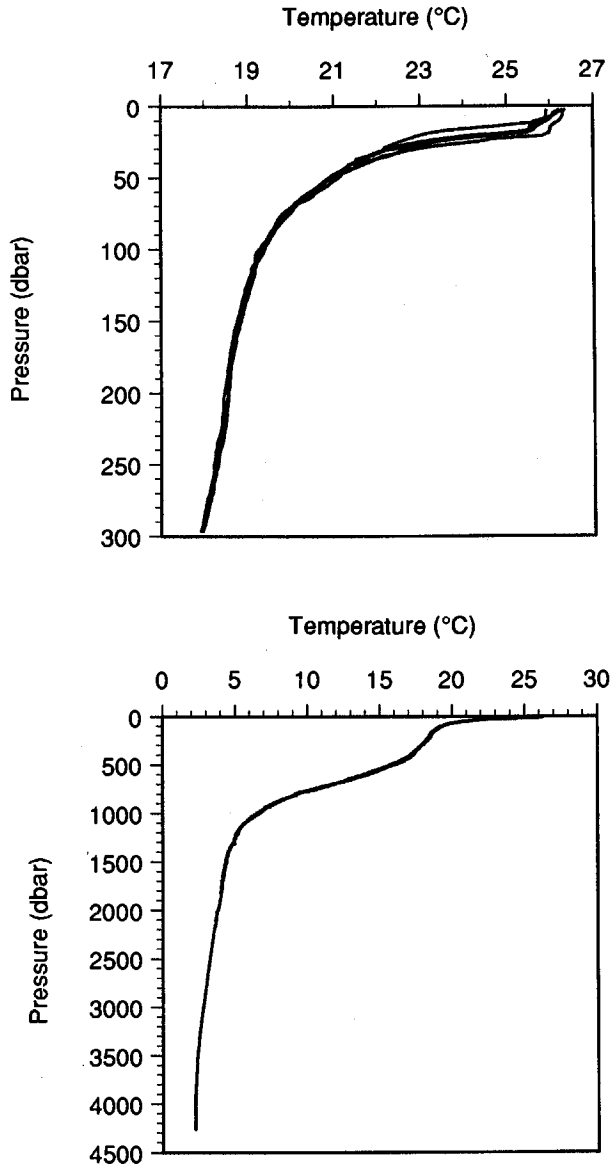
Depth (m)	Pres (db)	Temp (°C)	Pot.T (°C)	CTD Sal (ppt)	Sigma-t (kg/m3)	CTD 02 (µmole/kg)	02 Anom (µmole/kg)	BAC (m-1)	PAR (µE/m2/s)	Fluor (rfu)
3.0	3.0	26.229	26.228	36.787	24.312				1528.16	0.022
10.0	10.1	25.977	25.975	36.768	24.378				829.80	0.030
20.0	20.1	23.044	23.040	36.650	25.176				407.36	0.032
30.0	30.2	22.179	22.173	36.668	25.438				307.90	0.033
40.0	40.3	21.443	21.436	36.694	25.666				236.82	0.050
50.0	50.4	20.961	20.951	36.699	25.802				177.46	0.083
60.0	60.4	20.422	20.410	36.695	25.947				127.14	0.128
70.0	70.5	20.033	20.020	36.689	26.046				86.98	0.178
80.0	80.6	19.732	19.717	36.683	26.122				54.74	0.255
90.0	90.6	19.505	19.489	36.699	26.195				32.93	0.354
100.0	100.7	19.257	19.239	36.691	26.254				19.07	0.604
110.0	110.8	19.169	19.149	36.691	26.277				10.95	0.676
120.0	120.9	19.044	19.022	36.690	26.309				6.58	0.499
130.0	131.0	18.938	18.915	36.683	26.331				4.23	0.373
140.0	141.0	18.849	18.823	36.677	26.350				2.85	0.220
150.0	151.1	18.758	18.731	36.666	26.365				1.94	0.214
160.0	161.2	18.672	18.643	36.665	26.387				1.32	0.141
170.0	171.3	18.606	18.575	36.666	26.405				0.92	0.081
180.0	181.3	18.554	18.522	36.668	26.420				0.65	0.048
190.0	191.4	18.511	18.477	36.667	26.431				0.47	0.031
200.0	201.5	18.463	18.427	36.660	26.438				0.34	0.022
210.0	211.6	18.438	18.401	36.659	26.444				0.29	0.019
220.0	221.7	18.403	18.364	36.656	26.451				0.27	0.020
230.0	231.7	18.329	18.288	36.639	26.457				0.26	0.020
240.0	241.8	18.261	18.219	36.629	26.467				0.25	0.018
250.0	251.9	18.207	18.163	36.623	26.476				0.25	0.020

BATS 9, CTD Cast 6
22 June 1989: Start 18:49; End 19:17
Lat: 31.801 N; Long: 64.058 W

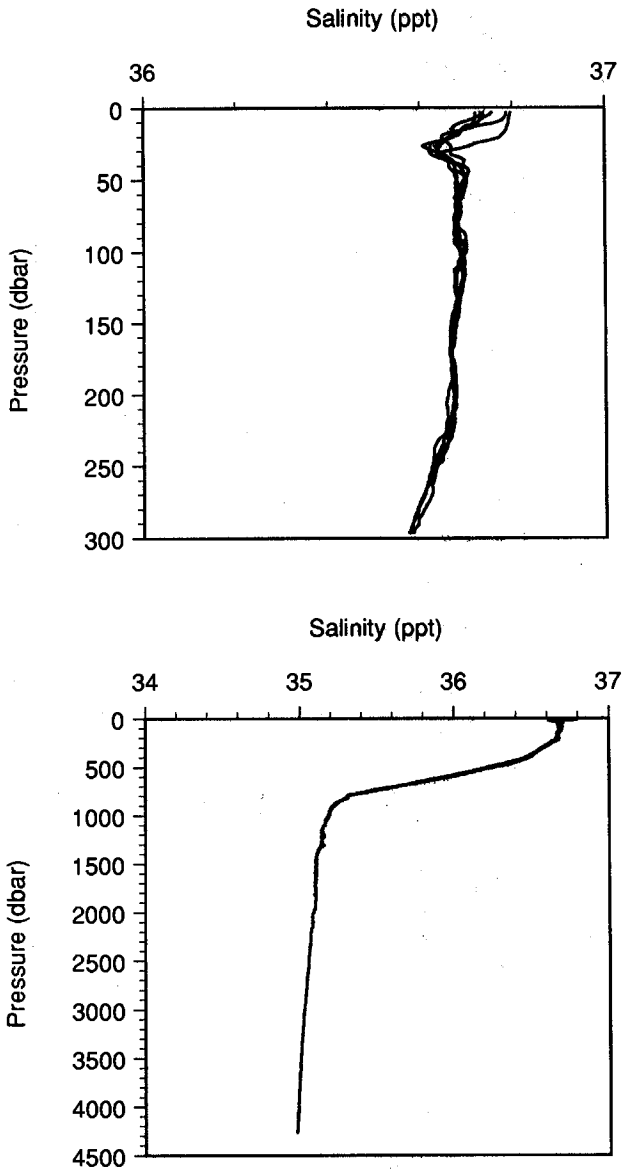
Depth (m)	Pres (db)	Temp (°C)	Pot.T (°C)	CTD Sal (ppt)	Sigma-t (kg/m3)	CTD 02 (µmole/kg)	02 Anom (µmole/kg)	BAC (m-1)	PAR (µE/m2/s)	Fluor (rfu)
3.0	3.0	26.314	26.313	36.797	24.293			0.433	158.94	0.040
10.0	10.1	26.247	26.244	36.793	24.312			0.434	95.73	0.048
20.0	20.1	25.910	25.906	36.775	24.405			0.435	72.53	0.045
30.0	30.2	22.922	22.916	36.661	25.220			0.439	52.65	0.047
40.0	40.3	21.760	21.752	36.692	25.575			0.446	37.34	0.052
50.0	50.4	20.938	20.929	36.702	25.811			0.462	25.29	0.094

Depth (m)	Pres (db)	Temp (°C)	Pot.T (°C)	CTD Sal (ppt)	Sigma-t (kg/m3)	CTD 02 (µmole/kg)	02 Anom (µmole/kg)	BAC (m-1)	PAR (µE/m2/s)	Fluor (rfu)
60.0	60.4	20.517	20.506	36.691	25.918			0.472	15.93	0.126
70.0	70.5	20.104	20.091	36.684	26.024			0.480	9.76	0.175
80.0	80.6	19.807	19.792	36.679	26.099			0.489	5.76	0.234
90.0	90.6	19.538	19.521	36.682	26.173			0.496	3.38	0.328
100.0	100.7	19.320	19.302	36.688	26.235			0.506	1.85	0.479
110.0	110.8	19.214	19.194	36.696	26.269			0.515	0.99	0.777
120.0	120.9	19.087	19.065	36.693	26.300			0.510	0.52	0.662
130.0	131.0	19.008	18.984	36.686	26.316			0.512	0.31	0.417
140.0	141.0	18.936	18.910	36.683	26.332			0.512	0.26	0.303
150.0	151.1	18.830	18.803	36.674	26.353			0.514	0.25	0.260
160.0	161.2	18.751	18.722	36.669	26.370			0.517	0.24	0.201
170.0	171.3	18.691	18.660	36.669	26.386			0.513	0.24	0.158
180.0	181.3	18.631	18.599	36.667	26.400			0.515	0.24	0.101
190.0	191.4	18.596	18.562	36.668	26.410			0.517	0.23	0.058
200.0	201.5	18.570	18.534	36.671	26.419			0.519	0.22	0.050
210.0	211.6	18.527	18.490	36.672	26.432			0.518	0.20	0.026
220.0	221.7	18.505	18.465	36.673	26.438			0.518	0.20	0.022
230.0	231.7	18.448	18.407	36.664	26.446			0.517	0.20	0.016
240.0	241.8	18.358	18.316	36.640	26.451			0.519	0.21	0.019
250.0	251.9	18.309	18.265	36.633	26.458			0.514	0.21	0.020

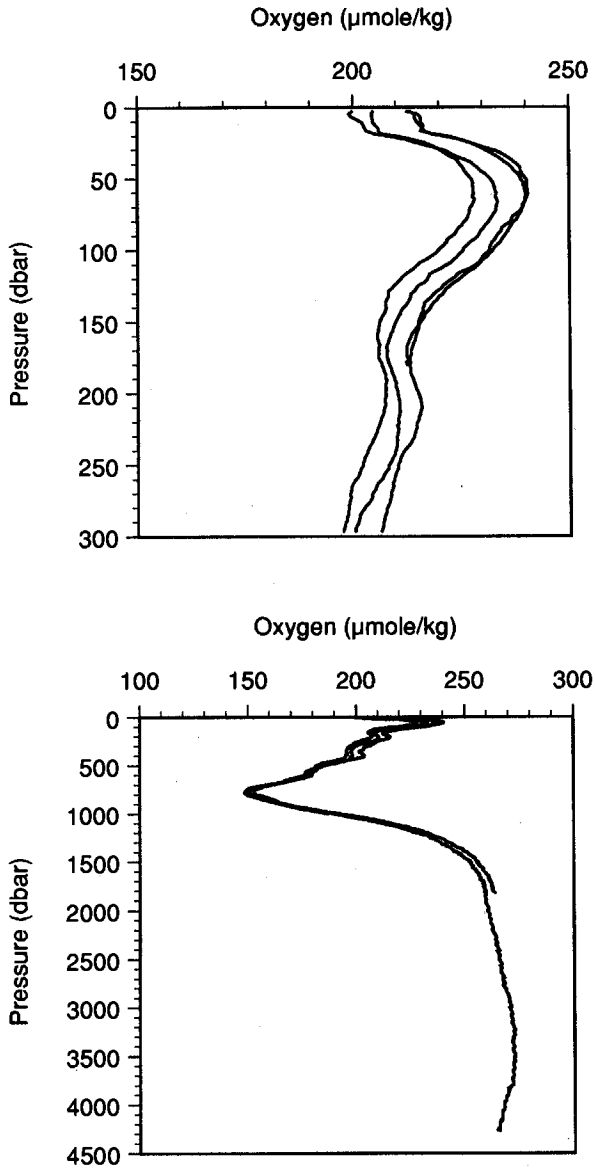
BATS 9—CTD Temperature Profile



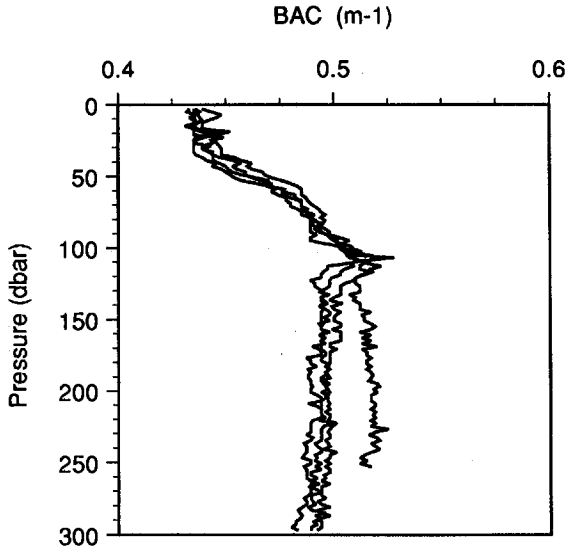
BATS 9—CTD Salinity Profile



BATS 9—CTD Oxygen Profile



BATS 9—CTD BAC Profile



BATS 9—Bottle Data
June 20-23, 1989
Physical Parameters

Bottle ID	Depth (m)	Pressure (db)	Temp (°C)	Pot. Temp (°C)	Salinity (ppt)	Sigma-t (kg/m^3)
G0905N12	3.9	3.9	26.111	26.110	36.689	24.276
G0905N11	16.2	16.3	24.278	24.274	36.595	24.769
G0905N10	24.1	24.3	22.609	22.604	36.542	25.220
G0905N09	37.5	37.8	21.453	21.446	36.598	25.589
G0905N08	52.8	53.2	20.667	20.657	36.597	25.805
G0905N07	67.0	67.5	20.058	20.046	36.593	25.967
G0905N06	83.9	84.5	19.612	19.596	36.587	26.081
G0905N05	99.5	100.3	19.318	19.300	36.590	26.161
G0905N04	116.0	116.9	19.093	19.072	36.584	26.215
G0905N03	148.9	150.0	18.780	18.753	36.566	26.283
G0905N02	198.2	199.7	18.447	18.412	36.548	26.356
G0905N01	251.3	253.2	18.200	18.155	36.514	26.395
G0904N12	6.1	6.1	26.561	26.560	36.651	24.105
G0904N11	15.5	15.6	25.916	25.912	36.630	24.293
G0904N10	25.5	25.7	24.303	24.297	36.584	24.754
G0904N09	38.2	38.5	21.746	21.739	36.588	25.500
G0904N08	53.3	53.7	20.654	20.644	36.594	25.806
G0904N07	65.1	65.6	20.172	20.159	36.613	25.952
G0904N06	75.7	76.3	19.841	19.827	36.605	26.034
G0904N05	84.7	85.3	19.603	19.587	36.612	26.102
G0904N04	1203.5	1215.5	5.160	5.043	35.064	27.721
G0904N03	1400.0	1414.6	4.518	4.385	35.016	27.758
G0904N02	1601.0	1618.4	4.247	4.092	35.010	27.785
G0904N01	1798.7	1819.1	3.983	3.807	34.994	27.802
G0902N12	300.8	303.1	17.928	17.875	36.477	26.436
G0902N11	300.6	302.9	17.929	17.876	36.473	26.433
G0902N10	400.6	403.8	17.246	17.177	36.383	26.535
G0902N09	501.8	506.0	15.867	15.785	36.138	26.674
G0902N08	501.8	506.0	15.863	15.781	36.142	26.678
G0902N07	599.5	604.5	14.089	13.997	35.858	26.852
G0902N06	748.7	755.3	10.146	10.051	35.303	27.180
G0902N05	748.7	755.3	10.154	10.059	35.304	27.180
G0902N04	800.7	807.9	9.227	9.130	35.216	27.267
G0902N03	898.6	906.9	7.558	7.459	35.113	27.443
G0902N02	999.2	1008.6	6.548	6.444	35.088	27.564
G0902N01	1000.0	1009.4	6.549	6.445	35.087	27.563
G0901N12	1998.8	2022.5	3.783	3.584	34.990	27.821
G0901N11	2199.2	2226.3	3.540	3.318	34.975	27.835
G0901N10	2398.5	2429.3	3.351	3.105	34.966	27.848
G0901N09	2598.5	2633.0	3.149	2.877	34.954	27.860
G0901N08	2801.2	2839.7	2.969	2.671	34.943	27.870
G0901N07	2999.8	3042.5	2.767	2.443	34.930	27.879
G0901N06	3199.1	3246.2	2.594	2.242	34.922	27.890
G0901N05	3401.3	3453.0	2.444	2.063	34.910	27.895
G0901N04	3601.3	3657.7	2.337	1.926	34.903	27.900
G0901N03	3800.1	3861.5	2.280	1.836	34.897	27.902
G0901N02	4000.1	4066.6	2.238	1.760	34.891	27.903
G0901N01	4200.9	4272.7	2.239	1.724	34.885	27.901

Bottle ID	Depth (m)	Pressure (db)	Temp (°C)	Pot. Temp (°C)	Salinity (ppt)	Sigma-t (kg/m^3)
G0906N12	4.2	4.3	26.286			
G0906N11	16.3	16.4	25.985			
G0906N10	25.2	25.3	22.644			
G0906N09	38.4	38.6	21.221			
G0906N08	53.8	54.2	20.517			
G0906N07	66.1	66.5	20.074			
G0906N06	84.8	85.4	19.569			
G0906N05	98.2	98.9	19.328			
G0906N04	111.9	112.7	19.179			
G0906N03	148.1	149.2	18.842			
G0906N02	199.3	200.8	18.564			
G0906N01	250.5	252.4	18.299			

BATS 9—Bottle Data
June 20-23, 1989
Gases

Bottle ID	Depth (m)	O_2(1) (µmole/kg)	O_2(2) (µmole/kg)	O_2(1) anomaly (µmole/kg)	O_2(2) anomaly (µmole/kg)	TCO_2 (1) (µmole/kg)	TCO_2 (2) (µmole/kg)
G0905N12	3.9	211.79	211.35	21.84	21.40	2041.7	2041.6
G0905N11	16.2	219.84	221.59	19.24	20.98	2043.3	
G0905N10	24.1	231.43	231.43	21.86	21.86	2039.8	
G0905N09	37.5	234.80		19.60		2043.7	
G0905N08	52.8	237.78	238.65	18.92	19.79	2045.1	
G0905N07	67.0	238.17	237.74	16.60	16.16	2047.8	
G0905N06	83.9	231.19	232.06	7.70	8.57	2052.6	
G0905N05	99.5	225.96	227.70	1.26	3.00	2058.7	
G0905N04	116.0	215.95	217.69	-9.66	-7.92	2060.5	
G0905N03	148.9	210.73	210.73	-16.12	-16.12	2069.4	
G0905N02	198.2	212.02	211.15	-16.07	-16.94		
G0905N01	251.3	206.80	205.93	-22.19	-23.06	2073.5	
G0904N12	6.1	212.73		25.44			
G0904N11	15.5	216.56	214.82	25.40	23.66		
G0904N10	25.5	219.85	218.98	19.39	18.52		
G0904N09	38.2	235.69	233.96	21.90	20.16		
G0904N08	53.3	239.52	239.09	20.60	20.16		
G0904N07	65.1	239.48	237.74	18.44	16.70		
G0904N06	75.7		238.16		15.67		
G0904N05	84.7	234.66	235.10	11.17	11.61		
G0904N04	1203.5	233.97	235.71	-47.33	-45.60		
G0904N03	1400.0		254.80		-30.31		
G0904N02	1601.0	257.83	257.83	-28.70	-28.70		
G0904N01	1798.7	261.29	260.86	-26.74	-27.18		

Bottle ID	Depth (m)	$O_2(1)$ (µmole/kg)	$O_2(2)$ (µmole/kg)	$O_2(1)$ anomaly (µmole/kg)	$O_2(2)$ anomaly (µmole/kg)	TCO_2 (1) (2) (µmole/kg)
G0902N12	300.8	200.71	201.58	-29.27	-28.40	
G0902N11	300.6	201.15	200.71	-28.84	-29.27	
G0902N10	400.6	198.09	199.83	-34.38	-32.64	
G0902N09	501.8	182.88	181.57	-54.75	-56.05	
G0902N08	501.8	181.57	182.44	-56.06	-55.19	
G0902N07	599.5	178.52	178.96	-65.45	-65.01	
G0902N06	748.7	148.10	146.79	-110.16	-111.47	
G0902N05	748.7	148.53	146.79	-109.70	-111.43	
G0902N04	800.7	153.30		-108.55		
G0902N03	898.6	165.00	165.00	-104.02	-104.02	
G0902N02	999.2	192.33	192.77	-81.49	-81.05	
G0902N01	1000.0	193.64	193.64	-80.18	-80.18	
G0901N12	1998.8	262.59	263.02	-26.56	-26.13	
G0901N11	2199.2	263.89	264.32	-26.83	-26.40	
G0901N10	2398.5	264.32	266.49	-27.65	-25.48	
G0901N09	2598.5		265.18		-28.25	
G0901N08	2801.2	268.65	267.78	-26.15	-27.02	
G0901N07	2999.8	272.55	272.55	-23.92	-23.92	
G0901N06	3199.1	272.11		-25.87		
G0901N05	3401.3	271.67	272.10	-27.72	-27.29	
G0901N04	3601.3	272.10		-28.38		
G0901N03	3800.1	269.06		-32.12		
G0901N02	4000.1	266.89	268.62	-34.91	-33.17	
G0901N01	4200.9	266.45		-35.63		

