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THE VENTS 1990 CLEFT SEGMENT PLUME MONITORING EXPERIMENT: PHYSICAL AND CHEMICAL DATA, NOAA SHIP DISCOVERER, SEPTEMBER 8-29, 1990

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Abstract. This report summarizes salinity, temperature, nutrient, and total suspended matter data collected during the NOAA VENTS cruise in September, 1990. These data were collected from September 8 to 29, 1990 over the Juan de Fuca Ridge covering an area from 44°34'N to 45°11'N and 130°06'W to 130°24'W.

1.0 INTRODUCTION

The National Oceanic and Atmospheric Administration (NOAA) VENTS Program was established in 1984 to study the oceanic effects of hydrothermal activity along seafloor spreading centers. VENTS Program scientists from the Pacific Marine Environmental Laboratory (PMEL) have conducted intensive oceanographic research on the Cleft Segment of the Juan de Fuca Ridge spreading center located in the northeast Pacific Ocean basin.

The Juan de Fuca Ridge is a medium rate spreading center, consisting of the Cleft, Vance, Axial, Cobb, Endeavor, and West Valley segments. The ridge is bounded on the south by the Blanco Fracture Zone and on the north by the Sovanco Fracture Zone.

As part of the continuing VENTS Program research effort, a chemical oceanography cruise was conducted in September 1990 aboard the NOAA Ship *Discoverer* with scientists from NOAA, the University of Washington, the Lamont-Doherty Geological Observatory, and the Florida Institute of Technology. This cruise concentrated on physical oceanography and geochemical studies of the nonbuoyant hydrothermal plumes over the Cleft segment (Fig. 1) in order to quantitatively assess the impact of hydrothermal emissions on the seawater chemistry of the northeast Pacific Ocean. This report includes the complete set of hydrographic, nutrient, and total suspended matter data collected on the cruise (Appendix A) and a description of the sampling and analytical methods employed.

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North Cleft Segment Plume Monitoring Experiment
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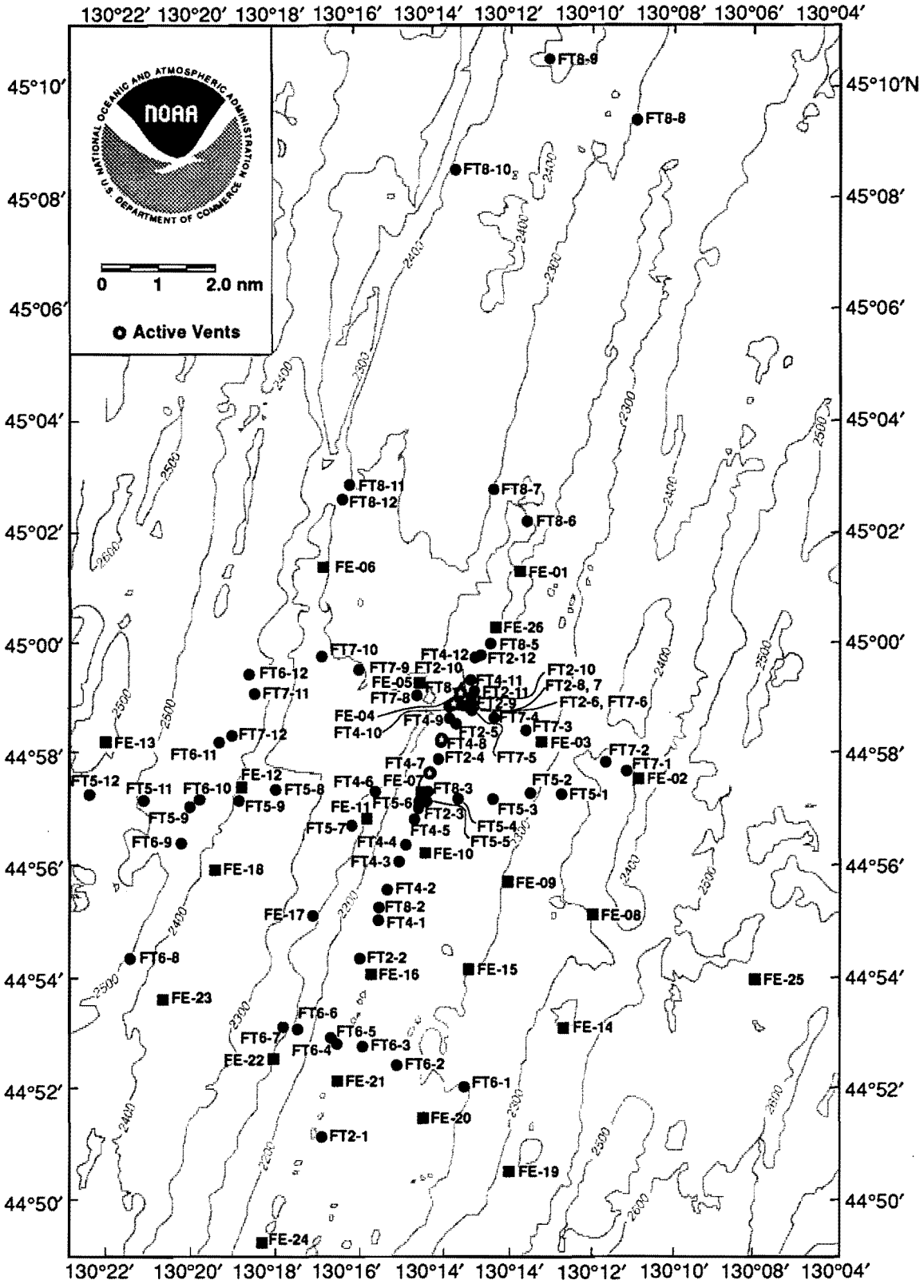