BATS 9—Bottle Data
June 20-23, 1989
Nutrients

Bottle ID	Depth (m)	Nitrate+Nitrite (µmole/kg)	Phosphate (µmole/kg)	Silicate (µmole/kg)
G0905N12	3.9	0.00	0.00	1.28
G0905N11	16.2	0.00	0.00	1.39
G0905N10	24.1	0.00	0.00	1.12
G0905N09	37.5	0.00	0.00	1.29
G0905N08	52.8	0.00	0.00	0.94
G0905N07	67.0	0.00	0.00	1.25
G0905N06	83.9	0.00	0.00	1.29
G0905N05	99.5	0.00	0.00	1.26
G0905N04	116.0	0.85	0.00	1.26
G0905N03	148.9	2.02	0.04	1.49
G0905N02	198.2	2.83	0.08	1.61
G0905N01	251.3	3.55	0.14	1.76

Bottle ID	Depth (m)	Nitrate+Nitrite (µmole/kg)	Phosphate (µmole/kg)	Silicate (µmole/kg)
G0904N12	6.1	0.06	0.00	1.05
G0904N11	15.5	0.05	0.00	0.99
G0904N10	25.5	0.00	0.00	0.95
G0904N09	38.2	0.00	0.00	1.05
G0904N08	53.3	0.05	0.00	0.99
G0904N07	65.1	0.00	0.05	0.89
G0904N06	75.7	0.00	0.00	0.87
G0904N05	84.7	0.00	0.00	0.94
G0904N04	1203.5	18.43	1.19	13.37
G0904N03	1400.0	17.17	1.14	12.72
G0904N02	1601.0	17.40		13.07
G0904N01	1798.7	17.05	1.19	14.15
G0902N12	300.8	4.44	0.17	2.11
G0902N11	300.6	4.40	0.20	2.05
G0902N10	400.6	5.98	0.25	2.50
G0902N09	501.8	9.51	0.51	3.90
G0902N08	501.8	9.86	0.49	4.01
G0902N07	599.5	13.04	0.63	5.95
G0902N06	748.7	21.13	1.34	13.44
G0902N05	748.7	21.34	1.33	13.39
G0902N04	800.7	22.02	1.45	14.58
G0902N03	898.6	22.48	1.50	16.44
G0902N02	999.2	21.06	1.29	15.36
G0902N01	1000.0	20.64	1.35	15.26
G0901N12	1998.8	17.14	1.21	15.63
G0901N11	2199.2	17.49	1.15	16.60
G0901N10	2398.5	17.38	1.17	18.18
G0901N09	2598.5	17.97	1.22	20.64
G0901N08	2801.2	17.42	1.21	21.22
G0901N07	2999.8	17.03	1.20	21.91
G0901N06	3199.1	17.49	1.22	23.78
G0901N05	3401.3	17.37	1.23	26.14
G0901N04	3601.3	17.74	1.25	28.20
G0901N03	3800.1	17.84	1.29	30.06
G0901N02	4000.1	18.27	1.34	34.29
G0901N01	4200.9	18.11	1.36	35.27

BATS 9—Bottle Data
June 20-23, 1989
Particulates

Bottle ID	Depth (m)	Chl *a* (μg/kg)	POC (μg/kg)	PON (μg/kg)	Bacteria (# x 10^8/kg)
G0905N12	3.9		18.06	2.93	
G0905N11	16.2		25.26	3.64	
G0905N10	24.1		21.22	3.15	
G0905N09	37.5		29.98	3.83	
G0905N08	52.8		27.95	4.34	
G0905N07	67.0		23.69	3.84	
G0905N06	83.9		21.40	3.89	
G0905N05	99.5		20.23	4.08	
G0905N04	116.0		13.55	3.01	
G0905N03	148.9		5.26	1.46	
G0905N02	198.2		4.54	1.16	
G0905N01	251.3		3.41	1.04	
G0904N12	6.1		19.25	2.29	
G0904N11	15.5		24.79	3.44	
G0904N10	25.5		20.97	2.92	
G0904N09	38.2		22.16	3.46	
G0904N08	53.3		31.30	4.41	
G0904N07	65.1		27.88	4.15	
G0904N06	75.7		26.88	4.26	
G0904N05	84.7		25.32	4.42	
G0904N04	1203.5				
G0904N03	1400.0				0.38
G0904N02	1601.0				
G0904N01	1798.7				
G0902N12	300.8		4.42	1.32	
G0902N11	300.6		2.86	0.81	
G0902N10	400.6				0.77
G0902N09	501.8		2.96	0.58	
G0902N08	501.8		2.59	0.89	
G0902N07	599.5				0.60
G0902N06	748.7		1.09	0.56	
G0902N05	748.7		1.07	0.60	
G0902N04	800.7				
G0902N03	898.6				0.29
G0902N02	999.2		2.20	0.52	
G0902N01	1000.0		0.91	0.53	
G0901N12	1998.8				
G0901N11	2199.2				
G0901N10	2398.5				
G0901N09	2598.5				
G0901N08	2801.2				
G0901N07	2999.8				0.18
G0901N06	3199.1				
G0901N05	3401.3				
G0901N04	3601.3				
G0901N03	3800.1				
G0901N02	4000.1				0.17
G0901N01	4200.9				

Bottle ID	Depth (m)	Chl *a* (μg/kg)	POC (μg/kg)	PON (μg/kg)	Bacteria (# x 10^8/kg)
G0906N12	4.2	0.029			2.74
G0906N11	16.3	0.031			3.03
G0906N10	25.2	0.032			4.41
G0906N09	38.4	0.050			4.81
G0906N08	53.8	0.069			5.19
G0906N07	66.1	0.091			5.07
G0906N06	84.8	0.146			4.30
G0906N05	98.2	0.257			4.36
G0906N04	111.9	0.318			3.88
G0906N03	148.1	0.111			1.45
G0906N02	199.3	0.021			0.76
G0906N01	250.5	0.011			1.18

BATS 9, Primary Production Data

R.V. Weatherbird

Light Bottles		Dark Bottles		Time-zero Bottles	
Depth (m)	Lt. Prod ($mg/m^2/day$)	Depth (m)	Dk. Prod ($mg/m^2/day$)	Depth (m)	$T_{\emptyset}$ Prod ($mg/m^2/day$)
3.0	3.37	3.0		3.0	0.29
3.0	4.82				
3.0	4.48				
16.0	4.24	16.0	0.45	16.0	0.26
16.0	5.04				
16.0	5.22				
24.0	5.18	24.0	0.44	24.0	0.25
24.0	4.17				
24.0	4.78				
39.0	3.39	39.0	0.61	39.0	0.29
39.0	2.21				
39.0	1.80				
53.0	5.10	53.0		53.0	0.28
53.0	4.54				
53.0	5.27				
66.0	4.22	66.0	0.36	66.0	0.37
66.0	4.27				
66.0	4.34				

Sediment Trap Estimated Particle Fluxes

Depth (m)	Sample #	Mass ($mg/m^2/d$)	Total Carbon (mg $C/m^2/d$)	Organic Carbon (mg $C/m^2/d$)	Nitrogen (mg $N/m^2/d$)
150	61	125.6	35.68		5.08
150[1]	61			31.23	5.07
150	62	181.0	53.47		8.00
150[1]	62			45.95	7.83
150	63	110.0	30.20		4.17
150[1]	63			25.13	3.90
200	64	131.7	33.94		4.49
200[1]	64			28.51	4.56
200	65	58.9[2]			
200[1]	65				
200	66	182.8	50.26		7.51
200[1]	66			43.02	7.72
300[3]	73+74	74.1	15.04		0.97
300[1,3]	73+74			10.00	1.10
400[3]	75+76	59.3	13.42		1.39
400[1,3]	75+76			10.98	1.50

1. Subsample acidified to remove carbonates.
2. Cod end with filter dropped—some sample lost.
3. Due to low weight, samples from the two traps were combined.

Cruise Report, BATS 10

Cruise dates: July 18, 1989 - July 21, 1989
Personnel: R.L. Sherriff-Dow, R. Johnson, K. Gundersen, M. Tuel
R.V. Weatherbird

July 18, 1989

0715 - Depart BBSR

1320 - Arrive BATS station. CTD **Cast 1** for PIT water to 150m, 1343-1400.
Lat: 31.782 N; Long: 64.162 W
Sunny, winds from the south at 10 K

Deploy traps - Lat: 31.830 N; Long: 64.142 W

1530 - 2117 **Cast 2:** Lat: 31.834 N; Long: 64.134 W
Wind: 5-8 knots. seas 2-4'. Error message received from CTD - Cast stopped and started again.

Nominal depths: 2000, 2200, 2400, 2600, 2800, 3000, 3200, 3400, 3600, 3800, 4000, 4200 m.

Samples:

dissolved O_2 -duplicates	12 depths
salinity	12 depths
NO_3, PO_4, SiO_4,	12 depths
Bacteria	3000, 4000 m

July 19, 1989

CTD **Cast 3:** 0755-0905 Lat: 31.857 N; Long: 64.189 W
Wind: S by SE at 10-12 knots, sunny, calm seas.

Nominal depths: 300, 300, 400, 500, 500, 600, 750, 750, 800, 900, 1000, 1000 m.

Samples taken:

dissolved O_2 -duplicates	12 samples
salinity	12 samples
NO_3, PO_4, SiO_4,	12 samples
POC/PON	300,500,750,1000 m
Bacteria	400,600,900 m

1215 - 1400 **Cast 4:** Lat: 31.868 N; Long: 64.195 W
Wind: 10-12 knots

Nominal depths: 1, 20, 40, 60, 80, 102, 150, 250, 1200, 1400, 1600, 1800 m.
Samples:

dissolved O_2 -duplicates	12 depths
salinity	12 depths

NO_3, PO_4, SiO_4,	12 depths
Bacteria	1200m
POC/PON	1,20,40,60,80,102,150,250 m.

Cast 5: 1755-1851, Lat: 31.883N; Long: 64.188 W

Nominal depths: 1, 10, 50, 90, 107, 115, 120, 126, 137, 149, 175, 200 m.

Samples:

dissolved O_2 -duplicates	12 depths
salinity	12 depths
NO_3, PO_4, SiO_4,	12 depths
POC/PON	12 depths
Brewer - CO_2	1,10,50,90,107,115,120,126,137,149,200 m.

July 20, 1989

0335-0355 **Cast 6** for Primary production water - 90m
Lat: 31.898 N; Long: 64.225 W

1000-1053 **Cast 7** Lat: 31.962 N; Long: 64.250 W
Wind: 15 knots

Nominal depths: 1, 10, 50, 90, 107, 115, 120, 126, 137, 149, 175, 200 m.

Samples:

Chlorophyll *a*	12 depths
Bacteria	12 depths

July 21, 1989

1150-1205 **Cast 8** Lat: 32.063 N; Long: 64.382 W
Fluorescence cast only.

Return to BBSR

** Note on BATS 10: Oxygen values are low on whole profile. No evidence of standardization errors.

CTD Sensor Corrections to Bottle Data for BATS 10:

Salinity:

$$DS = R_{\varnothing} + \sum_{i=1}^{l} A_i \left(\frac{P}{4300}\right)^i + \sum_{i=1}^{m} B_i \left(\frac{T}{30}\right)^i + \sum_{i=1}^{n} C_i \left(\frac{SC}{37}\right)^i$$

$$MS = SC + DS$$

Where:

DS = Model (Wet Salinity - CTD Salinity)
MS = modified salinity
SC = uncorrected CTD salinity
$R_{\varnothing}$ = linear Offset
P = pressure (dbar)
T = temperature (°C)
A_i, B_i, C_i = Regression coefficients
l, m, n = order of the polynomial functions

$R_{\varnothing}$ = 30440.0	B_3 = 1.088
A_1 = -0.1930	B_4 = -0.3571
A_2 = 0.3278	C_1 = -123400.0
A_3 = -0.1925	C_2 = 187800.0
A_4 = 0.005521	C_3 = -126800.0
B_1 = 0.2334	C_4 = 32100.0
B_2 = -1.035	

model correlation coefficient = 0.8974
standard deviation of model residuals = 0.002516 ppt

Oxygen:

$$MO = R_{\varnothing} + \sum_{i=1}^{l} A_i \left(\frac{P}{4300}\right)^i + \sum_{i=1}^{m} B_i \left(\frac{T}{30}\right)^i$$

$$+ \sum_{i=1}^{n} C_i (OC)^i + \sum_{i=1}^{o} D_i \left(\frac{OT}{30}\right)^i + \sum_{i=1}^{p} E_i \left(\frac{OS}{300}\right)^i$$

$$Mol = MO \times 300$$

Where:

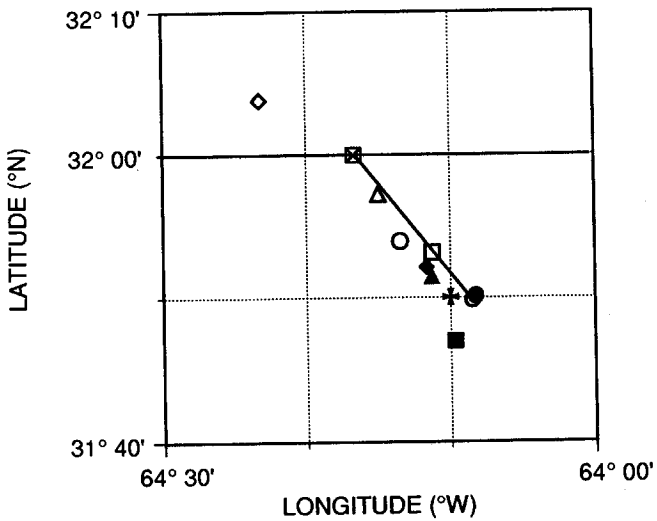
P = pressure (dbar)
T = temperature (°C)
MO = (CTD modeled oxygen (µmole/kg))/300

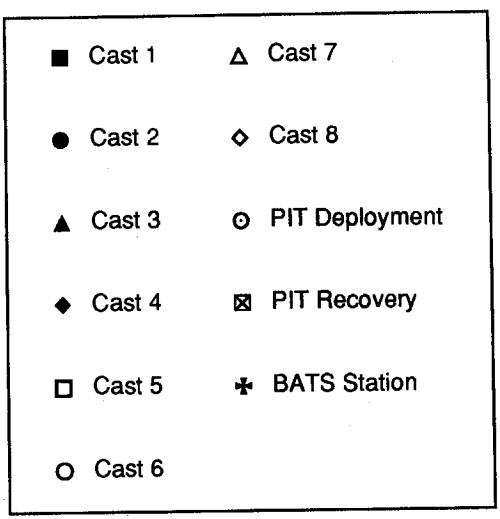
Mol = modeled oxygen (µmole/kg)
OC = Oxygen sensor current (µamps)
OT = Oxygen sensor temperature from internal thermistor (°C)
OS(t,p,s) = Oxygen saturation value at measured temperature, salinity and pressure (µmole/kg)
R_{ϕ}, A_i, B_i, C_i, D_i, E_i = Regression coefficients
l, m, n, o, p = order of the polynomial functions
l = 4; m=n=o=p=2

R_{ϕ}	= 6.5548487e+00	C_1	= 3.4515457e+00
A_1	= 1.3199943e+00	C_2	= -1.6803574e+00
A_2	= -1.6028343e+00	D_1	= -3.8964367e-02
A_3	= 7.4192996e-01	D_2	= -2.5471959e-01
A_4	= 9.0537679e-03	E_1	= -9.8533889e+00
B_1	= -2.8127057e+00	E_2	= 3.6770501e+00
B_2	= 5.3966515e-01		

model correlation coefficient = 9.994e-01
standard deviation of model residuals = 1.390e+00 µmole/kg

BATS 10—Cast Positions:





BATS 10, CTD Cast 1
18 July 1989: Start 13:43; End 14:00
Lat: 31.782 N; Long: 64.162 W

Depth (m)	Pres (db)	Temp (°C)	Pot.T (°C)	CTD Sal (ppt)	Sigma-t (kg/m3)	CTD 02 (µmole/kg)	02 Anom (µmole/kg)	BAC (m-1)	PAR (µE/m2/s)	Fluor (rfu)
3.0	3.0	27.047	27.046	36.451	23.798	193.63	-3.69		1350.73	
10.0	10.1	26.782	26.779	36.448	23.882	193.67	-4.50		917.64	
20.0	20.1	24.484	24.479	36.679	24.771	202.28	-3.26		638.21	
30.0	30.2	22.831	22.825	36.676	25.258	210.98	-0.46		437.38	
40.0	40.3	22.008	22.000	36.676	25.494	215.46	0.97		307.94	
50.0	50.4	21.432	21.422	36.666	25.647	215.59	-1.10		214.37	
60.0	60.4	21.024	21.012	36.644	25.744	212.49	-5.81		147.48	
70.0	70.5	20.652	20.639	36.635	25.839	209.36	-10.41		92.96	
80.0	80.6	20.407	20.392	36.631	25.903	205.09	-15.66		59.11	
90.0	90.6	20.064	20.047	36.613	25.982	202.96	-19.19		36.52	
100.0	100.7	19.899	19.880	36.607	26.021	203.26	-19.57		22.27	
110.0	110.8	19.500	19.479	36.594	26.117	203.98	-20.49		12.87	
120.0	120.9	19.348	19.326	36.590	26.154	202.24	-22.86		7.52	
130.0	131.0	19.236	19.213	36.587	26.181	199.44	-26.13		4.70	
140.0	141.0	19.178	19.152	36.585	26.195	198.48	-27.34		3.08	
150.0	151.1	19.129	19.102	36.583	26.207	193.48	-32.53		2.05	

BATS 10, CTD Cast 2
18 July 1989: Start 15:30; End 21:17
Lat: 31.834 N; Long: 64.134 W

Depth (m)	Pres (db)	Temp (°C)	Pot.T (°C)	CTD Sal (ppt)	Sigma-t (kg/m3)	CTD 02 (µmole/kg)	02 Anom (µmole/kg)	BAC (m-1)	PAR (µE/m2/s)	Fluor (rfu)
3.0	3.0	27.324	27.323	36.441	23.702	202.84	6.39			
10.0	10.1	26.886	26.884	36.433	23.837	203.03	5.17			
20.0	20.1	26.742	26.737	36.441	23.890	203.38	5.07			
30.0	30.2	23.566	23.559	36.660	25.031	213.77	4.97			
40.0	40.3	22.954	22.946	36.677	25.224	221.56	10.58			
50.0	50.4	22.278	22.268	36.666	25.410	225.53	12.04			
60.0	60.4	21.682	21.670	36.659	25.574	225.86	10.11			
70.0	70.5	21.105	21.091	36.646	25.723	224.11	6.12			
80.0	80.6	20.691	20.676	36.643	25.836	217.75	-1.86			
90.0	90.6	20.312	20.295	36.635	25.932	212.49	-8.63			
100.0	100.7	20.043	20.024	36.630	26.001	206.19	-16.01			
110.0	110.8	19.789	19.768	36.609	26.053	204.48	-18.79			
120.0	120.9	19.533	19.510	36.601	26.114	204.82	-19.50			
130.0	131.0	19.371	19.347	36.591	26.149	202.37	-22.64			
140.0	141.0	19.208	19.182	36.584	26.187	204.02	-21.67			
150.0	151.1	19.124	19.097	36.581	26.206	204.60	-21.44			
160.0	161.2	19.050	19.021	36.575	26.221	201.27	-25.09			
170.0	171.3	18.921	18.890	36.566	26.248	195.97	-30.95			
180.0	181.3	18.803	18.771	36.556	26.271	193.28	-34.14			
190.0	191.4	18.736	18.701	36.550	26.284	192.54	-35.18			
200.0	201.5	18.651	18.615	36.545	26.302	192.67	-35.42			
210.0	211.6	18.574	18.536	36.539	26.318	193.20	-35.22			
220.0	221.7	18.525	18.486	36.534	26.326	194.17	-34.47			
230.0	231.7	18.477	18.436	36.530	26.336	195.00	-33.85			
240.0	241.8	18.414	18.371	36.524	26.348	195.76	-33.37			

Depth (m)	Pres (db)	Temp (°C)	Pot.T (°C)	CTD Sal (ppt)	Sigma-t (kg/m3)	CTD 02 (µmole/kg)	02 Anom (µmole/kg)	BAC (m-1)	PAR (µE/m2/s)	Fluor (rfu)
250.0	251.9	18.363	18.318	36.518	26.357	195.91	-33.44			
275.0	277.1	18.224	18.175	36.503	26.381	195.53	-34.45			
300.0	302.3	18.130	18.077	36.490	26.396	195.01	-35.39			
325.0	327.5	17.982	17.925	36.470	26.418	193.87	-37.20			
350.0	352.7	17.822	17.761	36.449	26.443	192.87	-38.93			
375.0	378.0	17.650	17.584	36.426	26.469	192.87	-39.72			
400.0	403.2	17.488	17.419	36.405	26.493	191.69	-41.65			
425.0	428.4	17.352	17.278	36.388	26.514	195.21	-38.76			
450.0	453.6	17.147	17.069	36.355	26.539	194.44	-40.50			
475.0	478.9	16.820	16.739	36.294	26.572	189.32	-47.19			
500.0	504.1	16.410	16.326	36.226	26.616	179.62	-58.87			
550.0	554.6	15.357	15.268	36.048	26.722	172.65	-71.10			
600.0	605.1	14.488	14.394	35.903	26.802	165.69	-82.55			
650.0	655.6	13.569	13.471	35.760	26.886	160.06	-93.09			
700.0	706.1	12.522	12.422	35.602	26.976	152.36	-106.58			
750.0	756.6	11.334	11.232	35.442	27.078	146.71	-119.08			
800.0	807.2	10.065	9.963	35.285	27.181	142.96	-130.49			
850.0	857.7	9.022	8.920	35.191	27.281	147.76	-132.21			
900.0	908.3	8.155	8.052	35.139	27.375	161.09	-124.48			
950.0	958.9	7.300	7.196	35.109	27.478	176.23	-115.01			
1000.0	1009.4	6.550	6.446	35.075	27.554	191.45	-104.96			
1050.0	1060.0	6.087	5.980	35.071	27.612	204.54	-95.10			
1100.0	1110.7	5.688	5.578	35.066	27.658	215.10	-87.39			
1150.0	1161.3	5.327	5.214	35.045	27.686	224.03	-81.12			
1200.0	1211.9	5.271	5.154	35.059	27.704	228.66	-76.85			
1300.0	1313.2	4.882	4.756	35.039	27.735	235.16	-73.26			
1400.0	1414.6	4.515	4.381	35.003	27.748	244.30	-66.96			
1500.0	1516.0	4.482	4.337	35.018	27.765	247.75	-63.71			
1600.0	1617.4	4.104	3.950	34.978	27.774	253.93	-60.51			
1700.0	1718.9	3.991	3.827	34.969	27.780	256.61	-58.72			
1800.0	1820.5	3.877	3.702	34.965	27.789	259.53	-56.69			
1900.0	1922.1	3.828	3.641	34.966	27.796	260.52	-56.07			
2000.0	2023.7	3.797	3.598	34.976	27.808	261.53	-55.28			
2100.0	2125.4	3.614	3.404	34.968	27.821	262.39	-55.88			
2200.0	2227.2	3.539	3.317	34.969	27.830	261.91	-56.94			
2300.0	2328.9	3.540	3.304	34.980	27.840	259.62	-59.20			
2400.0	2430.8	3.408	3.161	34.968	27.845	260.21	-59.68			
2500.0	2532.7	3.329	3.069	34.966	27.852	261.00	-59.52			
2600.0	2634.6	3.207	2.935	34.956	27.856	260.90	-60.61			
2700.0	2736.6	3.095	2.809	34.945	27.859	263.19	-59.26			
2800.0	2838.6	3.012	2.714	34.939	27.863	265.51	-57.61			
2900.0	2940.7	2.907	2.595	34.933	27.868	266.35	-57.64			
3000.0	3042.8	2.801	2.477	34.925	27.872	267.21	-57.66			
3100.0	3144.9	2.705	2.367	34.919	27.877	269.69	-55.97			
3200.0	3247.2	2.594	2.242	34.913	27.882	268.92	-57.67			
3300.0	3349.4	2.509	2.144	34.908	27.886	267.88	-59.42			
3400.0	3451.7	2.456	2.075	34.903	27.888	268.24	-59.51			
3500.0	3554.1	2.388	1.992	34.898	27.891	267.11	-61.22			
3600.0	3656.5	2.347	1.935	34.894	27.892	266.59	-62.09			
3700.0	3758.9	2.317	1.889	34.890	27.892	265.17	-63.77			
3800.0	3861.4	2.289	1.844	34.886	27.893	266.80	-62.39			
3900.0	3964.0	2.277	1.815	34.882	27.892	265.92	-63.37			
4000.0	4066.5	2.263	1.784	34.879	27.892	266.98	-62.44			
4100.0	4169.2	2.255	1.758	34.875	27.891	267.10	-62.39			
4200.0	4271.8	2.251	1.737	34.872	27.890	267.90	-61.63			

BATS 10, CTD Cast 3
19 July 1989: Start 07:55; End 09:05
Lat: 31.857 N; Long: 64.189 W

Depth (m)	Pres (db)	Temp (°C)	Pot.T (°C)	CTD Sal (ppt)	Sigma-t (kg/m3)	CTD 02 (µmole/kg)	02 Anom (µmole/kg)	BAC (m-1)	PAR (µE/m2/s)	Fluor (rfu)
5.0	5.0	26.915	26.914	36.442	23.834	203.36	5.61			
10.0	10.1	26.847	26.845	36.442	23.856	203.65	5.68			
20.0	20.1	26.447	26.443	36.514	24.038	205.43	6.26			
30.0	30.2	23.669	23.663	36.666	25.005	216.93	8.51			
40.0	40.3	22.687	22.679	36.685	25.306	225.20	13.25			
50.0	50.4	21.673	21.663	36.666	25.580	227.25	11.48			
60.0	60.4	21.249	21.237	36.660	25.695	224.05	6.65			
70.0	70.5	20.974	20.961	36.640	25.755	218.74	0.24			
80.0	80.6	20.627	20.612	36.637	25.848	215.97	-3.90			
90.0	90.6	20.331	20.314	36.628	25.922	211.61	-9.45			
100.0	100.7	20.058	20.039	36.620	25.989	210.89	-11.27			
110.0	110.8	19.746	19.725	36.606	26.061	208.41	-15.03			
120.0	120.9	19.497	19.475	36.591	26.116	209.50	-14.99			
130.0	131.0	19.364	19.340	36.589	26.149	209.68	-15.35			
140.0	141.0	19.244	19.218	36.584	26.177	206.18	-19.36			
150.0	151.1	19.172	19.145	36.581	26.194	205.63	-20.22			
160.0	161.2	19.096	19.067	36.578	26.212	205.18	-20.98			
170.0	171.3	19.013	18.982	36.572	26.229	204.83	-21.69			
180.0	181.3	18.885	18.853	36.562	26.255	200.45	-26.63			
190.0	191.4	18.791	18.757	36.554	26.273	196.09	-31.39			
200.0	201.5	18.746	18.710	36.550	26.282	194.27	-33.41			
210.0	211.6	18.670	18.632	36.544	26.298	194.18	-33.83			
220.0	221.7	18.577	18.537	36.538	26.316	195.18	-33.24			
230.0	231.7	18.524	18.483	36.533	26.326	195.76	-32.88			
240.0	241.8	18.467	18.424	36.528	26.338	196.45	-32.44			
250.0	251.9	18.402	18.357	36.522	26.350	196.90	-32.29			
275.0	277.1	18.264	18.215	36.508	26.375	197.40	-32.39			
300.0	302.3	18.085	18.032	36.484	26.403	196.28	-34.32			
325.0	327.5	17.933	17.876	36.464	26.426	194.58	-36.71			
350.0	352.7	17.804	17.742	36.446	26.445	194.76	-37.13			
375.0	378.0	17.628	17.562	36.423	26.471	195.14	-37.55			
400.0	403.2	17.460	17.390	36.403	26.498	197.06	-36.41			
425.0	428.4	17.320	17.246	36.382	26.517	198.57	-35.55			
450.0	453.6	17.124	17.046	36.347	26.538	196.58	-38.48			
475.0	478.9	16.734	16.653	36.279	26.580	190.96	-45.97			
500.0	504.1	16.346	16.262	36.211	26.620	182.43	-56.38			
550.0	554.6	15.418	15.329	36.057	26.715	172.94	-70.50			
600.0	605.1	14.578	14.485	35.910	26.787	171.79	-75.99			
650.0	655.6	13.600	13.502	35.758	26.878	162.41	-90.58			
700.0	706.1	12.456	12.356	35.592	26.981	154.36	-104.95			
750.0	756.6	11.310	11.209	35.437	27.078	148.60	-117.33			
800.0	807.2	10.116	10.014	35.288	27.175	145.47	-127.66			
850.0	857.7	8.945	8.843	35.191	27.293	151.02	-129.43			
900.0	908.3	8.110	8.007	35.135	27.379	161.45	-124.42			
950.0	958.9	7.414	7.310	35.109	27.461	177.38	-113.10			
999.6	1009.0	6.517	6.413	35.073	27.557	194.18	-102.46			

BATS 10, CTD Cast 4
19 July 1989: Start 12:15; End 14:00
Lat: 31.868 N; Long: 64.195 W

Depth (m)	Pres (db)	Temp (°C)	Pot.T (°C)	CTD Sal (ppt)	Sigma-t (kg/m3)	CTD 02 (µmole/kg)	02 Anom (µmole/kg)	BAC (m-1)	PAR (µE/m2/s)	Fluor (rfu)
3.0	3.0	27.096	27.095	36.443	23.777	206.66	9.49			
10.0	10.1	26.913	26.911	36.438	23.832	205.24	7.48			
20.0	20.1	26.162	26.157	36.580	24.179	209.23	9.21			
30.0	30.2	23.086	23.080	36.685	25.191	222.72	12.23			
40.0	40.3	22.060	22.052	36.669	25.473	229.72	15.42			
50.0	50.4	21.717	21.707	36.654	25.559	231.12	15.50			
60.0	60.4	21.314	21.302	36.654	25.672	229.54	12.38			
70.0	70.5	20.944	20.930	36.638	25.762	224.77	6.15			
80.0	80.6	20.557	20.542	36.635	25.866	218.91	-1.23			
90.0	90.6	20.237	20.220	36.621	25.941	216.17	-5.27			
100.0	100.7	20.009	19.990	36.620	26.002	213.55	-8.81			
110.0	110.8	19.728	19.707	36.605	26.065	210.31	-13.21			
120.0	120.9	19.503	19.481	36.589	26.113	213.43	-11.04			
130.0	131.0	19.407	19.383	36.591	26.140	213.08	-11.77			
140.0	141.0	19.256	19.231	36.585	26.175	209.89	-15.59			
150.0	151.1	19.127	19.100	36.580	26.205	209.98	-16.05			
160.0	161.2	19.045	19.016	36.576	26.223	207.02	-19.36			
170.0	171.3	18.959	18.928	36.567	26.239	200.62	-26.13			
180.0	181.3	18.878	18.846	36.561	26.255	198.25	-28.86			
190.0	191.4	18.766	18.732	36.552	26.278	196.63	-30.96			
200.0	201.5	18.692	18.655	36.546	26.293	197.79	-30.12			
210.0	211.6	18.635	18.597	36.541	26.304	198.69	-29.47			
220.0	221.7	18.555	18.515	36.535	26.320	199.59	-28.92			
230.0	231.7	18.501	18.460	36.532	26.332	200.11	-28.63			
240.0	241.8	18.456	18.413	36.527	26.339	201.08	-27.86			
250.0	251.9	18.393	18.348	36.521	26.351	201.64	-27.58			
275.0	277.1	18.255	18.206	36.505	26.375	200.52	-29.32			
300.0	302.3	18.102	18.049	36.486	26.400	200.11	-30.41			
325.0	327.5	17.959	17.901	36.467	26.422	199.04	-32.14			
350.0	352.7	17.797	17.736	36.445	26.446	199.18	-32.74			
375.0	378.0	17.628	17.562	36.424	26.472	198.25	-34.45			
400.0	403.2	17.497	17.427	36.407	26.492	200.48	-32.81			
425.0	428.4	17.301	17.228	36.378	26.518	202.59	-31.63			
450.0	453.6	17.033	16.956	36.330	26.547	197.11	-38.37			
475.0	478.9	16.711	16.631	36.275	26.582	187.05	-49.98			
500.0	504.1	16.254	16.170	36.197	26.630	180.89	-58.38			
550.0	554.6	15.383	15.294	36.047	26.715	178.40	-65.22			
600.0	605.1	14.534	14.441	35.909	26.796	170.26	-77.74			
650.0	655.6	13.503	13.406	35.747	26.890	163.20	-90.31			
700.0	706.1	12.290	12.191	35.569	26.995	156.52	-103.73			
750.0	756.6	10.910	10.810	35.382	27.108	148.58	-119.74			
800.0	807.2	9.872	9.772	35.265	27.198	146.12	-128.51			
850.0	857.7	8.668	8.568	35.167	27.318	153.45	-128.79			
900.0	908.3	7.820	7.719	35.118	27.409	169.00	-118.79			
950.0	958.9	7.068	6.966	35.093	27.497	183.89	-108.95			
1000.0	1009.4	6.368	6.265	35.070	27.573	199.61	-98.07			
1050.0	1060.0	5.971	5.865	35.070	27.626	212.88	-87.58			
1100.0	1110.7	5.649	5.540	35.064	27.661	221.95	-80.82			
1150.0	1161.3	5.431	5.318	35.062	27.687	229.09	-75.26			
1200.0	1211.9	5.141	5.024	35.047	27.710	234.89	-71.61			
1300.0	1313.2	4.828	4.703	35.034	27.736	243.17	-65.67			

Depth (m)	Pres (db)	Temp (°C)	Pot.T (°C)	CTD Sal (ppt)	Sigma-t (kg/m3)	CTD 02 (µmole/kg)	02 Anom (µmole/kg)	BAC (m-1)	PAR (µE/m2/s)	Fluor (rfu)
1400.0	1414.6	4.426	4.293	34.993	27.749	251.42	-60.53			
1500.0	1516.0	4.427	4.282	35.018	27.770	252.31	-59.57			
1600.0	1617.4	4.078	3.925	34.974	27.773	259.10	-55.54			
1700.0	1718.9	3.956	3.793	34.966	27.781	261.93	-53.68			
1800.0	1820.5	3.870	3.695	34.965	27.790	262.54	-53.73			

BATS 10, CTD Cast 5
19 July 1989: Start 17:55; End 18:51
Lat: 31.883 N; Long: 64.188 W

Depth (m)	Pres (db)	Temp (°C)	Pot.T (°C)	CTD Sal (ppt)	Sigma-t (kg/m3)	CTD 02 (µmole/kg)	02 Anom (µmole/kg)	BAC (m-1)	PAR (µE/m2/s)	Fluor (rfu)
3.0	3.0	27.262	27.261	36.421	23.706				664.16	0.232
10.0	10.1	27.083	27.081	36.422	23.765				421.13	0.238
20.0	20.1	26.796	26.792	36.447	23.877				305.29	0.239
30.0	30.2	23.765	23.758	36.676	24.985				203.89	0.237
40.0	40.3	23.088	23.080	36.688	25.193				140.30	0.252
50.0	50.4	22.333	22.323	36.679	25.404				92.26	0.262
60.0	60.4	21.676	21.664	36.660	25.576				54.54	0.279
70.0	70.5	21.117	21.103	36.658	25.730				34.80	0.307
80.0	80.6	20.684	20.669	36.643	25.837				22.31	0.364
90.0	90.6	20.323	20.306	36.629	25.924				13.42	0.431
100.0	100.7	20.174	20.155	36.630	25.965				7.76	0.514
110.0	110.8	19.849	19.828	36.615	26.041				4.08	0.755
120.0	120.9	19.633	19.611	36.600	26.087				2.34	0.706
130.0	131.0	19.472	19.448	36.595	26.126				1.39	0.654
140.0	141.0	19.311	19.285	36.585	26.161				0.82	0.570
150.0	151.1	19.195	19.167	36.583	26.190				0.47	0.642
160.0	161.2	19.124	19.095	36.581	26.207				0.30	0.493
170.0	171.3	18.977	18.946	36.569	26.236				0.27	0.346
180.0	181.3	18.892	18.859	36.563	26.254				0.26	0.323
190.0	191.4	18.786	18.751	36.555	26.275				0.25	0.280
200.0	201.5	18.674	18.637	36.546	26.297				0.24	0.245
210.0	211.6	18.600	18.562	36.538	26.311				0.24	0.242
220.0	221.7	18.549	18.510	36.535	26.321				0.24	0.244
230.0	231.7	18.508	18.466	36.532	26.330				0.23	0.241
240.0	241.8	18.469	18.426	36.529	26.338				0.23	0.246
250.0	251.9	18.415	18.370	36.524	26.348				0.20	0.248
275.0	277.1	18.361	18.311	36.527	26.365				0.21	0.247

BATS 10, CTD Cast 6
20 July 1989: Start 03:35; End 03:55
Lat: 31.900 N; Long: 64.225 W

Depth (m)	Pres (db)	Temp (°C)	Pot.T (°C)	CTD Sal (ppt)	Sigma-t (kg/m3)	CTD 02 (µmole/kg)	02 Anom (µmole/kg)	BAC (m-1)	PAR (µE/m2/s)	Fluor (rfu)
5.0	5.0	27.012	27.011	36.415	23.783					0.351
10.0	10.1	26.993	26.991	36.422	23.794					0.353
20.0	20.1	26.585	26.580	36.492	23.978					0.354
30.0	30.2	24.268	24.262	36.662	24.823					0.357
40.0	40.3	22.925	22.917	36.662	25.220					0.365
50.0	50.4	21.832	21.822	36.662	25.533					0.390
60.0	60.4	21.200	21.188	36.652	25.702					0.421
70.0	70.5	20.816	20.802	36.632	25.792					0.467
80.0	80.6	20.584	20.569	36.633	25.856					0.506
90.0	90.6	20.185	20.168	36.617	25.952					0.585

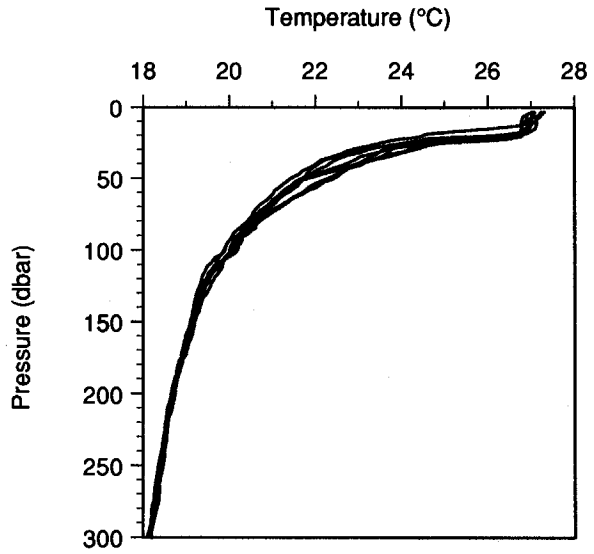
BATS 10, CTD Cast 7
20 July 1989: Start: 10:00; End 10:53
Lat: 31.962 N; Long: 64.250 W

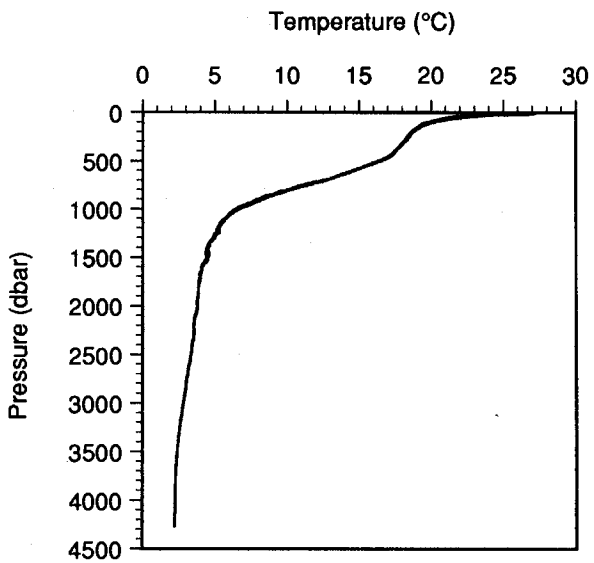
Depth (m)	Pres (db)	Temp (°C)	Pot.T (°C)	CTD Sal (ppt)	Sigma-t (kg/m3)	CTD 02 (µmole/kg)	02 Anom (µmole/kg)	BAC (m-1)	PAR (µE/m2/s)	Fluor (rfu)
4.0	4.0	27.036	27.035	36.446	23.798				228.98	0.348
10.0	10.1	27.007	27.005	36.445	23.807				587.42	0.350
20.0	20.1	26.063	26.059	36.566	24.199				473.81	0.354
30.0	30.2	23.201	23.195	36.671	25.146				319.06	0.354
40.0	40.3	22.308	22.300	36.668	25.402				211.01	0.378
50.0	50.4	21.759	21.749	36.651	25.545				150.78	0.397
60.0	60.4	21.345	21.333	36.647	25.658				98.85	0.419
70.0	70.5	20.835	20.821	36.638	25.792				61.12	0.450
80.0	80.6	20.490	20.475	36.635	25.883				37.97	0.499
90.0	90.6	20.141	20.124	36.617	25.964				23.51	0.563
100.0	100.7	19.864	19.845	36.611	26.034				13.90	0.786
110.0	110.8	19.667	19.647	36.611	26.086				7.95	0.803
120.0	120.9	19.458	19.435	36.596	26.130				4.73	0.792
130.0	131.0	19.284	19.260	36.586	26.168				2.90	0.751
140.0	141.0	19.167	19.142	36.581	26.195				1.74	0.696
150.0	151.1	19.093	19.065	36.578	26.213				1.10	0.647
160.0	161.2	18.992	18.963	36.571	26.233				0.74	0.526
170.0	171.3	18.945	18.914	36.565	26.241				0.51	0.460
180.0	181.3	18.821	18.789	36.556	26.267				0.36	0.438
190.0	191.4	18.738	18.704	36.550	26.283				0.28	0.399
200.0	201.5	18.658	18.622	36.545	26.300				0.26	0.384
210.0	211.6	18.565	18.528	36.537	26.319				0.26	0.369
220.0	221.7	18.518	18.479	36.533	26.328				0.25	0.373
230.0	231.7	18.475	18.434	36.528	26.335				0.24	0.374
240.0	241.8	18.419	18.376	36.522	26.345				0.24	0.381
250.0	251.9	18.350	18.306	36.517	26.359				0.24	0.379

BATS 10, CTD Cast 8
21 July 1989: Start 11:50; End 12:05
Lat: 32.063 N; Long: 64.382 W