Fig. 1. Station locations for the VENTS 1990 Plume Monitoring Experiment.

2.0 SAMPLING METHODS

2.1 Sample and Data Collection

2.1.1 Seawater Samples

Seawater samples were collected in standard 30-liter Niskin™ bottles fixed to a 12-position General Oceanics™ sampling rosette. The Niskin™ bottles were internally coated with Teflon and modified with Teflon stopcocks. The sampling rosette was also equipped with a CTD-transmissometer, altimeter, and pinger locator. It was lowered into the water using standard hydrographic cable. The bottles were electronically tripped at pre-determined depths via a signal from the shipboard deck unit and closed by use of silastic tubing. Upon retrieval the Niskin™ bottles were removed from the rosette and placed in a non-contaminating pressure filtration rack for sub-sampling (Feely *et al.*, 1991).

Salinity samples were collected from the Niskin™ bottle in 250 ml citrate bottles.

Nutrient samples were collected from the Niskin™ bottle in HDPE 60 ml bottles prepared using 10% HCL and rinsed with deionized water. Unfiltered nutrient samples were taken directly from the Niskin™ bottle. Filtered nutrient samples were taken downline of the 0.4 μm pore size Nuclepore polycarbonate filter during the total suspended matter pressure filtration of the seawater. All nutrients were analyzed at sea within twelve hours after collection.

Total suspended matter samples were collected by 12 psi nitrogen pressure filtration of the seawater in the Niskin™ bottle through 37 mm diameter, 0.4 μm pore size Nuclepore polycarbonate filters. As described in detail in Feely *et al.* (1991) an air filter was placed in the tygon line connecting the nitrogen gas and the Niskin™ bottle to prevent contamination of the seawater sample from particulates in the gas. To ensure that all particulates were filtered out of the seawater the filtration racks were designed to tilt the Niskin™ bottle at a 45° angle and during filtration the bottle was gently agitated to keep particles in suspension. The seawater filtrate was directed into pre-calibrated 20 L plastic jerricans and volumes were measured to the nearest 100 mL. Depending upon the sample's proximity to the ridge crest it took anywhere from 2 to 8 hours to filter 20 L of seawater. All filters were loaded and unloaded from the teflon savillex holders inside a laminar flow hood. After filtration the particulate samples were rinsed with pH 8.0 deionized water then dried in a desiccator under vacuum.

2.1.2. Conductivity-Temperature-Depth-Transmissometer Data

CTD-transmissometer data was collected using a Sea-Bird conductivity-temperature-depth (CTD) sensor and a Sea Tech 0.25 m path length beam transmissometer secured to the frame of a General Oceanics™ sampling rosette. CTD information at the sampling depths was recorded shipboard on a MicroVax data acquisition system at trip time by taking a ten second average of the continuously collected one second average data.

2.2 Sample Analysis

2.2.1. Bottle Salinity

Bottle salinity analysis was conducted by NOAA Ship *Discoverer* personnel on a shipboard Guildline Autosal™. Samples were thermostated to room temperature, 18°C, before analysis. Final salinity was determined by averaging three measurements from each citrate bottle.

2.2.2. Nutrients

University of Washington silicic acid analysis was conducted by Kathy Krogslund employing a Technicon Autoanalyzer and the techniques described by Whitledge (1981). The average precision of the replicate analyses was ±0.5 μmol/l. Alpha Inorganics™ reagent grade Na_2SiF_6 was the standard used for analysis. This standard was calibrated against Lamont-Doherty standards and corrections were applied.

Lamont-Doherty silicic acid analysis was performed by Rick Mortlock employing the manual molybdate blue spectrophotometric method (Fanning and Pilson, 1973). The precision was ±0.2 μmol/l. Standardization was against three sets of fused quartz silica primary standards (20 mmol/l-Si). Secondary and tertiary standards (accurate to ±0.3%) were prepared in Sargasso Seawater (35‰) by serial dilution of the primary standard and are traceable to GEOSECS North Pacific Deep Water.