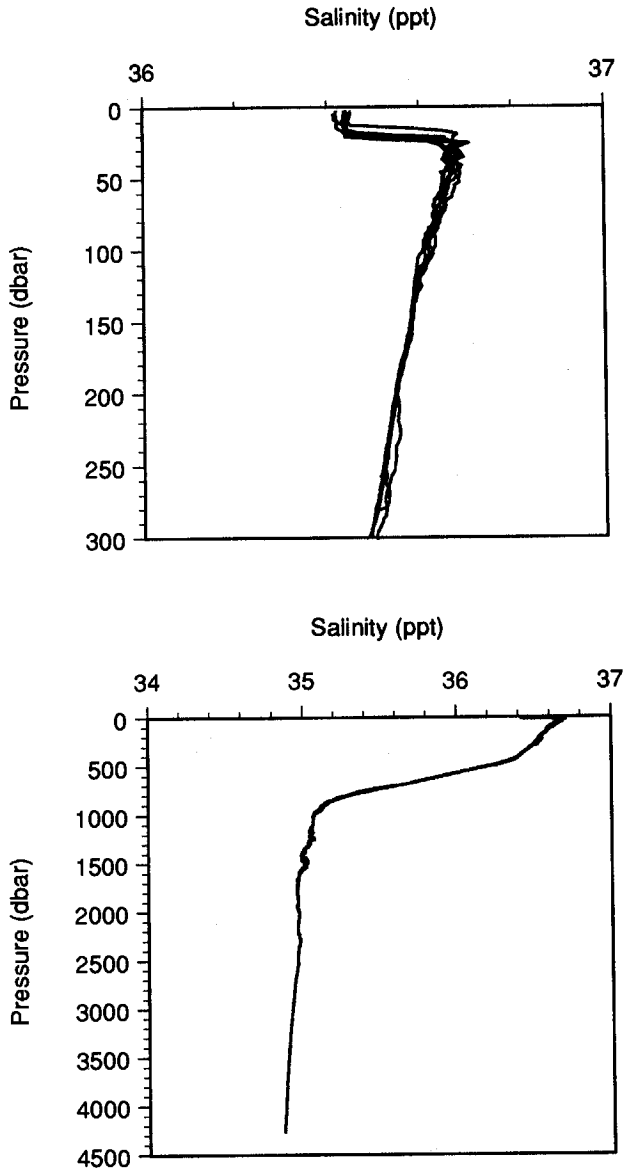
Depth (m)	Pres (db)	Temp (°C)	Pot.T (°C)	CTD Sal (ppt)	Sigma-t (kg/m3)	CTD 02 (µmole/kg)	02 Anom (µmole/kg)	BAC (m-1)	PAR (µE/m2/s)	Fluor (rfu)
3.0	3.0	27.231	27.230	36.438	23.729				1076.00	0.372
10.0	10.1	27.134	27.131	36.437	23.760				760.16	0.374
20.0	20.1	26.738	26.733	36.486	23.925				578.76	0.384
30.0	30.2	24.171	24.165	36.657	24.849				433.80	0.388
40.0	40.3	22.964	22.956	36.688	25.229				331.25	0.388
50.0	50.4	22.431	22.421	36.687	25.382				235.96	0.409
60.0	60.4	21.744	21.732	36.673	25.566				164.85	0.427
70.0	70.5	21.196	21.183	36.653	25.704				108.77	0.457
80.0	80.6	20.543	20.528	36.645	25.877				71.11	0.508
90.0	90.6	20.278	20.261	36.628	25.936				44.85	0.562
100.0	100.7	20.049	20.030	36.621	25.992				28.04	0.688
110.0	110.8	19.649	19.628	36.614	26.093				16.80	0.923
120.0	120.9	19.444	19.422	36.597	26.134				9.89	0.793
130.0	131.0	19.310	19.286	36.589	26.163				5.98	0.748
140.0	141.0	19.202	19.176	36.587	26.190				3.71	0.761
150.0	151.1	19.088	19.060	36.579	26.214				2.43	0.642
160.0	161.2	18.988	18.959	36.572	26.235				1.65	0.551
170.0	171.3	18.903	18.872	36.566	26.252				1.17	0.506
180.0	181.3	18.825	18.792	36.559	26.268				0.84	0.443
190.0	191.4	18.717	18.683	36.551	26.289				0.62	0.417
200.0	201.5	18.647	18.611	36.546	26.304				0.44	0.408
210.0	211.6	18.638	18.600	36.553	26.312				0.33	0.427
220.0	221.7	18.582	18.542	36.553	26.327				0.28	0.418
230.0	231.7	18.555	18.514	36.553	26.334				0.26	0.411
240.0	241.8	18.506	18.463	36.546	26.342				0.26	0.410
250.0	251.9	18.464	18.419	36.542	26.350				0.25	0.410
275.0	277.1	18.326	18.277	36.524	26.372				0.24	0.422

BATS 10—CTD Temperature Profile

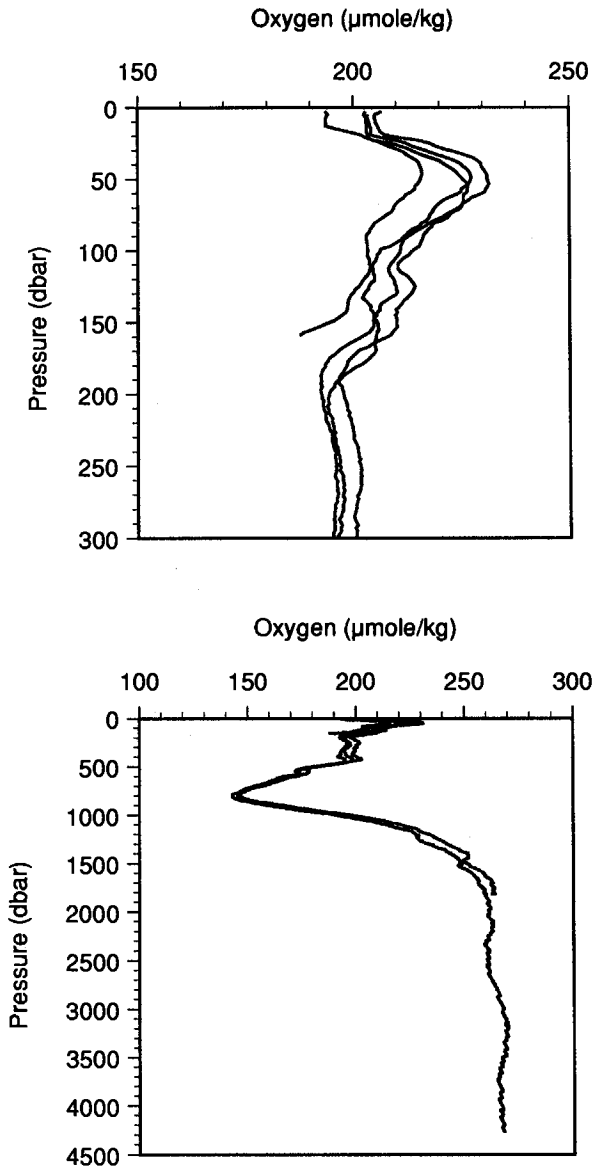




BATS 10—CTD Salinity Profile



BATS 10—CTD Oxygen Profile



BATS 10—Bottle Data
July 18-21, 1989
Physical Parameters

Bottle ID	Depth (m)	Pressure (db)	Temp (°C)	Pot. Temp (°C)	Salinity (ppt)	Sigma-t (kg/m^3)
G1005N12	1.5	1.5	27.205	27.205	36.431	23.732
G1005N11	9.7	9.7	26.839	26.837	36.440	23.857
G1005N10	49.9	50.2	22.157	22.147	36.671	25.448
G1005N09	90.3	90.9	20.215	20.198	36.634	25.957
G1005N08	107.6	108.4	19.761	19.741	36.619	26.067
G1005N07	116.3	117.1	19.568	19.546	36.615	26.115
G1005N06	119.2	120.1	19.488	19.466	36.605	26.129
G1005N05	127.2	128.2	19.378	19.354	36.597	26.152
G1005N04	136.3	137.3	19.266	19.241	36.596	26.181
G1005N03	148.5	149.6	19.168	19.141	36.593	26.204
G1005N02	173.9	175.2	18.873	18.841	36.569	26.263
G1005N01	197.9	199.4	18.644	18.608	36.553	26.310
G1003N12	300.1	302.4	18.037	17.984	36.488	26.417
G1003N11	299.3	301.6	18.038	17.985	36.488	26.417
G1003N10	400.5	403.7	17.448	17.379	36.411	26.507
G1003N09	503.5	507.6	16.265	16.181	36.210	26.638
G1003N08	501.2	505.4	16.272	16.189	36.204	26.631
G1003N07	602.1	607.2	14.429	14.336	35.901	26.813
G1003N06	751.3	757.9	11.142	11.041	35.426	27.100
G1003N05	750.0	756.6	11.160	11.059	35.428	27.099
G1003N04	799.5	806.6	9.950	9.849	35.282	27.198
G1003N03	902.6	910.8	8.075	7.972	35.152	27.398
G1003N02	999.8	1009.2	6.500	6.396	35.078	27.563
G1003N01	998.3	1007.7	6.524	6.420	35.076	27.558
G1004N12	4.5	4.5	27.225	27.224	36.487	23.768
G1004N11	20.3	20.4	26.803	26.798	36.472	23.894
G1004N10	39.1	39.3	22.683	22.675	36.695	25.315
G1004N09	59.9	60.3	21.257	21.246	36.652	25.686
G1004N08	82.0	82.6	20.384	20.369	36.640	25.916
G1004N07	102.9	103.7	19.865	19.846	36.630	26.048
G1004N06	150.9	152.0	19.048	19.021	36.585	26.229
G1004N05	249.4	251.3	18.343	18.299	36.526	26.368
G1004N04	1200.2	1212.1	5.162	5.045	35.059	27.717
G1004N03	1400.3	1414.9	4.473	4.339	35.004	27.753
G1004N02	1597.8	1615.2	4.084	3.931	34.983	27.780
G1004N01	1799.9	1820.4	3.870	3.695	34.973	27.796
G1002N12	1999.8	2023.4	3.785	3.586	34.984	27.816
G1002N11	2201.1	2228.3	3.548	3.325	34.978	27.837
G1002N10	2402.4	2433.2	3.408	3.160	34.979	27.853
G1002N09	2600.8	2635.4	3.190	2.918	34.961	27.862
G1002N08	2802.2	2840.8	2.982	2.684	34.947	27.872
G1002N07	3000.4	3043.1	2.778	2.454	34.932	27.880
G1002N06	3202.2	3249.4	2.592	2.240	34.921	27.889
G1002N05	3397.9	3449.5	2.453	2.072	34.910	27.894
G1002N04	3600.0	3656.4	2.344	1.932	34.901	27.898
G1002N03	3799.2	3860.6	2.290	1.846	34.895	27.900
G1002N02	4001.0	4067.5	2.262	1.783	34.889	27.900
G1002N01	4202.6	4274.5	2.251	1.735	34.878	27.895

Bottle ID	Depth (m)	Pressure (db)	Temp (°C)	Pot. Temp (°C)	Salinity (ppt)	Sigma-t (kg/m^3)
G1007N12	0.9	0.9	27.097			
G1007N11	25.0	25.2	23.869			
G1007N10	75.7	76.2	20.523			
G1007N09	91.2	91.9	19.980			
G1007N08	99.9	100.7	19.801			
G1007N07	107.3	108.1	19.689			
G1007N06	116.9	117.7	19.455			
G1007N05	123.4	124.3	19.337			
G1007N04	126.0	126.9	19.278			
G1007N03	135.4	136.3	19.186			
G1007N02	150.5	151.6	19.046			
G1007N01	190.3	191.7	18.678			

BATS 10—Bottle Data
July 18-21, 1989
Gases

Bottle ID	Depth (m)	$O_2(1)$ (µmole/kg)	$O_2(2)$ (µmole/kg)	$O_2(1)$ anomaly (µmole/kg)	$O_2(2)$ anomaly (µmole/kg)	TCO_2 (µmole/kg)
G1005N12	1.5		205.02		21.56	2018.1
G1005N11	9.7	204.96	204.52	19.29	18.85	2021.0
G1005N10	49.9	229.20	229.63	17.79	18.22	2035.1
G1005N09	90.3	213.84	213.84	-6.69	-6.69	2045.4
G1005N08	107.6	210.34	209.91	-12.16	-12.60	2045.2
G1005N07	116.3	205.55	205.55	-17.77	-17.77	2053.3
G1005N06	119.2	212.07	210.33	-11.60	-13.34	2050.8
G1005N05	127.2	222.06		-2.07		2048.0
G1005N04	136.3	214.23	215.53	-10.35	-9.05	2057.9
G1005N03	148.5	202.49	203.36	-22.47	-21.60	2064.2
G1005N02	173.9	196.40	196.83	-29.76	-29.33	
G1005N01	197.9	202.04	200.73	-25.02	-26.32	2072.2
G1003N12	300.1		196.37		-32.92	
G1003N11	299.3	197.24	195.94	-32.05	-33.36	
G1003N10	400.5	197.67	198.54	-33.75	-32.88	
G1003N09	503.5	177.67	176.37	-58.16	-59.46	
G1003N08	501.2	178.11	176.37	-57.71	-59.45	
G1003N07	602.1		171.58		-70.88	
G1003N06	751.3	148.11	147.67	-105.99	-106.43	
G1003N05	750.0	148.54	148.11	-105.49	-105.93	
G1003N04	799.5	144.62	144.19	-113.97	-114.40	
G1003N03	902.6	164.58	162.84	-101.66	-103.40	
G1003N02	999.8	193.64	192.34	-80.12	-81.42	
G1003N01	998.3	195.81	194.07	-77.83	-79.56	

Bottle ID	Depth (m)	$O_2(1)$ (µmole/kg)	$O_2(2)$ (µmole/kg)	$O_2(1)$ anomaly (µmole/kg)	$O_2(2)$ anomaly (µmole/kg)	TCO_2 (µmole/kg)
G1004N12	4.5		207.19		23.93	
G1004N11	20.3		204.95		19.11	
G1004N10	39.1	227.07	226.20	18.32	17.45	
G1004N09	59.9	228.26		12.47		
G1004N08	82.0	219.50	221.24	-0.28	1.46	
G1004N07	102.9	209.48	210.34	-12.57	-11.70	
G1004N06	150.9	199.88	198.58	-25.59	-26.89	
G1004N05	249.4	201.16	199.86	-27.00	-28.31	
G1004N04	1200.2	232.24	232.24	-48.72	-48.72	
G1004N03	1400.3	253.06		-32.02		
G1004N02	1597.8	259.56	258.70	-27.83	-28.69	
G1004N01	1799.9	262.60	263.03	-25.95	-25.51	
G1002N12	1999.8	263.90		-24.88		
G1002N11	2201.1	262.59	261.72	-27.69	-28.56	
G1002N10	2402.4	259.54	259.11	-31.56	-31.99	
G1002N09	2600.8	259.10	259.10	-33.58	-33.58	
G1002N08	2802.2	264.74	263.01	-29.54	-31.28	
G1002N07	3000.4	268.64	266.91	-27.33	-29.07	
G1002N06	3202.2	269.07	267.33	-28.53	-30.27	
G1002N05	3397.9	267.33	267.76	-31.58	-31.15	
G1002N04	3600.0	267.76	266.89	-32.26	-33.13	
G1002N03	3799.2	267.32	266.02	-33.36	-34.66	
G1002N02	4001.0		267.32		-33.85	
G1002N01	4202.6	267.32	266.89	-34.25	-34.69	

BATS 10—Bottle Data
July 18-21, 1989
Nutrients

Bottle ID	Depth (m)	Nitrate+Nitrite (µmole/kg)	Phosphate (µmole/kg)	Silicate (µmole/kg)
G1005N12	1.5	0.00	0.00	0.62
G1005N11	9.7	0.00	0.00	0.57
G1005N10	49.9	0.07	0.00	0.70
G1005N09	90.3	0.00	0.00	0.73
G1005N08	107.6	0.19	0.00	0.69
G1005N07	116.3	0.47	0.00	0.74
G1005N06	119.2	0.16	0.00	0.88
G1005N05	127.2	0.00	0.00	0.30
G1005N04	136.3	0.36	0.00	0.62
G1005N03	148.5	2.06	0.00	0.85
G1005N02	173.9	2.40	0.05	0.87
G1005N01	197.9	2.63	0.08	1.02

Bottle ID	Depth (m)	Nitrate+Nitrite (µmole/kg)	Phosphate (µmole/kg)	Silicate (µmole/kg)
G1003N12	300.1	4.36	0.17	1.41
G1003N11	299.3	4.36	0.15	1.39
G1003N10	400.5		0.24	1.78
G1003N09	503.5	9.54	0.48	3.14
G1003N08	501.2	9.77	0.51	3.48
G1003N07	602.1	13.05	0.74	5.17
G1003N06	751.3	19.50	1.25	10.72
G1003N05	750.0	20.82	1.27	10.90
G1003N04	799.5	21.98	1.44	13.11
G1003N03	902.6	21.68	1.48	14.32
G1003N02	999.8	20.82	1.25	13.95
G1003N01	998.3	20.32		13.77
G1004N12	4.5	0.00	0.00	0.65
G1004N11	20.3	0.00	0.00	0.91
G1004N10	39.1	0.00	0.00	0.65
G1004N09	59.9	0.00	0.00	0.66
G1004N08	82.0	0.53	0.00	0.74
G1004N07	102.9	0.08	0.00	0.79
G1004N06	150.9	1.94	0.05	0.89
G1004N05	249.4	3.37	0.15	1.18
G1004N04	1200.2	17.55	1.15	12.51
G1004N03	1400.3		1.11	11.87
G1004N02	1597.8	16.75	1.07	12.26
G1004N01	1799.9	17.03	1.10	12.76
G1002N12	1999.8		1.20	14.79
G1002N11	2201.1	17.03	1.15	17.19
G1002N10	2402.4	17.42	1.25	20.14
G1002N09	2600.8	17.94	1.26	22.09
G1002N08	2802.2	17.36	1.28	22.46
G1002N07	3000.4	17.12	1.22	21.81
G1002N06	3202.2	17.23	1.22	23.47
G1002N05	3397.9		1.27	25.59
G1002N04	3600.0		1.28	27.54
G1002N03	3799.2	17.99	1.27	29.92
G1002N02	4001.0	18.05	1.27	31.15
G1002N01	4202.6		1.31	33.18

BATS 10—Bottle Data
July 18-21, 1989
Particulates

Bottle ID	Depth (m)	Chl *a* (μg/kg)	POC (μg/kg)	PON (μg/kg)	Bacteria (# x 10^8/kg)
G1005N12	1.5		11.63	1.46	
G1005N11	9.7		19.24	2.43	
G1005N10	49.9		20.43	2.59	
G1005N09	90.3		16.31	2.55	
G1005N08	107.6		14.52	2.60	
G1005N07	116.3		12.51	2.41	
G1005N06	119.2		16.41	3.07	
G1005N05	127.2		11.84	2.44	
G1005N04	136.3		9.31	2.07	
G1005N03	148.5		8.07	1.60	
G1005N02	173.9		3.47	0.54	
G1005N01	197.9		3.63	0.57	
G1003N12	300.1		5.18	0.26	
G1003N11	299.3		1.50	0.34	
G1003N10	400.5				0.92
G1003N09	503.5		1.91	0.35	
G1003N08	501.2		2.31	0.33	
G1003N07	602.1				0.71
G1003N06	751.3		1.82	0.27	
G1003N05	750.0		3.53	0.32	
G1003N04	799.5				
G1003N03	902.6				0.47
G1003N02	999.8		0.60	0.09	
G1003N01	998.3		2.52	0.39	
G1004N12	4.5		18.19	2.42	
G1004N11	20.3		19.83	2.56	
G1004N10	39.1		22.03	2.74	
G1004N09	59.9		24.71	3.78	
G1004N08	82.0		20.86	2.52	
G1004N07	102.9		21.60	3.75	
G1004N06	150.9		6.97	1.34	
G1004N05	249.4		4.50	0.70	
G1004N04	1200.2				0.29
G1004N03	1400.3				
G1004N02	1597.8				
G1004N01	1799.9				
G1002N12	1999.8				
G1002N11	2201.1				
G1002N10	2402.4				
G1002N09	2600.8				
G1002N08	2802.2				
G1002N07	3000.4				0.14
G1002N06	3202.2				
G1002N05	3397.9				
G1002N04	3600.0				
G1002N03	3799.2				
G1002N02	4001.0				0.24
G1002N01	4202.6				

Bottle ID	Depth (m)	Chl *a* (µg/kg)	POC (µg/kg)	PON (µg/kg)	Bacteria (# x 10^6/kg)
G1007N12	0.9	0.033			3.49
G1007N11	25.0	0.037			5.49
G1007N10	75.7	0.092			4.01
G1007N09	91.2	0.169			3.61
G1007N08	99.9	0.245			3.42
G1007N07	107.3	0.224			3.38
G1007N06	116.9	0.206			3.78
G1007N05	123.4	0.184			3.45
G1007N04	126.0	0.174			3.19
G1007N03	135.4	0.148			3.19
G1007N02	150.5	0.108			2.02
G1007N01	190.3	0.014			1.32

BATS 10, Primary Production Data

R.V. Weatherbird

Light Bottles		Dark Bottles		Time-zero Bottles	
Depth (m)	Lt. Prod ($mg/m^2/day$)	Depth (m)	Dk. Prod ($mg/m^2/day$)	Depth (m)	$T_{\emptyset}$ Prod ($mg/m^2/day$)
1.0	4.32	1.0	0.47	1.0	0.30
1.0	4.76				
1.0	4.51				
20.0	4.97	20.0	0.47	20.0	0.30
20.0	4.58				
20.0	4.77				
40.0	3.73	40.0	0.46	40.0	0.30
40.0	4.60				
40.0	4.33				
60.0	4.32	60.0	0.38	60.0	0.22
60.0	4.01				
60.0	4.07				
80.0	4.00	80.0	0.39	80.0	0.19
80.0					
80.0	4.00				
100.0		100.0	0.33	100.0	
100.0					
100.0	3.68				

Sediment Trap Estimated Particle Fluxes

Depth (m)	Sample #	Mass ($mg/m^2/d$)	Total Carbon ($mg\ C/m^2/d$)	Organic Carbon ($mg\ C/m^2/d$)	Nitrogen ($mg\ N/m^2/d$)
150	77	132.5	34.91		4.93
150[1]	77			30.01	4.79
150	78	137.6	44.44		6.99
150[1]	78			39.12	6.66
150	79	181.2	64.87		11.59
150[1]	79			58.88	10.89
200	93	112.8	33.78		4.71
200[1]	93			28.86	4.75
200	94				
200	95				
300	96	97.4			
300	97		22.54		2.06
300[1]	97			17.19	1.75
400	98				
400	99			10.98	

1. Subsample acidified to remove carbonates.

Cruise Report, BATS 11

Cruise dates: August 14, 1989 - August 18, 1989
Personnel: R.L. Sherriff-Dow, R. Johnson, K. Gundersen, M. Tuel
R.V. Weatherbird

August 14, 1989

1100 - Depart BBSR

1700 - Arrive BATS Station

Cast 1 for PIT water. Lat: 31.697 N; Long: 64.130 W
Wind from SE at 15-20 knots, seas 5-7'.