University of Washington phosphate analysis was conducted by Kathy Krogslund of the University of Washington using a Technicon AutoAnalyzer and the techniques described by Whitledge (1981). The average precision of replicate analyses was ±20.0 nmol/l. Fisher™ certified primary standard KH_2PO_4 was used for standardization.

2.2.3 Total Suspended Matter

Total suspended matter filters were weighed after desiccation on a Cahn 26™ Automatic Electrobalance which has an accuracy of ±0.005% of the true sample mass. Corrections for changes in filter weight were determined by re-weighing reference filters, resulting in a net weight of particulate suspended matter. Given the net weight and volume of water filtered, total suspended matter concentrations were determined.

2.2.4 Conductivity-Temperature-Depth-Transmissometer Data

Measured conductivity was converted to salinity using standard UNESCO algorithms (Fofonoff and Millard, 1983). The conductivity data was corrected by direct comparison of bottle salinity and CTD salinity values. An average salinity offset was determined for each cast.

Potential temperature was calculated using standard UNESCO algorithms (Fofonoff and Millard, 1983) and the CTD measured values of in situ temperature and salinity.

In situ density was calculated using standard UNESCO algorithms (Fofonoff and Millard, 1983) and the CTD measured values of in situ temperature and salinity.

Potential density was determined using standard UNESCO algorithms (Fofonoff and Millard, 1983) and the CTD measured salinity values.

Attenuation was measured and final values calculated as described in detail in Bartz *et al.* (1978).

The temperature anomaly ($\Delta\theta$) of each cast was calculated relative to ambient water of the same potential density using the method of Lupton *et al.* (1985) with the equation

$$\Delta\theta = (\theta + m \times \sigma_\theta) - b$$

where θ and σ_θ are the potential temperature and potential density, respectively, of the linear equation of the θ versus σ_θ trend for water immediately above the hydrothermal plume where the hydrographic effect of the hydrothermal emissions is negligible. The equation used for calculating the temperature anomaly for each individual cast is listed in the bottom left-hand portion of each station table.

3.0 STATION DATA

3.1 Station Locations

The data represented in Appendix A were collected from September 8 to 29, 1990 over the Juan de Fuca Ridge covering an area from 44°34′N to 45°11′N and 130°06′W to 130°24′W. LORAN-C was used for shipboard navigation and a listing of each station's latitude, longitude, and date of occupation is given in Table 1.

Vertical CTD profiles were taken at the majority of stations. Additionally, given the dynamic nature of hydrothermal plumes, a limited number of lengthy, horizontal tows, called "to-yos", were also conducted. To-yos were conducted by regularly cycling the CTD rosette package between the top and bottom layers of the hydrothermal plume. The ship's towing speed varied from 2–3 km/hr.

A bathymetric map of the cruise project area overlain with vertical cast positions and tow samples is given in Fig. 1.

3.2 Individual Station Data

The header on the data tables in Appendix A contains the station identification and consecutive cast number, the date the station was occupied, and the latitude and longitude of the station. The data is listed in rows by Niskin™ bottle number and in 19 columns as follows:

Column 1: Niskin™ bottle number
Column 2: Depth in meters
Column 3: Depth in decibars
Column 4: In situ temperature (°C)
Column 5: Potential temperature (°C)

Column 6: Temperature anomaly (°C)
Column 7: Salinity-CTD (PSU)
Column 8: Salinity-Bottle (PSU)
Column 9: Attenuation (1/m)
Column 10: In situ density calculated using CTD salinity
Column 11: In situ density calculated using bottle salinity
Column 12: Potential density calculated using CTD salinity
Column 13: Potential density calculated using bottle salinity
Column 14: Unfiltered H_4PO_4 (μmol/l)
Column 15: Filtered H_4PO_4 (μmol/l)
Column 16: University of Washington unfiltered H_4SiO_4 (μmol/l)
Column 17: University of Washington filtered H_4SiO_4 (μmol/l)
Column 18: Lamont-Doherty H_4SiO_4 (μmol/l)
Column 19: Total suspended matter (μg/l)

The lower left portion of each table displays the equation used to calculate the station's temperature anomaly and indicates additional samples which were collected from the cast but not included in this data report. For further information on these samples please contact the following individuals at the Pacific Marine Environmental Laboratory, Seattle, Washington.

Helium data: Dr. John Lupton
Particulate trace elements: Dr. Richard A. Feely
Dissolved iron and manganese: Mr. Gary J. Massoth

4.0 ACKNOWLEDGMENTS

This research was supported by the National Oceanic and Atmospheric Administration's VENTS Program. We gratefully acknowledge the assistance and professionalism of the Captain and crew of the NOAA Ship *Discoverer* in the collection of these data.