2200 - Deploy traps Lat: 31.643 N; Long: 64.222 W

August 15, 1989

0757—**Cast 2** Lat: 31.568 N; Long: 64.184 W

Nominal depths: 300, 300, 400, 500, 500, 600, 750, 750, 800, 900, 1000, 1000 m

Samples:

dissolved O_2 -duplicates	12 samples
salinity	12 samples
NO_3, PO_4, SiO_4,	12 samples
POC/PON	300,500,750,1000 m
Bacteria	400,600,900 m

Cast 3 1253-1718 Lat: 31.533 N; Long: 64.158 W
Winch drops out of gear - CTD drops 700m but seems okay.
Nominal depths: 2000, 2200, 2400, 2600, 2800, 3000, 3200, 3400, 3600, 3800, 4000, 4200 m.

Samples taken:

dissolved O_2 -duplicates	12 depths
salinity	12 depths
NO_3, PO_4, SiO_4,	12 depths
Bacteria	3000, 4000 m

August 16, 1989

0300 Primary production cast, array deployed before sunrise

0833-1035 **Cast 4** ,Lat: 31.433 N; Long: 64.067 W

Nominal depths: 1, 20, 40, 60, 80, 100, 120, 140, 1200, 1400, 1600, 1800 m
Niskin 10 and 11 misfired - water cold.

Samples:

dissolved O_2 -duplicates	12 depths

salinity	12 depths
NO_3, PO_4, SiO_4,	12 depths
POC/PON	1,60,80,10,120,140 m
Bacteria	1400 m

1500 CTD problems - no electrical constant

1835 Hydrocast to 250m, Lat: 31.433 N; Long: 64.067 W

Nominal depths: 1, 20, 40, 60, 70, 80, 90, 100, 120, 150, 200, 250 m.

Samples:

dissolved O_2 -duplicates	12 depths
salinity	12 depths
NO_3, PO_4, SiO_4,	12 depths
POC/PON	12 depths
Brewer - CO_2	11 depths, 1 surface replicate

August 17, 1989

0700 Begin second hydrocast, Lat: 31.433 N; Long: 64.067 W

Nominal depths: 1, 20, 40, 60, 70, 80, 90, 100, 120, 150, 200, 250 m.

Samples taken:

dissolved O_2 -duplicates	12 depths
salinity	12 depths
NO_3, PO_4, SiO_4,	12 depths
POC/PON	12 depths
Brewer - CO_2	11 depths, 1 surface replicate

1715 - Recover traps. Lat: 31.292 N; Long: 63.917 W

August 18, 1989

0030 - Arrive BBSR

CTD Sensor Corrections to Bottle Data for BATS 11:

Salinity:

$$DS = R_{\varnothing} + \sum_{i=1}^{l} A_i \left(\frac{P}{4300}\right)^i + \sum_{i=1}^{m} B_i \left(\frac{T}{30}\right)^i + \sum_{i=1}^{n} C_i \left(\frac{SC}{37}\right)^i$$

$$MS = SC + DS$$

Where: DS = Model (Wet Salinity - CTD Salinity)
MS = modified salinity (ppt)
SC = uncorrected CTD salinity
$R_{\varnothing}$ = Linear Offset
P = pressure (dbar)
T = temperature (°C)
A_i, B_i, C_i = Regression coefficients
l, m, n = order of the polynomial functions

$R_{\varnothing}$ = -8208.0	B_2 = 49.25
A_1 = 5.685	B_3 = -57.79
A_2 = -78.55	B_4 = 24.28
A_3 = 272.6	C_1 = 25470.0
A_4 = -433.3	C_2 = -26320.0
A_5 = 326.3	C_3 = 9059.0
A_6 = -94.17	
B_1 = -17.22	

model correlation coefficient = 0.9931
standard deviation of model residuals = 0.004097 ppt

Oxygen:

$$MO = R_{\varnothing} + \sum_{i=1}^{l} A_i \left(\frac{P}{4300}\right)^i + \sum_{i=1}^{m} B_i \left(\frac{T}{30}\right)^i$$

$$+ \sum_{i=1}^{n} C_i (OC)^i + \sum_{i=1}^{o} D_i \left(\frac{OT}{30}\right)^i$$

$$Mol = MO \times 300$$

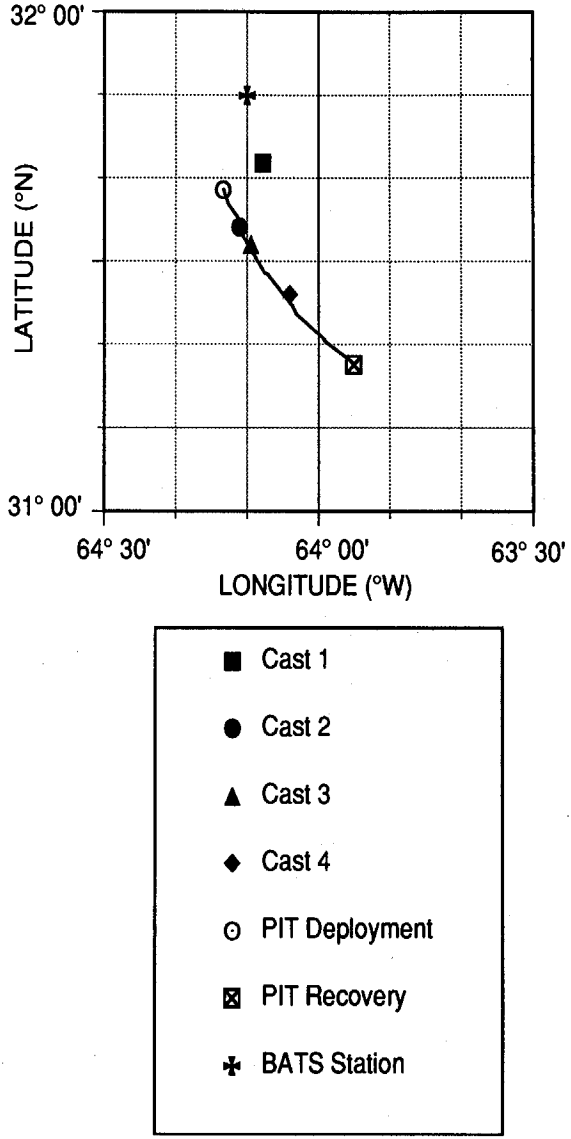
Where:
P = pressure (dbar)

T = temperature (°C)
MO = (CTD modeled oxygen (µmole/kg))/300
Mol = modeled oxygen (µmole/kg)
OC = Oxygen sensor current (µamps)
OT = Oxygen sensor temperature from internal thermistor (°C)
OS(t,p,s) = Oxygen saturation value at measured temperature, salinity and pressure (µmole/kg)
$R_{ø}$, A_i, B_i, C_i, D_i, E_i = Regression coefficients
l, m, n, o, p = order of the polynomial functions
l = 4; m = 2; n = 4; o = 2

$R_{ø}$	= 1.7421960e+00	C_1	= -1.7255961e+01
A_1	= -1.0317886e+00	C_2	= 1.2329205e+02
A_2	= 2.6438399e+00	C_3	= -3.0687015e+02
A_3	= -2.2929808e+00	C_4	= 2.6404211e+02
A_4	= 6.7251316e-01	D_1	= 4.4065479e-01
B_1	= -1.8730148e+0	D_2	= -6.3156301e-01
B_2	= 8.8382263e-01		

model correlation coefficient = 9.9887040e-01
standard deviation of model residuals = 1.6934852e+00 µmole/kg

BATS 11—Cast Positions



BATS 11, CTD Cast 1
14 August 1989: Start 17:13
Lat: 31.697 N; Long: 64.130 W

Depth (m)	Pres (db)	Temp (°C)	Pot.T (°C)	CTD Sal (ppt)	Sigma-t (kg/m3)	CTD 02 (µmole/kg)	02 Anom (µmole/kg)	BAC (m-1)	PAR (µE/m2/s)	Fluor (rfu)
2.0	2.0	26.390	26.390	36.528	24.066	200.12	0.78			
10.0	10.1	26.380	26.377	36.538	24.077	196.82	-2.54			
20.0	20.1	26.273	26.268	36.541	24.114	196.60	-3.11			
30.0	30.2	25.777	25.770	36.558	24.283	196.51	-4.81			
40.0	40.3	24.272	24.263	36.604	24.780	200.30	-6.08			
50.0	50.4	22.135	22.125	36.619	25.415	211.53	-2.56			
60.0	60.4	21.413	21.401	36.609	25.610	221.69	4.84			
70.0	70.5	20.752	20.738	36.605	25.789	228.92	9.49			
80.0	80.6	20.305	20.290	36.594	25.902	230.01	8.81			
90.0	90.6	19.897	19.880	36.602	26.018	228.86	6.02			
100.0	100.7	19.723	19.705	36.613	26.072	224.33	0.81			
110.0	110.8	19.408	19.388	36.596	26.142	219.00	-5.84			
120.0	120.9	19.272	19.250	36.597	26.179	215.64	-9.76			
130.0	131.0	19.181	19.157	36.597	26.203	211.87	-13.92			
140.0	141.0	19.069	19.044	36.595	26.230	208.90	-17.36			
150.0	151.1	18.978	18.951	36.595	26.255	208.01	-18.62			

BATS 11, CTD Cast 2
15 August 1989: Start: 09:15
Lat: 31.568 N; Long: 64.184 W

Depth (m)	Pres (db)	Temp (°C)	Pot.T (°C)	CTD Sal (ppt)	Sigma-t (kg/m3)	CTD 02 (µmole/kg)	02 Anom (µmole/kg)	BAC (m-1)	PAR (µE/m2/s)	Fluor (rfu)
3.0	3.0	26.058	26.057	36.493	24.144	199.66	-0.81			
10.0	10.1	26.107	26.105	36.501	24.135	199.61	-0.69			
20.0	20.1	26.053	26.049	36.519	24.166	199.03	-1.43			
30.0	30.2	25.292	25.285	36.521	24.405	199.55	-3.44			
40.0	40.3	24.423	24.414	36.546	24.690	201.73	-4.21			
50.0	50.4	22.299	22.289	36.594	25.349	213.28	-0.23			
60.0	60.4	21.451	21.439	36.596	25.590	223.53	6.81			
70.0	70.5	20.777	20.764	36.628	25.800	224.93	5.64			
80.0	80.6	20.370	20.354	36.618	25.903	214.77	-6.15			
90.0	90.6	20.057	20.040	36.616	25.986	213.76	-8.41			
100.0	100.7	19.669	19.650	36.604	26.080	212.98	-10.78			
110.0	110.8	19.459	19.439	36.604	26.135	211.54	-13.08			
120.0	120.9	19.299	19.277	36.600	26.174	210.56	-14.73			
130.0	131.0	19.194	19.170	36.601	26.203	210.49	-15.24			
140.0	141.0	19.064	19.038	36.597	26.234	210.76	-15.51			
150.0	151.1	18.980	18.953	36.593	26.253	211.37	-15.25			
160.0	161.2	18.898	18.869	36.592	26.273	211.87	-15.10			
170.0	171.3	18.853	18.822	36.592	26.286	212.38	-14.78			
180.0	181.3	18.789	18.757	36.590	26.301	212.74	-14.70			
190.0	191.4	18.736	18.701	36.587	26.312	213.32	-14.34			
200.0	201.5	18.687	18.650	36.584	26.323	213.32	-14.55			
210.0	211.6	18.627	18.589	36.579	26.335	213.38	-14.75			
220.0	221.7	18.592	18.552	36.576	26.342	213.21	-15.08			
230.0	231.7	18.560	18.518	36.571	26.347	212.76	-15.67			

Depth (m)	Pres (db)	Temp (°C)	Pot.T (°C)	CTD Sal (ppt)	Sigma-t (kg/m3)	CTD 02 (µmole/kg)	02 Anom (µmole/kg)	BAC (m-1)	PAR (µE/m2/s)	Fluor (rfu)
240.0	241.8	18.510	18.467	36.566	26.356	212.55	-16.10			
250.0	251.9	18.457	18.412	36.560	26.365	212.24	-16.64			
275.0	277.1	18.348	18.298	36.549	26.385	212.64	-16.74			
300.0	302.3	18.197	18.143	36.523	26.405	212.83	-17.23			
325.0	327.5	18.058	18.001	36.491	26.416	211.17	-19.54			
350.0	352.7	17.841	17.779	36.450	26.439	205.66	-26.06			
375.0	378.0	17.641	17.575	36.414	26.462	202.83	-29.82			
400.0	403.2	17.482	17.412	36.379	26.474	201.21	-32.20			
425.0	428.4	17.287	17.213	36.336	26.490	199.01	-35.33			
450.0	453.6	16.982	16.905	36.295	26.533	196.43	-39.34			
475.0	478.9	16.689	16.608	36.241	26.562	192.02	-45.17			
500.0	504.1	16.193	16.110	36.191	26.640	187.02	-52.54			
550.0	554.6	15.342	15.254	36.046	26.723	178.23	-65.59			
600.0	605.1	14.427	14.334	35.891	26.805	174.99	-73.58			
650.0	655.6	13.288	13.192	35.715	26.909	165.99	-88.69			
700.0	706.1	11.896	11.799	35.553	27.057	157.02	-105.42			
750.0	756.6	10.783	10.684	35.402	27.146	162.34	-106.66			
800.0	807.2	9.681	9.582	35.259	27.225	164.90	-110.90			
850.0	857.7	8.696	8.596	35.168	27.314	162.90	-119.16			
900.0	908.3	7.777	7.676	35.124	27.420	179.31	-108.74			
950.0	958.9	6.945	6.844	35.107	27.525	198.79	-94.84			
1000.0	1009.4	6.505	6.401	35.109	27.587	211.97	-84.68			

BATS 11, CTD Cast 3
15 August 1989: Start 12:53; End 17:18
Lat: 31.533 N; Long: 64.158 W

Depth (m)	Pres (db)	Temp (°C)	Pot.T (°C)	CTD Sal (ppt)	Sigma-t (kg/m3)	CTD 02 (µmole/kg)	02 Anom (µmole/kg)	BAC (m-1)	PAR (µE/m2/s)	Fluor (rfu)
3.0	3.0	26.230				210.36				
10.0	10.1	26.075				210.37				
20.0	20.1	26.011				209.09				
30.0	30.2	25.202				208.97				
40.0	40.3	24.107				212.17				
50.0	50.4	22.344				222.99				
60.0	60.4	21.512				237.10				
70.0	70.5	20.785				236.75				
80.0	80.6	20.118				223.39				
90.0	90.6	19.681				218.40				
100.0	100.7	19.470				216.40				
110.0	110.8	19.283				214.01				
120.0	120.9	19.155				213.11				
130.0	131.0	19.064				213.22				
140.0	141.0	18.992				213.83				
150.0	151.1	18.937				214.78				
160.0	161.2	18.888				215.50				
170.0	171.3	18.855				216.26				
180.0	181.3	18.791				216.72				
190.0	191.4	18.734				217.02				
200.0	201.5	18.694				217.21				
210.0	211.6	18.663				217.67				
220.0	221.7	18.579				218.09				
230.0	231.7	18.535				217.49				

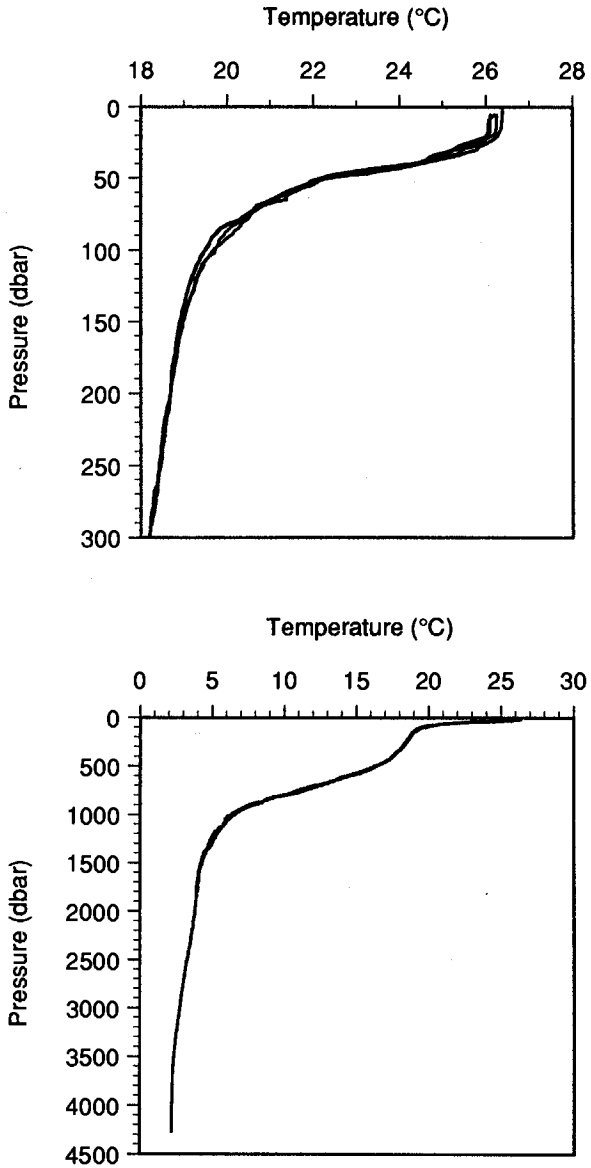
Depth (m)	Pres (db)	Temp (°C)	Pot.T (°C)	CTD Sal (ppt)	Sigma-t (kg/m3)	CTD 02 (µmole/kg)	02 Anom (µmole/kg)	BAC (m-1)	PAR (µE/m2/s)	Fluor (rfu)
240.0	241.8	18.478				216.99				
250.0	251.9	18.438				216.82				
275.0	277.1	18.312				217.01				
300.0	302.3	18.194				218.36				
325.0	327.5	18.024				218.09				
350.0	352.7	17.793				213.48				
375.0	378.0	17.611				208.14				
400.0	403.2	17.423				207.03				
425.0	428.4	17.267				205.36				
450.0	453.6	16.980				203.39				
475.0	478.9	16.639				200.62				
500.0	504.1	16.315				196.32				
550.0	554.6	15.556				187.24				
600.0	605.1	14.397				184.76				
650.0	655.6	13.262				175.33				
700.0	706.1	12.257				164.26				
750.0	756.6	11.258				159.14				
800.0	807.2	9.683				167.39				
850.0	857.7	8.630				169.45				
900.0	908.3	7.436				192.13				
950.0	958.9	6.845				206.72				
1000.0	1009.4	6.433				217.98				
1050.0	1060.0	6.098				225.17				
1100.0	1110.7	5.824				230.44				
1150.0	1161.3	5.514				236.41				
1200.0	1211.9	5.303				240.87				
1300.0	1313.2	4.922				247.57				
1400.0	1414.6	4.377				257.44				
1500.0	1516.0	4.181				261.01				
1600.0	1617.4	4.097	3.944	34.958	27.759	261.12	-53.42			
1700.0	1718.9	4.010	3.846	34.946	27.759	260.74	-54.50			
1800.0	1820.5	3.907	3.731	34.940	27.766	261.04	-55.01			
1900.0	1922.1	3.857	3.670	34.932	27.766	260.68	-55.78			
2000.0	2023.7	3.792	3.593	34.931	27.773	260.72	-56.24			
2100.0	2125.4	3.708	3.497	34.934	27.785	261.28	-56.33			
2200.0	2227.2	3.583	3.360	34.942	27.805	260.45	-58.12			
2300.0	2328.9	3.504	3.269	34.943	27.814	261.04	-58.15			
2400.0	2430.8	3.369	3.122	34.950	27.834	261.59	-58.65			
2500.0	2532.7	3.209	2.951	34.959	27.857	264.65	-56.84			
2600.0	2634.6	3.127	2.856	34.951	27.859	264.88	-57.29			
2700.0	2736.6	3.016	2.732	34.950	27.869	266.54	-56.52			
2800.0	2838.6	2.920	2.623	34.944	27.874	267.56	-56.30			
2900.0	2940.7	2.815	2.505	34.939	27.881	268.69	-56.03			
3000.0	3042.8	2.737	2.413	34.927	27.879	266.53	-58.86			
3100.0	3144.9	2.642	2.305	34.920	27.883	267.50	-58.68			
3200.0	3247.2	2.545	2.194	34.916	27.889	268.53	-58.46			
3300.0	3349.4	2.468	2.103	34.909	27.891	269.15	-58.49			
3400.0	3451.7	2.399	2.020	34.903	27.892	269.60	-58.62			
3500.0	3554.1	2.335	1.940	34.899	27.896	269.88	-58.89			
3600.0	3656.5	2.295	1.885	34.894	27.896	269.83	-59.28			
3700.0	3758.9	2.265	1.838	34.891	27.897	268.05	-61.32			
3800.0	3861.4	2.249	1.806	34.889	27.898	267.59	-61.91			
3900.0	3964.0	2.229	1.769	34.891	27.903	267.25	-62.42			
4000.0	4066.5	2.221	1.743	34.892	27.905	266.60	-63.14			
4100.0	4169.2	2.220	1.724	34.890	27.905	265.86	-63.89			
4200.0	4271.8	2.227	1.713	34.881	27.899	264.74	-64.97			

BATS 11, CTD Cast 4
16 August 1989: Start 08:33; End 10:35
Lat: 31.433 N; Long: 64.067 W

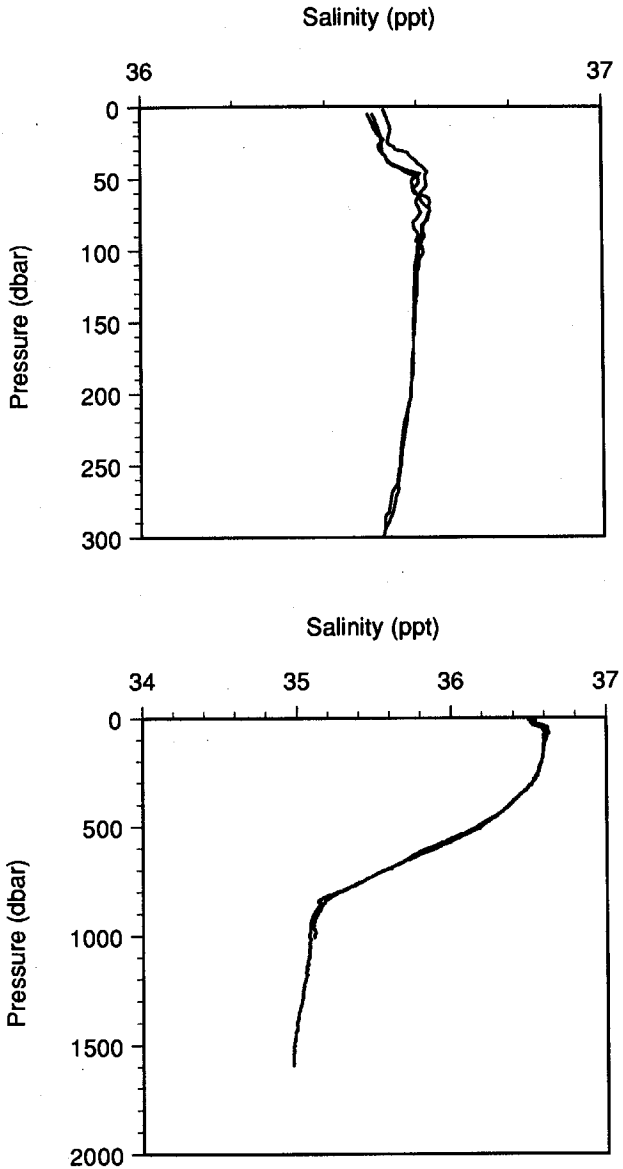
Depth (m)	Pres (db)	Temp (°C)	Pot.T (°C)	CTD Sal (ppt)	Sigma-t (kg/m3)	CTD 02 (µmole/kg)	02 Anom (µmole/kg)	BAC (m-1)	PAR (µE/m2/s)	Fluor (rfu)
3.0	3.0	26.253	26.252	36.502	24.090	213.66	13.84			
10.0	10.1	26.251	26.249	36.511	24.098	212.33	12.51			
20.0	20.1	26.140	26.136	36.522	24.142	211.04	10.87			
30.0	30.2	25.465	25.458	36.526	24.356	210.68	8.28			
40.0	40.3	24.425	24.417	36.548	24.691	212.15	6.22			
50.0	50.4	22.345	22.335	36.604	25.343	222.43	9.10			
60.0	60.4	21.323	21.311	36.600	25.628	236.63	19.43			
70.0	70.5	20.651	20.638	36.626	25.832	242.52	22.74			
80.0	80.6	20.121	20.106	36.618	25.969	233.09	11.18			
90.0	90.6	19.665	19.648	36.609	26.084	223.82	0.05			
100.0	100.7	19.480	19.461	36.601	26.127	217.70	-6.84			
110.0	110.8	19.306	19.286	36.597	26.170	216.00	-9.26			
120.0	120.9	19.187	19.165	36.595	26.200	214.41	-11.35			
130.0	131.0	19.066	19.042	36.594	26.231	213.33	-12.94			
140.0	141.0	18.966	18.940	36.593	26.256	213.32	-13.37			
150.0	151.1	18.889	18.862	36.591	26.275	213.50	-13.51			
160.0	161.2	18.836	18.807	36.591	26.288	213.50	-13.73			
170.0	171.3	18.797	18.767	36.590	26.298	214.76	-12.63			
180.0	181.3	18.728	18.696	36.587	26.314	215.78	-11.91			
190.0	191.4	18.708	18.674	36.587	26.319	216.08	-11.70			
200.0	201.5	18.681	18.645	36.586	26.326	216.32	-11.57			
210.0	211.6	18.605	18.567	36.578	26.340	217.07	-11.16			
220.0	221.7	18.531	18.492	36.571	26.353	216.98	-11.57			
230.0	231.7	18.496	18.454	36.567	26.360	216.30	-12.41			
240.0	241.8	18.466	18.423	36.563	26.365	215.93	-12.92			
250.0	251.9	18.418	18.373	36.562	26.376	216.01	-13.04			
275.0	277.1	18.285	18.235	36.540	26.394	217.04	-12.62			
300.0	302.3	18.191	18.138	36.522	26.405	216.95	-13.13			
325.0	327.5	18.032	17.974	36.488	26.420	215.93	-14.90			
350.0	352.7	17.815	17.753	36.449	26.445	214.59	-17.24			
375.0	378.0	17.646	17.580	36.412	26.459	209.48	-23.16			
400.0	403.2	17.435	17.366	36.373	26.481	204.70	-28.93			
425.0	428.4	17.268	17.195	36.334	26.493	202.91	-31.52			
450.0	453.6	16.988	16.911	36.282	26.521	200.66	-35.11			
475.0	478.9	16.643	16.562	36.220	26.557	195.81	-41.63			
500.0	504.1	16.343	16.259	36.162	26.583	192.19	-46.72			
550.0	554.6	15.367	15.279	36.005	26.686	187.53	-56.24			
600.0	605.1	14.114	14.022	35.829	26.824	182.06	-68.18			
650.0	655.6	13.396	13.300	35.702	26.876	177.14	-77.00			
700.0	706.1	12.331	12.232	35.547	26.970	170.84	-89.23			
750.0	756.6	11.348	11.246	35.412	27.052	164.76	-101.01			
800.0	807.2	9.888	9.788	35.243	27.178	167.97	-106.61			
850.0	857.7	8.658	8.558	35.148	27.305	167.39	-114.95			
900.0	908.3	7.796	7.695	35.101	27.399	186.68	-101.30			
950.0	958.9	6.751	6.651	35.086	27.535	209.69	-85.32			
1000.0	1009.4	6.259	6.156	35.076	27.593	223.95	-74.48			
1050.0	1060.0	5.973	5.867	35.079	27.633	233.97	-66.46			
1100.0	1110.7	5.753	5.643	35.070	27.654	236.29	-65.72			
1150.0	1161.3	5.388	5.275	35.061	27.691	243.08	-61.58			
1200.0	1211.9	5.071	4.955	35.047	27.718	249.28	-57.73			
1300.0	1313.2	4.736	4.612	35.024	27.739	257.34	-52.21			

Depth (m)	Pres (db)	Temp (°C)	Pot.T (°C)	CTD Sal (ppt)	Sigma-t (kg/m3)	CTD 02 (µmole/kg)	02 Anom (µmole/kg)	BAC (m-1)	PAR (µE/m2/s)	Fluor (rfu)
1400.0	1414.6	4.472	4.338	34.997	27.748	258.30	-53.30			
1500.0	1516.0	4.290	4.147	34.973	27.750	260.66	-52.37			
1600.0	1617.4	4.029				263.66				
1700.0	1718.9	3.951				263.00				
1800.0	1820.5	3.883				261.41				

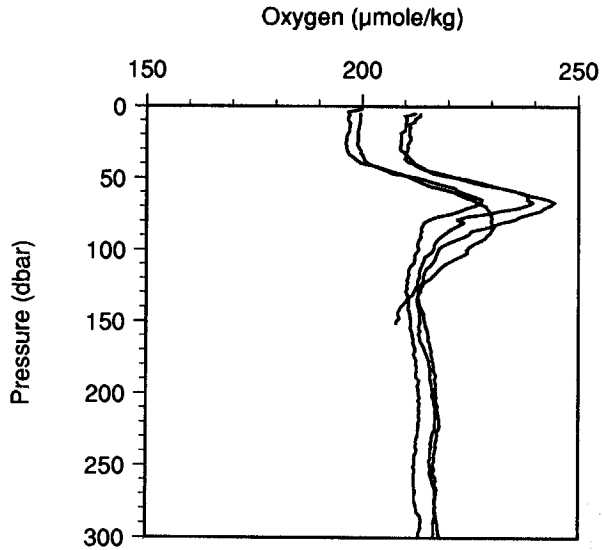
BATS 11—CTD Temperature Profile

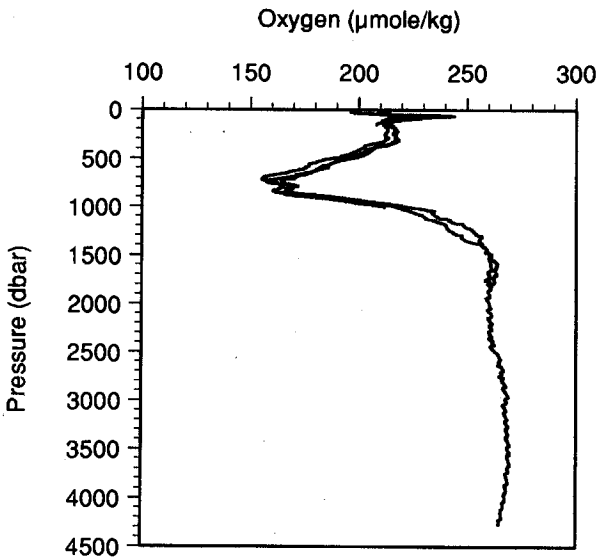


BATS 11—CTD Salinity Profile



BATS 11—CTD Oxygen Profile





BATS 11—Bottle Data
August 14-18, 1989
Physical Parameters

Bottle ID	Depth (m)	Pressure (db)	Temp (°C)	Pot. Temp (°C)	Salinity (ppt)	Sigma-t (kg/m^3)
G1105N12	1.0				36.491	
G1105N11	20.0				36.495	
G1105N10	40.0				36.607	
G1105N09	60.0				36.608	
G1105N08	70.0				36.624	
G1105N07	80.0				36.625	
G1105N06	90.0				36.636	
G1105N05	100.0				36.617	
G1105N04	120.0				36.608	
G1105N03	150.0				36.590	
G1105N02	200.0				36.604	
G1105N01	250.0				36.549	
G1104N12	4.1	4.1	26.295	26.294	36.505	24.079
G1104N11	21.3	21.5	26.130			
G1104N10	39.7	40.0	24.381			
G1104N09	60.1	60.5	21.581	21.569	36.602	25.558
G1104N08	79.6	80.1	20.529	20.514	36.621	25.862
G1104N07	101.7	102.4	19.573	19.554	36.617	26.115
G1104N06	120.8	121.7	19.215	19.193	36.599	26.195
G1104N05	138.9	139.9	19.007	18.982	36.589	26.242
G1104N04	1199.6	1211.5	5.057	4.941	35.047	27.719
G1104N03	1398.8	1413.3	4.521	4.387	35.010	27.753
G1104N02	1599.0	1616.4	4.032	3.880	34.968	27.773
G1104N01	1799.9	1820.3	3.883	3.708	34.971	27.793
G1102N12	300.1	302.4	18.218	18.165	36.526	26.401
G1102N11	299.2	301.5	18.219	18.166	36.525	26.400
G1102N10	400.5	403.7	17.473	17.404	36.410	26.500
G1102N09	502.3	506.5	16.187	16.103	36.188	26.639
G1102N08	501.4	505.5	16.189	16.106	36.189	26.639
G1102N07	599.6	604.6	14.175	14.083	35.860	26.835
G1102N06	751.7	758.4	10.767	10.669	35.397	27.145
G1102N05	751.5	758.2	10.763	10.664	35.399	27.147
G1102N04	799.7	806.9	9.651	9.552	35.253	27.226
G1102N03	898.1	906.3	7.782	7.681	35.115	27.412
G1102N02	999.8	1009.2	6.450	6.346	35.112	27.596
G1102N01	1000.4	1009.9	6.450	6.346	35.109	27.594
G1103N12	2001.9	2025.6	3.811			
G1103N11	2199.7	2226.8	3.561			
G1103N10	2400.3	2431.1	3.378			
G1103N09	2599.9	2634.4	3.145	2.874	34.953	27.859
G1103N08	2799.3	2837.8	2.935	2.638	34.938	27.868
G1103N07	2998.7	3041.4	2.740			
G1103N06	3199.6	3246.7	2.526			
G1103N05	3401.6	3453.4	2.380			
G1103N04	3599.8	3656.2	2.295	1.884	34.897	27.898
G1103N03	3799.4	3860.8	2.248	1.805	34.891	27.900
G1103N02	3999.5	4065.9	2.220	1.742	34.888	27.902
G1103N01	4200.8	4272.6	2.227	1.713	34.883	27.900

BATS 11—Bottle Data
August 14-18, 1989
Gases

Bottle ID	Depth (m)	O_2(1) (μmole/kg)	O_2(2) (μmole/kg)	O_2(1) anomaly (μmole/kg)	O_2(2) anomaly (μmole/kg)	TCO_2 (1) (μmole/kg)	TCO_2 (2) (μmole/kg)
G1105N12	1.0	208.76	209.20				
G1105N11	20.0	209.63	209.63				
G1105N10	40.0	224.19	223.75				
G1105N09	60.0	248.72	248.29				
G1105N08	70.0	240.40	239.96				
G1105N07	80.0	233.40					
G1105N06	90.0	211.20					
G1105N05	100.0	219.88	219.45				
G1105N04	120.0	213.35	213.35				
G1105N03	150.0	212.91	212.47				
G1105N02	200.0	213.33	212.89				
G1105N01	250.0	214.63					
G1106N12	1.0					2019.8	2017.2
G1106N11	20.0					2019.7	
G1106N10	40.0					2027.8	
G1106N09	60.0						
G1106N08	70.0					2040.2	
G1106N07	80.0					2044.0	
G1106N06	90.0					2060.0	
G1106N05	100.0					2056.5	
G1106N04	120.0					2062.3	
G1106N03	150.0					2065.0	
G1106N02	200.0					2057.8	
G1106N01	250.0					2062.7	
G1104N12	4.1	213.59	212.71	24.62	23.75		
G1104N11	21.3						
G1104N10	39.7						
G1104N09	60.1	252.64		38.25			
G1104N08	79.6	241.25	241.68	22.00	22.43		
G1104N07	101.7	215.98	217.28	-7.45	-6.15		
G1104N06	120.8		213.35		-11.57		
G1104N05	138.9		215.52		-10.24		
G1104N04	1199.6	246.56	246.56	-35.23	-35.23		
G1104N03	1398.8	260.87	259.14	-24.01	-25.74		
G1104N02	1599.0	268.68	268.24	-19.26	-19.70		
G1104N01	1799.9	270.41	270.41	-18.19	-18.19		

Bottle ID	Depth (m)	O_2(1) (µmole/kg)	O_2(2) (µmole/kg)	O_2(1) anomaly (µmole/kg)	O_2(2) anomaly (µmole/kg)	TCO_2 (1) (2) (µmole/kg)
G1102N12	300.1	214.62	215.06	-14.00	-13.56	
G1102N11	299.2	213.75	212.45	-14.87	-16.17	
G1102N10	400.5	197.23	198.54	-34.19	-32.89	
G1102N09	502.3	186.36		-49.89		
G1102N08	501.4	186.79		-49.45		
G1102N07	599.6	174.18	172.44	-69.33	-71.06	
G1102N06	751.7	162.43	163.30	-93.18	-92.31	
G1102N05	751.5	163.74	164.17	-91.89	-91.45	
G1102N04	799.7	148.09	147.23	-111.82	-112.69	
G1102N03	898.1	171.96	171.52	-95.82	-96.26	
G1102N02	999.8	204.49	204.49	-69.61	-69.61	
G1102N01	1000.4	204.05	202.32	-70.05	-71.79	
G1103N12	2001.9					
G1103N11	2199.7					
G1103N10	2400.3					
G1103N09	2599.9	263.44	263.44	-29.78	-29.78	
G1103N08	2799.3	268.21	266.91	-26.65	-27.95	
G1103N07	2998.7					
G1103N06	3199.6					
G1103N05	3401.6					
G1103N04	3599.8	271.66	272.97	-28.99	-27.68	
G1103N03	3799.4	266.89	265.59	-34.36	-35.66	
G1103N02	3999.5	265.15	263.42	-36.58	-38.32	
G1103N01	4200.8	266.02		-35.93		

BATS 11—Bottle Data
August 14-18, 1989
Nutrients

Bottle ID	Depth (m)	Nitrate+Nitrite (µmole/kg)	Phosphate (µmole/kg)	Silicate (µmole/kg)
G1105N12	1.0	0.00	0.00	0.76
G1105N11	20.0	0.00	0.00	1.01
G1105N10	40.0	0.00	0.00	0.86
G1105N09	60.0	0.00	0.00	0.71
G1105N08	70.0	0.00	0.00	0.92
G1105N07	80.0	0.00	0.00	0.70
G1105N06	90.0	0.71	0.00	0.76
G1105N05	100.0	0.71	0.00	0.80
G1105N04	120.0	0.99	0.00	0.95
G1105N03	150.0	1.92	0.03	1.16
G1105N02	200.0	2.43	0.04	1.04
G1105N01	250.0	3.22	0.09	1.28

Bottle ID	Depth (m)	Nitrate+Nitrite (μmole/kg)	Phosphate (μmole/kg)	Silicate (μmole/kg)
G1104N12	4.1	0.02	0.00	0.78
G1104N11	21.3			
G1104N10	39.7			
G1104N09	60.1	0.02	0.00	0.69
G1104N08	79.6	0.03	0.00	0.50
G1104N07	101.7	0.97	0.00	0.74
G1104N06	120.8	0.95	0.00	0.83
G1104N05	138.9	2.32	0.03	0.98
G1104N04	1199.6	18.65	1.19	13.12
G1104N03	1398.8	17.92	1.14	12.58
G1104N02	1599.0	17.72	1.10	12.38
G1104N01	1799.9	17.56	1.13	13.41
G1102N12	300.1	3.62	0.11	1.40
G1102N11	299.2	3.66	0.12	1.44
G1102N10	400.5	6.18	0.24	2.04
G1102N09	502.3	9.55	0.45	3.39
G1102N08	501.4	9.45	0.46	3.45
G1102N07	599.6	14.05	0.74	5.57
G1102N06	751.7	19.60	1.18	10.84
G1102N05	751.5	19.83	1.19	10.84
G1102N04	799.7	22.73	1.46	14.07
G1102N03	898.1	22.07	1.46	14.83
G1102N02	999.8	20.51	1.25	13.88
G1102N01	1000.4	20.53	1.31	13.98
G1103N12	2001.9			
G1103N11	2199.7			
G1103N10	2400.3			
G1103N09	2599.9	18.33	1.19	21.11
G1103N08	2799.3	18.22	1.24	21.11
G1103N07	2998.7			
G1103N06	3199.6			
G1103N05	3401.6			
G1103N04	3599.8	18.61	1.26	29.57
G1103N03	3799.4	19.04	1.33	31.57
G1103N02	3999.5	19.06	1.31	34.71
G1103N01	4200.8	19.30	1.34	35.47

BATS 11—Bottle Data
August 14-18, 1989
Particulates

Bottle ID	Depth (m)	Chl *a* (µg/kg)	POC (µg/kg)	PON (µg/kg)	Bacteria (# x 10^8/kg)
G1105N12	1.0		23.84	3.60	
G1105N11	20.0		32.14	4.52	
G1105N10	40.0		29.62	4.09	
G1105N09	60.0		24.05	3.63	
G1105N08	70.0		24.92	3.52	
G1105N07	80.0		42.95	5.90	
G1105N06	90.0		32.12	5.26	
G1105N05	100.0		23.08	4.18	
G1105N04	120.0		14.12	2.40	
G1105N03	150.0		8.18	1.39	
G1105N02	200.0		5.61	0.90	
G1105N01	250.0		6.64	0.97	
G1106N12	1.0	0.033			3.58
G1106N11	20.0	0.042			3.35
G1106N10	40.0	0.053			4.33
G1106N09	60.0	0.079			6.34
G1106N08	70.0	0.094			4.18
G1106N07	80.0				5.07
G1106N06	90.0	0.242			3.41
G1106N05	100.0	0.235			2.37
G1106N04	120.0	0.134			2.07
G1106N03	150.0	0.035			1.05
G1106N02	200.0	0.010			0.90
G1106N01	250.0	0.008			0.90
G1104N12	4.1		25.14	3.98	
G1104N11	21.3				
G1104N10	39.7				
G1104N09	60.1		23.63	3.70	
G1104N08	79.6		21.47	3.68	
G1104N07	101.7		16.73	3.12	
G1104N06	120.8		9.58	1.67	
G1104N05	138.9		7.38	1.26	
G1104N04	1199.6				
G1104N03	1398.8				0.16
G1104N02	1599.0				
G1104N01	1799.9				
G1102N12	300.1		6.94	0.97	
G1102N11	299.2		3.72	0.83	
G1102N10	400.5				0.48
G1102N09	502.3		6.45	0.81	
G1102N08	501.4		5.89	0.65	
G1102N07	599.6				0.34
G1102N06	751.7		6.13	0.68	
G1102N05	751.5		5.50	0.74	
G1102N04	799.7				
G1102N03	898.1				0.31
G1102N02	999.8		6.06	0.57	
G1102N01	1000.4		9.43	0.62	

Bottle ID	Depth (m)	Chl *a* (µg/kg)	POC (µg/kg)	PON (µg/kg)	Bacteria (# x 10^8/kg)
G1103N12	2001.9				
G1103N11	2199.7				
G1103N10	2400.3				
G1103N09	2599.9				
G1103N08	2799.3				
G1103N07	2998.7				0.14
G1103N06	3199.6				
G1103N05	3401.6				
G1103N04	3599.8				
G1103N03	3799.4				
G1103N02	3999.5				0.12
G1103N01	4200.8				

BATS 11, Primary Production Data

R.V. Weatherbird

Light Bottles		Dark Bottles		Time-zero Bottles	
Depth (m)	Lt. Prod ($mg/m^2/day$)	Depth (m)	Dk. Prod ($mg/m^2/day$)	Depth (m)	$T_{\emptyset}$ Prod ($mg/m^2/day$)
1.0	2.58	1.0	0.35	1.0	0.21
1.0	3.54				
1.0	3.18				
20.0	6.10	20.0	0.22	20.0	
20.0	5.63				
20.0	5.10				
40.0		40.0	0.32	40.0	0.23
40.0					
40.0	3.15				
60.0		60.0	0.36	60.0	
60.0	2.97				
60.0	2.57				
80.0	1.17	80.0	0.32	80.0	0.21
80.0	1.12				
80.0	1.28				
100.0		100.0	0.30	100.0	
100.0	0.63				
100.0	0.73				
120.0	1.43	120.0	0.31	120.0	0.17
120.0	1.15				
120.0	1.02				
140.0	0.42	140.0	0.20	140.0	
140.0	0.43				
140.0	0.38				

BATS 11, Sediment Trap Estimated Particle Fluxes

R.V. Weatherbird

Depth (m)	Sample #	Mass ($mg/m^2/d$)	Total Carbon ($mg\ C/m^2/d$)	Organic Carbon ($mg\ C/m^2/d$)	Nitrogen ($mg\ N/m^2/d$)
150	104	73.3	20.58		3.53
150[1]	104			17.44	2.73
150	105	88.8	25.84		4.85
150[1]	105			22.25	3.83
150	106	85.2	22.67		3.56
150[1]	106			15.69	2.48
200[2]	117+118	82.9	23.26		3.15
200[1]	117+118			19.59	2.97
300[2]	119+120	54.9	11.82		1.20
300[1]	119+120			7.86	0.79
400[2]	121+122	41.2	8.68		0.83
400[1]	121+122			6.67	0.81

1. Subsample acidified to remove carbonates
2. Due to low weight, samples from two traps were combined

Cruise Report, BATS 12

Cruise dates: September 18, 1989 - September 19, 1989
Personnel: R.L. Sherriff-Dow, R. Johnson, K. Gundersen, M. Tuel
R.V. Weatherbird

September 18, 1989

Depart BBSR at 1440. No CTD on this cruise--double Niskin casts instead.

1800 Stop for trap water

2145 Arrive BATS station

2240 PITs in water

2245 Begin 1800m cast.

September 19, 1989

0030 Messenger thrown on 1800m cast. Start ascent at 0110, on deck at 0225.

0800 End second part of cast.

1400 Weather deteriorating rapidly--8-10' seas, gale warning, Hurricane "Hugo" nearing. Decide to recover traps early.

1440 Recover PITs and head for BBSR.

BATS 12—Bottle Data
September 18-19, 1989
Physical Parameters

Bottle ID	Depth (m)	Pressure (db)	Temp (°C)	Pot. Temp (°C)	Salinity (ppt)	Sigma-t (kg/m^3)
G1201N12	0.9		27.340		36.562	
G1201N11	18.5		27.400		36.549	
G1201N10	37.0		27.420		36.535	
G1201N09	55.4		22.270		36.576	
G1201N08	73.9		20.680		36.430	
G1201N07	92.4		19.480		36.536	
G1201N06	110.9		18.860		36.527	
G1201N05	129.4		18.520		36.522	
G1201N04	1108.8		5.350		35.032	
G1201N03	1293.6		4.750		35.004	
G1201N02	1478.4		4.270		34.969	
G1201N01	1663.2		4.050		34.962	

BATS 12—Bottle Data
September 18-19, 1989
Gases

Bottle ID	Depth (m)	$O_2(1)$ (µmole/kg)	$O_2(2)$ (µmole/kg)	$O_2(1)$ anomaly (µmole/kg)	$O_2(2)$ anomaly (µmole/kg)	TCO_2 (µmole/kg)
G1201N12	0.9		205.02		22.50	
G1201N11	18.5	204.16	202.41	22.01	20.26	
G1201N10	37.0	204.16		22.16		
G1201N09	55.4	253.14	253.14	42.10	42.10	
G1201N08	73.9	246.08	245.64	27.22	26.79	
G1201N07	92.4	234.24		10.26		
G1201N06	110.9		220.30		-6.25	
G1201N05	129.4	208.12	206.81	-19.77	-21.08	
G1201N04	1108.8	234.85		-45.39		
G1201N03	1293.6		252.20		-31.42	
G1201N02	1478.4	263.04		-23.47		
G1201N01	1663.2		265.21		-22.47	

BATS 12—Bottle Data
September 18-19, 1989
Nutrients

Bottle ID	Depth (m)	Nitrate+Nitrite (μmole/kg)	Phosphate (μmole/kg)	Silicate (μmole/kg)
G1201N12	0.9	0.06	0.00	0.86
G1201N11	18.5	0.05	0.00	0.87
G1201N10	37.0	0.05	0.03	0.83
G1201N09	55.4	0.07	0.00	0.73
G1201N08	73.9	0.25	0.00	0.73
G1201N07	92.4	0.72	0.00	0.73
G1201N06	110.9	0.12	0.00	0.96
G1201N05	129.4	1.55	0.04	1.18
G1201N04	1108.8	19.18	1.18	12.83
G1201N03	1293.6	18.61	1.11	11.92
G1201N02	1478.4	17.30	1.06	11.83
G1201N01	1663.2	16.79	1.12	12.56

BATS 12—Bottle Data
September 18-19, 1989
Particulates

Bottle ID	Depth (m)	Chl *a* (μg/kg)	POC (μg/kg)	PON (μg/kg)	Bacteria (# x 10^8/kg)
G1201N12	0.9		36.22	3.74	
G1201N11	18.5		34.31	4.23	
G1201N10	37.0		43.75	5.07	
G1201N09	55.4		53.82	6.62	
G1201N08	73.9		26.05	3.81	
G1201N07	92.4		21.75	3.28	
G1201N06	110.9		24.44	4.05	
G1201N05	129.4		17.09	2.97	
G1201N04	1108.8				
G1201N03	1293.6				
G1201N02	1478.4				
G1201N01	1663.2				

Meteorological data—1989

Jul. Day	0000-0400	0400-0800	0800-1200 (WS/WG/WD)	1200-1600 (WS/WG/WD)	1600-2000 (WS/WG/WD)	2000-2400 (WS/WG/WD)	Air Temp (°C) mean	min	max	Rel. Hum. (%)	Air Press (mB)	Solar Rad. ($MJ/m^2/d$)
7	4/6/150	8/10/179	6/9/207	8/11/201	9/12/202	6/9/211	18.7	16.7	19.8	1026.0	78.6	0.53
8	5/8/217	5/7/222	3/5/238	4/6/231	3/5/253	2/3/257	19.4	18.3	21.3	1026.5	86.4	0.51
9	2/3/208	3/4/177	5/6/176	5/6/165	5/7/182	4/5/176	19.4	18.7	19.9	1026.9	86.5	0.53
10	4/5/170	4/5/177	6/7/174	5/6/161	5/6/173	5/7/158	19.8	19.1	20.6	1028.3	87.3	0.59
11	7/8/162	4/6/193	3/5/207	2/4/238	3/5/270	2/4/287	19.5	17.5	21.6	1027.8	88.7	0.52
12	3/4/331	6/10/43	10/14/53	11/13/78	8/11/99	6/9/109	18.4	17.7	19.3	1028.3	89.1	0.23
13	9/11/129	9/11/159	8/10/197	6/10/215	7/11/233	5/9/244	19.8	18.5	21.0	1022.7	89.8	0.51
14	6/10/244	4/6/297	5/9/28	5/9/31	9/12/54	10/13/59	15.9	14.1	19.9	1027.0	81.7	0.39
15	8/11/82	7/10/113	8/11/138	9/12/149	11/14/160	11/14/164	17.9	15.8	19.0	1028.1	75.7	0.48
16	12/14/172	11/13/187	8/11/198	10/13/202	8/12/212	8/12/212	19.8	18.7	20.8	1021.7	83.3	0.46
17	7/12/217	7/11/229	6/9/240	4/5/310	3/5/310	2/3/309	18.5	17.2	19.9	1019.4	93.3	0.30
18	2/3/359	3/5/13	3/5/21	4/6/81	1/2/59	1/2/33	18.1	16.5	19.9	1021.7	86.9	0.38
19	0/0/93	4/5/169	6/10/246	8/13/246	8/13/279	8/12/310	18.7	16.4	21.3	1016.3	86.4	0.46
20	5/8/318	3/4/308	2/3/322	1/1/335	5/7/172	10/12/178	17.7	16.2	19.6	1018.8	77.1	0.50
21	12/14/193	8/13/226	8/13/245	7/11/277	8/11/304	10/14/317	18.0	14.5	20.5	1015.9	87.3	0.21
22	6/10/339	5/9/2	6/10/42	9/12/66	9/12/87	9/13/100	15.1	13.4	17.2	1025.9	80.8	0.26
23	10/14/99	12/16/116	14/18/137	15/18/156	15/18/165	14/17/168	19.7	16.9	20.9	1017.5	94.4	0.24
24	16/20/174	18/23/181	17/22/188	17/21/195	13/19/206	9/15/243	20.3	18.7	21.0	1007.8	91.7	0.30
25	8/13/289	8/12/322	7/13/1	8/14/351	6/11/357	9/15/2	17.6	16.2	19.2	1014.9	85.4	0.54
26	11/17/11	5/8/32	7/12/34	10/14/55	9/13/68	6/10/97	16.4	15.3	17.6	1025.1	79.1	0.54
27	7/10/131	9/12/162	4/7/210	5/8/254	7/13/254	7/12/263	17.7	15.1	19.7	1016.3	86.6	0.35
28	4/8/256	7/12/295	11/16/314	11/17/334	6/11/343	6/10/353	15.3	13.9	17.6	1017.8	75.1	0.46
29	5/10/16	3/6/349	2/4/331	2/5/292	3/5/279	3/6/256	14.9	13.6	16.2	1024.1	72.5	0.23
30	3/5/261	3/6/269	3/6/269	3/6/262	4/8/244	6/10/225	17.6	15.5	19.4	1020.7	75.2	0.25
31	10/15/205	9/15/221	9/15/223	9/15/257	7/13/272	9/13/306	18.2	15.9	20.3	1013.8	85.1	0.20
32	4/7/308	2/4/295	1/2/343	2/4/204	6/8/199	6/8/202	17.5	15.8	19.1	1021.5	82.7	0.58
33	8/11/206	6/9/213	4/7/224	4/7/216	4/7/231	3/6/243	19.8	19.0	21.5	1022.2	94.5	0.34
34	3/5/220	3/5/240	3/6/249	4/7/256	4/8/265	3/6/267	19.4	18.3	21.5	1021.1	95.2	0.52
35	4/6/257	4/7/253	4/7/271	4/7/272	4/8/266	4/7/269	19.7	18.7	20.7	1020.3	95.3	0.36
36	3/6/262	3/6/266	4/7/264	4/6/263	4/8/274	4/7/255	19.7	18.9	21.4	1022.1	95.5	0.45
37	4/6/254	4/6/255	3/6/265	4/7/263	5/9/269	4/7/268	19.7	18.7	21.3	1023.8	94.3	0.61
38	3/5/262	3/5/250	3/4/248	4/6/255	4/8/257	4/7/252	19.7	18.2	21.8	1024.6	93.2	0.57
39	4/7/243	5/8/246	5/7/243	5/8/251	6/10/250	6/10/244	20.2	19.3	21.5	1022.8	94.2	0.31
40	6/10/242	7/12/236	8/13/239	9/15/240	6/11/293	8/13/312	18.6	15.7	20.7	1017.8	92.1	0.09
41	9/14/319	7/10/322	6/10/323	5/7/318	3/6/307	3/6/289	14.9	14.3	15.5	1020.6	78.5	0.38
42	6/10/278	10/16/302	9/15/308	6/10/309	4/7/293	3/5/278	14.7	13.6	16.0	1021.8	70.0	0.40
43	3/5/266	3/5/254	4/6/240	7/11/202	12/16/202	7/12/238	16.5	14.4	18.7	1019.4	77.7	0.56
44	5/8/274	8/13/321	7/13/341	9/15/6	5/9/360	7/12/25	16.0	14.7	17.6	1026.4	75.1	0.53
45	4/7/41	4/8/49	7/11/40	10/13/77	8/11/60	7/10/56	15.8	15.0	16.8	1033.4	74.1	0.74
46	8/11/61	7/10/74	8/10/55	9/11/64	6/10/90	6/8/82	17.3	16.4	19.2	1031.5	80.3	0.88
47	5/7/104	3/4/109	2/3/50	1/2/49	1/2/69	1/1/17	18.3	17.4	19.8	1028.1	91.4	0.84
48	2/3/330	2/4/335	2/2/322	2/3/353	6/10/50	5/8/51	17.7	16.9	19.6	1025.9	89.3	0.55
49	8/10/60	6/7/89	6/8/90	7/9/110	8/9/163	6/8/207	18.0	16.7	19.1	1021.6	93.4	0.76
50	7/8/206	6/9/224	5/8/227	6/10/225	8/12/223	5/8/237	19.4	18.4	20.7	1017.0	95.7	0.90
51	4/7/272	5/7/310	6/9/16	4/8/34	4/7/62	5/6/73	17.9	17.3	18.5	1022.7	88.5	1.03
52	5/6/89	4/5/99	5/7/129	8/9/142	8/10/153	8/10/166	18.8	17.7	19.4	1025.3	94.3	1.03
53	8/10/171	8/10/176	11/13/183	10/12/189	10/11/183	10/12/183	19.7	19.4	20.0	1022.3	97.2	1.08
54	11/14/182	12/14/185	11/13/193	13/16/189	13/15/193	12/15/192	20.0	19.6	20.2	1017.1	96.4	1.01
55	13/15/192	14/17/192	14/17/191	16/19/194	15/18/196	14/18/206	19.7	17.1	20.6	1012.6	97.0	0.69
56	3/6/257	4/6/248	5/9/276	7/13/271	8/13/286	8/13/306	16.6	14.8	18.1	1012.3	81.8	0.98
57	6/10/311	3/6/296	4/6/301	4/6/257	6/10/273	8/12/308	14.5	12.4	15.9	1013.0	79.4	0.81
58	6/11/304	4/6/276	6/9/258	8/13/258	8/14/264	8/13/268	17.3	14.2	20.1	1014.4	76.2	1.02
59	6/10/266	4/7/258	4/7/246	4/7/241	5/9/251	6/8/218	19.2	18.1	21.6	1018.5	86.5	0.82
92	6/9/221	8/11/217	5/7/271	9/13/335	9/12/335	6/10/3	18.0	16.4	20.4	1017.8	84.4	1.19

Jul. Day	0000-0400	0400-0800	0800-1200 (WS/WG/WD)	1200-1600 (WS/WG/WD)	1600-2000 (WS/WG/WD)	2000-2400 (WS/WG/WD)	Air Temp (°C) mean	min	max	Rel. Hum. (%)	Air Press (mB)	Solar Rad. ($MJ/m^2/d$)
93	6/10/24	4/7/31	5/7/67	6/8/75	5/7/75	5/8/72	17.1	16.4	17.9	1026.0	75.2	1.37
94	6/9/107	5/8/118	5/8/129	4/6/126	3/6/118	4/7/129	18.6	17.6	19.8	1026.5	79.6	1.43
95	6/8/134	7/8/142	6/8/150	6/7/148	7/8/150	7/8/150	19.4	18.9	20.0	1025.8	92.4	1.44
96	7/8/151	8/9/150	8/10/154	10/12/155	11/13/159	11/13/164	19.9	19.3	20.5	1022.3	94.0	1.46
97	11/13/172	11/13/184	10/12/190	9/11/190	7/9/219	7/9/212	20.3	18.3	20.7	1016.3	97.2	0.79
98	9/11/202	12/14/199	11/14/210	11/15/213	6/10/254	5/8/290	20.3	17.4	22.7	1012.3	93.8	1.10
99	3/5/329	1/1/315	4/5/190	5/7/207	6/9/216	6/9/221	20.1	17.9	22.2	1017.8	94.6	1.44
100	4/7/237	4/6/230	3/5/231	3/5/226	5/7/204	6/8/210	20.4	19.5	21.1	1021.0	98.4	1.49
101	5/8/221	7/9/210	8/10/209	9/11/200	9/11/202	8/10/208	20.7	20.2	21.2	1019.4	96.8	1.47
102	9/10/209	8/9/209	7/9/210	8/10/213	2/3/237	7/8/196	19.6	17.7	20.9	1017.1	96.7	0.42
103	5/6/193	6/7/191	2/2/182	8/13/54	6/8/89	4/5/166	19.1	17.7	20.2	1017.4	96.2	1.03
104	5/6/183	6/8/218	3/5/266	6/9/325	6/9/351	7/10/19	19.0	17.3	20.2	1017.3	89.3	1.13
105	5/8/29	3/5/36	3/5/33	3/6/32	4/6/88	7/10/121	17.5	16.8	18.7	1022.5	77.7	1.03
106	9/11/152	10/13/157	11/13/161	11/13/173	11/13/194	11/13/210	20.2	18.6	21.2	1018.5	93.9	1.39
107	10/12/213	9/12/216	5/7/243	3/5/300	4/7/350	4/7/7	19.0	17.2	20.9	1017.0	93.5	0.64
108	4/6/350	4/7/340	5/8/328	4/6/343	4/6/12	3/5/17	17.9	16.8	19.2	1018.1	76.5	1.06
109	2/4/21	1/2/104	1/2/225	1/1/257	2/2/163	3/4/145	18.5	17.1	20.3	1016.4	79.2	1.48
110	4/6/160	5/7/175	5/6/176	4/5/196	4/5/166	6/7/149	19.5	18.7	20.5	1013.9	86.3	1.54
111	4/6/133	3/5/116	2/4/101	4/6/69	5/7/84	5/7/105	19.5	19.1	20.0	1009.0	93.5	0.83
112	5/7/135	6/7/159	8/10/210	8/12/238	6/10/253	9/14/360	19.8	17.3	21.8	1002.3	91.2	1.39
113	6/9/339	4/6/328	4/6/313	3/5/297	4/7/307	4/8/283	18.6	16.8	20.3	1012.2	77.8	1.44
114	5/8/259	6/9/255	6/10/274	4/7/306	5/8/338	6/9/333	18.0	16.0	19.5	1012.8	81.1	1.02
115	5/8/317	3/6/307	4/7/304	4/7/267	8/13/269	8/12/302	18.1	15.6	21.1	1012.5	77.4	1.34
116	5/8/311	4/6/311	3/6/305	2/4/277	4/6/228	7/10/216	19.3	17.6	21.0	1011.3	83.1	1.32
117	9/12/215	8/12/261	5/10/281	5/8/316	4/7/356	5/7/349	19.6	18.6	20.6	1006.8	92.2	1.61
118	3/5/347	1/1/308	2/3/258	3/5/249	6/9/225	7/10/221	19.4	17.8	21.3	1009.0	90.8	1.27
119	4/7/228	4/6/225	5/7/221	3/5/280	5/8/10	4/7/37	20.4	19.3	21.1	1011.8	96.3	1.13
120	3/5/54	5/8/58	5/7/62	4/7/63	6/7/88	5/7/106	19.1	18.5	19.7	1019.5	90.1	1.53
121	3/4/110	2/3/118	1/2/112	2/3/98	2/3/147	3/5/181	19.4	18.3	20.8	1020.9	89.3	1.46
122	2/3/192	2/3/155	4/5/174	5/6/196	5/6/186	7/8/198	20.4	19.5	21.5	1019.1	93.4	1.59
123	8/9/195	9/11/190	10/12/198	9/11/207	9/11/213	7/10/224	21.4	20.8	22.6	1016.0	97.0	1.38
124	5/8/233	4/7/238	4/6/265	1/3/21	3/4/159	4/5/156	19.3	16.9	21.8	1016.2	95.9	0.52
125	2/3/95	3/5/72	4/6/63	8/9/79	9/11/89	9/12/103	19.7	18.4	20.6	1019.9	91.7	1.53
126	8/11/117	9/12/132	9/11/140	6/7/137	5/7/141	6/8/151	20.8	20.3	21.4	1021.1	96.2	1.57
127	7/8/155	7/9/166	7/8/181	7/8/182	9/11/173	11/13/174	21.0	20.6	21.4	1018.2	97.3	1.46
128	8/10/177	8/10/185	10/12/189	7/10/193	7/8/172	7/8/186	20.5	18.6	21.4	1013.8	96.4	0.48
129	6/7/159	7/9/155	6/8/198	2/3/329	5/7/345	8/11/337	19.9	17.9	20.8	1011.7	91.3	1.30
130	7/10/350	5/9/5	5/8/6	5/8/349	6/8/334	6/8/331	18.8	17.9	19.8	1013.6	80.9	1.57
131	5/8/320	4/6/319	1/2/277	3/4/256	3/5/214	6/7/194	19.3	17.8	21.1	1014.8	82.5	1.50
132	6/8/204	7/8/188	8/9/173	8/10/166	8/9/166	8/10/180	21.0	20.4	21.8	1014.5	88.6	1.31
133	8/10/171	10/12/180	10/11/181	9/10/179	9/11/179	9/11/194	21.6	20.7	22.3	1014.6	95.7	1.40
134	7/10/211	4/6/232	2/3/338	2/4/21	2/4/22	2/4/53	21.1	20.1	22.0	1018.0	94.4	1.63
135	3/5/110	2/4/107	4/5/127	4/5/138	5/6/162	8/9/192	21.5	20.8	22.3	1018.3	97.3	1.36
136	8/9/199	8/9/200	8/11/209	10/12/199	11/13/173	11/14/194	21.5	20.1	22.1	1012.8	96.4	0.70
137	10/13/204	4/7/249	4/6/285	3/5/256	4/6/237	7/10/219	21.9	20.6	23.2	1009.3	96.1	1.60
138	5/8/244	3/6/281	4/7/247	6/10/259	6/11/273	6/11/270	20.8	18.9	22.1	1008.3	85.7	1.05
139	5/8/269	4/6/249	4/6/255	3/6/278	3/7/283	4/7/260	20.2	18.9	22.4	1007.0	87.1	1.09
140	3/5/240	4/6/195	9/11/180	3/5/269	3/6/291	4/7/296	20.0	17.9	21.8	1006.7	89.7	1.40
141	3/5/292	2/4/302	3/6/300	4/6/311	4/7/310	4/7/308	21.0	19.9	22.6	1011.4	87.2	1.62
142	3/6/311	2/3/296	2/3/266	3/5/289	3/5/291	3/6/282	21.4	19.5	23.3	1016.1	89.2	1.44
143	3/5/287	3/4/232	3/5/232	3/5/244	3/6/233	5/8/222	21.6	20.5	23.1	1017.1	88.8	1.64
144	4/6/235	3/4/225	5/6/214	4/6/223	5/6/207	7/8/206	21.7	20.9	22.6	1016.3	92.6	1.63
145	6/8/200	7/8/195	5/7/210	3/5/244	5/7/214	6/8/219	22.3	20.7	23.9	1015.2	94.7	1.58
146	5/7/223	4/6/217	6/8/213	4/6/223	5/7/210	6/7/208	22.5	21.9	23.3	1017.8	96.9	1.63
147	4/6/218	4/5/214	3/5/226	2/4/245	4/5/213	6/7/212	22.6	21.8	23.9	1019.6	95.7	1.68
148	6/8/219	4/7/229	4/7/238	4/7/246	4/8/238	5/9/269	23.2	21.9	25.4	1017.5	94.8	1.21

Jul. Day	0000-0400	0400-0800	0800-1200 (WS/WG/WD)	1200-1600 (WS/WG/WD)	1600-2000 (WS/WG/WD)	2000-2400 (WS/WG/WD)	Air Temp (°C) mean	min	max	Rel. Hum. (%)	Air Press (mB)	Solar Rad. ($MJ/m^2/d$)
149	4/ 7/266	3/ 6/295	4/ 7/ 17	7/11/ 25	4/ 7/ 42	4/ 7/ 19	21.0	17.8	23.1	1019.5	88.6	1.27
150	5/ 8/ 24	6/ 9/ 63	5/ 8/ 75	5/ 8/ 55	5/ 7/ 58	4/ 6/ 74	20.8	20.1	22.2	1023.4	75.9	1.62
151	4/ 6/ 69	3/ 5/ 69	1/ 3/ 53	3/ 6/ 60	3/ 4/ 69	2/ 4/ 44	21.3	20.1	22.9	1023.8	74.7	1.68
152	2/ 4/ 20	1/ 3/356	1/ 1/267	2/ 3/287	3/ 5/306	3/ 6/294	21.5	19.8	23.5	1021.7	74.8	1.43
153	4/ 7/304	3/ 5/294	3/ 5/260	4/ 6/250	5/ 8/256	5/ 8/287	21.9	20.8	23.9	1017.5	87.5	0.90
154	5/ 8/296	4/ 6/290	3/ 5/265	3/ 7/273	4/ 8/283	4/ 8/297	23.1	21.9	24.8	1015.5	94.2	1.28
155	4/ 7/286	3/ 5/296	2/ 4/264	3/ 4/248	3/ 5/268	3/ 6/301	23.7	22.0	25.9	1016.6	94.3	1.38
156	3/ 5/320	2/ 3/323	2/ 3/306	1/ 2/297	2/ 3/215	1/ 2/ 44	23.4	22.2	25.0	1019.6	94.0	0.99
157	1/ 2/154	2/ 3/214	3/ 4/223	3/ 4/226	4/ 6/213	4/ 5/203	23.3	22.6	23.9	1020.2	92.8	1.67
158	5/ 6/181	6/ 8/177	7/ 8/191	5/ 6/188	5/ 6/164	6/ 8/154	23.6	23.0	24.3	1020.4	92.8	1.65
159	5/ 7/166	6/ 7/164	8/ 9/167	8/10/170	8/10/169	7/ 9/189	23.5	23.0	23.9	1020.7	93.1	1.68
160	7/ 8/205	7/ 8/201	7/ 9/204	6/ 9/215	5/ 8/222	5/ 8/222	23.8	22.6	25.3	1020.0	94.7	1.31
161	4/ 7/234	3/ 5/244	3/ 5/238	4/ 6/245	4/ 7/239	5/ 9/245	24.1	23.1	25.8	1019.2	95.2	1.33
162	5/ 9/254	5/ 8/250	5/ 7/253	5/ 9/250	7/11/265	8/13/268	24.6	23.3	26.5	1015.9	93.3	1.52
163	6/11/276	5/ 9/289	4/ 7/295	4/ 6/310	3/ 5/311	3/ 5/314	24.1	23.2	25.6	1015.2	91.8	0.99
164	3/ 5/291	1/ 2/301	0/ 1/331	1/ 2/ 55	1/ 2/ 28	2/ 4/231	24.0	22.8	26.7	1015.9	91.5	1.12
165	4/ 6/253	3/ 6/275	4/ 6/267	4/ 8/271	5/10/274	6/11/275	24.8	23.4	26.5	1015.8	91.8	1.42
166	6/11/276	5/ 9/288	5/ 8/288	5/ 8/308	6/ 8/333	4/ 6/346	24.7	23.9	25.7	1017.1	93.0	1.71
167	2/ 4/ 15	2/ 4/ 18	1/ 3/ 24	1/ 3/ 39	2/ 5/ 37	4/ 6/ 81	23.7	22.6	25.3	1021.3	90.7	1.59
168	6/ 8/103	6/ 8/101	6/ 7/ 76	5/ 7/ 82	6/ 7/ 83	6/ 8/105	23.5	22.7	24.0	1023.2	90.3	1.62
169	6/ 8/ 98	6/ 8/100	5/ 7/101	5/ 7/100	5/ 7/138	6/ 8/163	23.7	22.7	24.8	1021.2	92.0	1.11
170	5/ 7/165	5/ 7/153	5/ 7/164	5/ 6/161	3/ 5/159	2/ 3/171	24.4	23.6	25.8	1019.2	87.7	1.65
171	2/ 3/148	2/ 3/147	2/ 3/127	2/ 3/120	3/ 4/ 85	3/ 5/ 61	24.3	23.5	25.6	1019.8	87.6	1.69
172	3/ 5/ 81	3/ 4/127	2/ 4/112	3/ 4/ 76	3/ 4/ 66	3/ 4/ 86	24.5	23.4	25.9	1020.3	89.6	1.59
173	2/ 4/ 45	2/ 3/ 59	1/ 1/338	3/ 4/323	3/ 5/351	4/ 6/ 17	24.4	23.6	25.8	1018.4	88.8	1.42
174	3/ 6/ 24	2/ 4/ 26	2/ 4/ 27	2/ 3/ 24	2/ 4/336	3/ 5/286	24.1	22.9	26.0	1014.5	84.0	1.39
175	4/ 7/288	4/ 7/287	3/ 6/287	4/ 7/275	4/ 7/296	3/ 6/296	22.8	20.4	24.2	1009.9	93.1	0.65
176	4/ 6/320	2/ 3/337	2/ 4/ 8	2/ 4/337	4/ 7/330	5/ 7/317	22.0	18.6	25.0	1008.7	88.2	1.45
177	4/ 8/297	6/10/304	6/ 9/313	5/ 9/301	6/10/301	6/10/305	23.7	22.4	25.4	1008.3	83.5	1.64
178	6/ 9/304	5/ 9/311	5/ 8/312	5/ 7/317	4/ 7/323	5/ 8/341	23.5	22.2	24.9	1011.3	85.7	1.63
179	5/ 7/332	3/ 5/320	2/ 3/305	2/ 3/300	1/ 1/277	1/ 2/238	24.0	22.6	26.4	1016.3	87.1	1.35
180	3/ 4/222	2/ 4/213	2/ 3/216	3/ 4/216	4/ 6/193	6/ 7/196	24.4	23.7	25.5	1018.0	85.9	1.68
181	4/ 6/217	3/ 4/225	3/ 5/219	5/ 7/214	7/ 8/206	7/ 9/206	24.5	22.7	25.1	1016.9	88.3	1.41
182	8/ 9/199	8/10/211	9/12/213	7/10/218	9/12/215	12/14/207	23.9	22.5	25.1	1013.2	94.9	0.93
183	10/15/218	9/16/253	7/12/298	6/ 9/311	4/ 6/313	3/ 4/320	24.2	22.9	25.9	1012.7	91.3	1.15
184	3/ 4/340	1/ 2/ 46	2/ 3/ 81	3/ 4/ 86	5/ 6/ 73	5/ 6/ 83	23.9	23.4	25.2	1016.0	92.2	1.35
185	2/ 4/ 62	2/ 4/ 25	1/ 3/ 19	2/ 4/ 49	3/ 5/ 84	3/ 4/ 92	23.8	23.0	25.2	1018.5	88.3	1.65
186	2/ 3/ 49	3/ 4/ 66	2/ 4/ 86	2/ 4/ 89	3/ 5/ 88	4/ 6/ 93	23.7	22.8	24.5	1022.3	85.7	1.70
187	3/ 4/ 98	2/ 3/ 84	2/ 3/ 72	1/ 2/ 80	2/ 3/ 53	2/ 3/ 61	24.3	22.9	25.9	1024.2	87.0	1.68
188	1/ 2/ 70	0/ 1/318	2/ 3/249	2/ 4/240	3/ 6/229	3/ 6/283	24.5	23.3	26.6	1022.0	86.6	1.65
189	4/ 6/226	4/ 6/247	5/ 7/255	5/ 8/255	6/10/249	7/11/248	24.9	23.9	26.7	1017.3	87.4	1.19
190	7/11/242	6/10/239	5/ 9/259	5/ 9/278	5/ 9/270	5/10/276	25.3	21.9	27.1	1014.6	91.5	1.34
191	5/ 8/264	5/ 8/243	4/ 7/266	4/ 7/304	4/ 6/ 12	3/ 6/ 51	24.8	23.9	25.8	1015.2	92.1	1.64
192	2/ 4/ 33	2/ 4/ 49	2/ 3/ 73	0/ 0/319	2/ 4/207	5/ 7/212	23.9	22.2	25.4	1016.7	82.5	1.50
193	5/ 8/232	3/ 6/274	3/ 6/270	4/ 6/262	4/ 6/272	4/ 7/276	25.2	23.5	27.4	1015.5	89.8	1.46
194	5/ 8/265	4/ 7/273	3/ 5/278	3/ 5/258	4/ 7/229	5/ 8/225	25.3	23.9	27.1	1015.5	92.6	1.66
195	5/ 8/226	4/ 7/231	5/ 8/220	5/ 7/229	5/ 8/226	7/10/215	25.5	24.3	26.8	1015.2	94.1	1.67
196	6/ 9/219	7/ 9/216	6/ 9/222	4/ 6/217	6/ 8/211	6/ 8/211	25.8	25.1	26.4	1018.3	96.0	1.72
197	5/ 6/211	3/ 4/197	3/ 4/193	1/ 1/200	2/ 3/152	4/ 5/151	25.8	24.5	27.7	1019. 3	94.1	1.55
198	6/ 7/171	7/ 9/175	9/12/172	10/13/172	11/14/172	12/15/180	26.0	25.2	26.3	1018.9	92.5	1.59
199	10/12/204	8/10/208	6/ 8/210	6/ 8/210	7/ 9/204	6/ 8/210	25.6	23.4	26.4	1020.2	92.9	1.70
200	5/ 6/202	5/ 6/194	6/ 7/196	6/ 7/191	7/ 8/190	7/ 8/206	25.8	25.1	26.4	1020.3	91.5	1.68
201	6/ 8/209	5/ 6/200	7/ 8/190	8/ 9/198	7/ 8/189	7/ 9/192	25.9	25.4	26.6	1018.9	91.6	1.67
202	7/ 8/195	6/ 7/193	6/ 8/186	7/ 8/188	6/ 7/198	5/ 6/193	26.1	25.6	26.7	1021.2	91.9	1.69
203	5/ 6/206	4/ 5/196	4/ 5/197	2/ 3/184	2/ 3/170	3/ 4/163	26.5	25.1	27.8	1023. 0	90.4	1.66
204	2/ 3/171	2/ 3/199	1/ 2/237	0/ 1/ 60	2/ 4/345	3/ 5/330	26.6	25.1	28.4	1022.0	88.5	1.73

Jul. Day	0000-0400	0400-0800	0800-1200 (WS/WG/WD)	1200-1600 (WS/WG/WD)	1600-2000 (WS/WG/WD)	2000-2400 (WS/WG/WD)	Air Temp (°C) mean	min	max	Rel. Hum. (%)	Air Press (mB)	Solar Rad. ($MJ/m^2/d$)
205	3/5/311	2/4/314	2/3/306	2/4/270	3/6/306	4/7/311	25.3	23.1	26.7	1017.2	91.0	0.73
206	4/7/317	2/3/316	2/3/242	2/3/233	4/5/210	5/6/209	25.4	24.2	26.8	1016.6	89.7	1.44
207	4/6/202	5/6/196	6/8/208	5/8/217	6/8/210	7/8/204	26.2	24.8	27.0	1018.9	89.4	1.65
208	5/7/212	4/5/216	5/7/206	6/7/199	6/8/205	6/9/213	25.7	24.2	26.4	1018.7	89.9	1.38
209	8/10/209	7/9/208	6/8/222	4/7/230	7/10/217	8/10/218	25.3	22.1	27.3	1015.2	90.4	1.20
210	5/8/244	5/8/247	5/8/244	6/10/252	6/11/244	7/12/256	26.1	23.0	28.9	1012.4	91.5	1.55
211	6/11/265	5/8/267	5/9/290	4/6/314	2/4/347	2/4/14	26.1	22.3	27.8	1013.6	90.8	1.58
212	2/3/76	2/3/130	3/4/154	3/4/159	3/5/141	5/7/153	26.0	23.7	26.8	1017.6	91.3	1.42
213	5/7/156	4/5/185	5/6/204	3/5/230	4/7/235	5/8/232	26.6	23.8	28.8	1017.0	92.6	
214	5/8/245	5/8/250	5/9/263	6/10/273	6/10/276	6/10/260	26.9	26.3	28.6	1013.2	91.0	
215	6/10/242	6/10/247	7/12/245	8/14/248	4/8/280	4/6/314	24.9	21.1	28.5	1009.7	90.9	
216	2/3/239	2/3/232	3/4/207	2/3/215	4/6/213	6/8/213	24.9	23.3	26.0	1011.6	88.5	
217	6/8/199	6/7/175	6/7/167	8/10/174	9/11/155	8/10/159	24.9	20.6	26.5	1013.6	92.2	
218	9/10/152	10/12/142	9/13/130	13/18/107	17/24/119	27/34/151	25.2	22.0	26.3	1002.1	93.6	
219	24/30/202	14/21/212	8/13/221	8/11/212	9/12/201	9/11/201	25.3	24.4	25.8	1007.3	94.6	
220	8/10/197	9/11/193	9/11/196	9/11/189	10/12/184	7/9/207	25.1	21.3	26.0	1011.3	96.2	
221	6/8/207	6/8/194	8/10/193	7/8/197	6/7/182	6/7/187	25.2	24.8	25.4	1016.4	97.5	
222	5/6/189	3/4/176	4/5/152	4/5/138	3/5/116	3/5/109	25.1	24.3	26.2	1019.5	94.9	
223	4/5/101	5/7/98	5/7/95	7/8/81	7/9/81	5/7/103	25.4	24.0	25.9	1018.8	93.9	
224	5/7/102	5/6/97	5/6/101	5/7/94	4/6/102	4/5/132	25.5	25.0	26.3	1018.1	93.5	
225	4/5/148	3/4/127	3/5/112	6/8/128	7/8/140	4/5/142	25.5	23.5	26.7	1018.4	92.9	
226	3/5/127	5/6/133	5/7/157	6/7/161	6/8/157	7/8/150	25.0	22.6	25.8	1018.1	94.3	
227	8/10/140	9/11/149	7/9/191	7/8/166	7/9/165	7/9/168	24.9	22.0	25.9	1017.4	93.2	
228	7/8/176	7/8/168	8/10/175	8/9/183	8/10/181	8/10/184	25.4	25.0	26.0	1017.1	94.4	
229	8/9/189	7/8/183	8/10/186	9/11/187	9/11/201	9/11/199	25.6	25.0	26.3	1017.9	95.0	
230	7/9/205	7/8/197	7/9/199	6/8/202	5/6/200	5/6/194	25.7	25.2	26.3	1020.5	96.4	
231	4/5/198	4/5/199	3/4/204	2/2/223	2/3/177	2/3/137	26.1	24.7	27.9	1020.9	92.1	
232	1/2/115	1/2/136	2/3/167	1/2/233	1/2/90	1/2/53	26.6	25.1	28.2	1020.1	90.5	
233	1/1/326	1/2/359	1/2/30	1/1/321	1/2/356	2/3/351	26.3	25.2	27.7	1018.9	90.2	
234	3/5/5	1/2/343	1/2/290	2/3/255	2/4/279	3/6/296	26.2	25.0	27.8	1017.1	90.0	
235	3/5/290	2/4/265	3/5/254	3/5/266	4/7/270	4/8/271	26.3	23.6	27.7	1014.9	88.7	
236	4/8/278	4/8/267	5/8/258	5/8/260	5/9/276	6/11/272	26.4	23.3	28.1	1011.8	89.3	
237	6/10/276	5/9/271	5/9/264	5/10/274	4/7/281	3/6/300	25.6	23.1	27.8	1009.8	93.3	
238	2/4/317	2/3/247	3/5/256	2/4/301	1/2/294	1/2/150	24.1	22.6	25.5	1010.3	95.8	
239	2/3/123	2/3/99	4/6/85	10/13/87	11/13/88	9/11/88	24.7	22.5	25.6	1011.6	88.7	
240	7/10/83	7/9/61	7/9/52	7/10/58	6/8/65	4/6/102	25.2	24.4	27.3	1014.7	83.1	
241	3/4/91	6/8/83	7/9/70	5/7/54	3/5/35	4/6/64	25.2	23.4	26.2	1015.0	86.7	
242	2/4/48	3/5/53	3/5/80	2/4/117	2/4/147	3/4/153	25.2	24.2	26.5	1014.7	85.3	
243	4/6/153	6/8/173	5/7/199	4/6/232	3/5/254	2/3/227	25.2	23.3	27.8	1012.4	93.1	
244	3/4/155	3/5/131	3/5/49	4/6/340	3/5/323	3/5/333	25.9	24.5	27.4	1013.1	92.2	
245	2/3/300	2/3/237	4/5/197	6/8/198	6/8/198	6/8/203	25.9	24.4	27.0	1016.2	91.9	
246	6/7/202	6/7/189	7/8/181	6/7/177	4/5/171	4/5/158	26.3	25.6	27.3	1016.8	91.9	
247	5/6/170	4/5/166	4/6/154	4/5/177	3/4/149	3/4/150	26.4	25.2	27.5	1016.7	91.6	
248	3/4/145	1/1/123	4/5/151	3/5/151	3/4/145	3/4/141	25.9	23.7	27.6	1016.2	91.0	
249	3/5/110	3/6/117	3/6/114	4/5/98	4/6/90	6/7/83	25.8	25.4	26.2	1012.9	88.9	
250	7/9/70	7/9/65	7/10/56	3/6/50	5/8/32	6/11/31	25.6	23.6	26.3	1005.1	90.1	
251	8/12/18	7/11/15	6/10/3	6/10/342	7/11/325	8/12/321	25.3	22.7	26.2	1000.5	90.4	
252	8/12/327	8/12/321	7/11/313	6/10/300	5/9/294	6/10/299	25.3	24.6	26.3	1005.9	82.9	
253	5/9/289	5/8/288	4/7/287	4/6/283	4/7/286	4/7/289	25.4	24.6	26.7	1009.8	82.5	
254	4/6/292	3/5/274	3/4/258	3/4/251	2/4/247	2/4/253	25.3	24.2	27.9	1013.5	83.9	
255	2/4/235	2/3/228	1/1/292	2/2/312	0/1/284	2/3/148	25.3	24.0	26.8	1016.2	86.8	
256	1/2/119	2/3/87	2/4/70	3/4/71	4/5/86	3/5/98	25.1	24.3	26.0	1018.3	90.9	
257	2/4/103	3/4/77	3/4/69	3/4/99	2/4/104	2/4/110	25.4	24.6	26.9	1018.7	92.0	
258	2/4/108	3/4/103	4/5/144	4/5/167	4/5/168	4/5/165	25.7	24.4	26.7	1018.6	89.6	
259	4/5/167	3/4/171	3/4/148	4/5/152	3/5/155	3/4/146	25.9	25.1	27.7	1019.1	89.5	
260	2/3/128	3/4/119	4/5/138	4/5/141	5/6/136	5/6/159	25.8	24.8	27.0	1018.9	90.2	

Jul. Day	0000-0400	0400-0800	0800-1200	1200-1600	1600-2000	2000-2400	Air Temp (°C) mean	min	max	Rel. Hum. (%)	Air Press (mB)	Solar Rad. ($MJ/m^2/d$)
			(WS/WG/WD)									
261	5/6/166	4/5/152	5/7/148	5/7/157	7/8/140	6/8/136	25.6	23.9	26.3	1016.7	90.0	
262	6/8/141	5/7/137	6/8/120	7/11/119	9/12/98	8/11/115	25.4	24.2	26.5	1018.0	91.2	
263	10/12/132	10/12/136	7/11/124	8/11/122	8/12/120	10/13/128	26.1	25.5	26.4	1019.4	92.0	
264	9/11/132	7/10/118	8/11/113	8/11/110	6/10/118	6/9/117	25.7	23.7	26.3	1020.0	91.2	
265	5/8/114	6/8/99	6/8/106	4/7/112	4/7/117	7/9/102	25.4	25.0	25.9	1019.4	90.9	
266	6/8/105	8/9/95	9/11/99	9/11/103	7/10/127	11/14/161	25.3	23.9	26.5	1015.6	91.6	
267	13/16/178	12/15/186	9/12/195	8/10/202	5/7/200	6/7/181	25.8	23.9	26.4	1015.9	92.2	
268	4/5/188	1/2/178	1/1/142	1/2/119	2/3/103	2/3/99	25.3	24.0	26.4	1018.0	93.0	
269	3/4/125	3/4/174	2/3/198	2/3/225	2/3/224	4/5/200	25.6	24.7	27.1	1017.0	92.5	
270	5/7/207	3/5/225	3/5/236	4/6/225	4/7/232	5/9/231	25.6	24.8	26.9	1014.6	91.8	
271	5/8/259	6/9/311	4/6/61	6/11/37	8/14/44	10/15/47	23.3	21.0	26.2	1016.0	88.9	
272	11/15/55	11/14/59	11/13/79	9/12/79	10/13/85	8/11/89	23.3	22.7	23.9	1019.2	80.4	