TABLE 1
VENTS 1990 LEG IV (SEPTEMBER, 1990)
STATION LOCATIONS

STATION NAME	DATE OCCUPIED	LATITUDE (N)	LONGITUDE (W)	NOTES
FT1C1*	09-SEP-90	44° 39.0′	130° 23.6′	
FT2C2*	10-SEP-90	44° 59.0′	130° 13.0′	
FE1C3	11-SEP-90	45° 1.4′	130° 11.8′	
FE1C4	11-SEP-90	45° 1.0′	130° 12.2′	
FE2C5	11-SEP-90	44° 57.6′	130° 8.8′	
FT3C6				No Data
FT4C7*	12-SEP-90	44° 57.7′	130° 14.0′	
FE3C8	12-SEP-90	44° 58.1′	130° 11.3′	
FE3C9	13-SEP-90	44° 58.4′	130° 11.1′	
FE4C10	13-SEP-90	44° 58.9′	130° 13.3′	
FE4C11	13-SEP-90	44° 58.9′	130° 13.2′	
FE4C12	13-SEP-90	44° 59.1′	130° 13.3′	
FE5C13	13-SEP-90	44° 59.3′	130° 14.3′	
FE5C14	14-SEP-90	44° 59.5′	130° 13.9′	
FE6C15	14-SEP-90	45° 1.4′	130° 16.7′	
FT5C16*	14-SEP-90	44° 57.2′	130° 13.3′	
FE7C17	15-SEP-90	44° 57.3′	130° 14.2′	
FE7C18	15-SEP-90	44° 57.3′	130° 14.1′	
FE7C19	15-SEP-90	44° 57.2′	130° 14.2′	
FE8C20	15-SEP-90	44° 55.1′	130° 9.9′	
FE8C21	15-SEP-90	44° 55.1′	130° 10.1′	
FE9C22	15-SEP-90	44° 55.7′	130° 12.0′	
FE9C23	16-SEP-90	44° 55.7′	130° 12.0′	
FE14C24	16-SEP-90	44° 53.1′	130° 10.6′	
FE7C25	16-SEP-90	44° 57.0′	130° 14.3′	
FE1OC26	17-SEP-90	44° 56.2′	130° 14.1′	
FE1OC27	17-SEP-90	44° 56.2′	130° 14.1′	
FE1OC28	17-SEP-90	44° 56.2′	130° 14.1′	
FE1OC29	17-SEP-90	44° 55.3′	130° 14.3′	
FE13C30				Bad CTD
FE13C31				Bad CTD
FE13C32	18-SEP-90	44° 57.9′	130° 21.6′	
FE12C33	19-SEP-90	44° 57.4′	130° 18.7′	P04 Bkgrd Sta.
FE12C34	19-SEP-90	44° 57.8′	130° 18.2′	
FE12C35	19-SEP-90	44° 57.8′	130° 18.1′	

*NOTE: LAT/LONG is approximate, see Table 2.

TABLE 1 (Continued)
VENTS 1990 – LEG IV
(SEPTEMBER, 1990)
STATION LOCATIONS

STATION NAME	DATE OCCUPIED	LATITUDE (N)	LONGITUDE (W)	NOTES
FE11C36	20-SEP-90	44° 56.9′	130° 15.6′	
FE11C37	20-SEP-90	44° 56.6′	130° 16.0′	
FE11C38	20-SEP-90	44° 56.7′	130° 16.1′	
FE18C39	20-SEP-90	44° 55.9′	130° 19.3′	
FE18C40	21-SEP-90	44° 55.6′	130° 19.7′	
FE17C41				Bottles Contaminated
FE17C42	21-SEP-90	44° 55.1′	130° 16.9′	
FE17C43	21-SEP-90	44° 55.1′	130° 17.6′	
FE23C44	21-SEP-90	44° 53.6′	130° 20.6′	
FE23C45	22-SEP-90	44° 53.3′	130° 20.7′	
FE16C46	22-SEP-90	44° 54.1′	130° 15.5′	
FE16C47	22-SEP-90	44° 54.3′	130° 14.9′	
FE16C48	23-SEP-90	44° 54.1′	130° 15.4′	
FE15C49	23-SEP-90	44° 54.2′	130° 13.0′	
FE15C50	23-SEP-90	44° 54.1′	130° 12.8′	
FE19C51	23-SEP-90	44° 50.6′	130° 12.0′	
FE19C52	23-SEP-90	44° 50.7′	130° 11.9′	
FE25C53	23-SEP-90	44° 54.0′	130° 5.9′	P04 Bkgrd Sta.
FE14C54	24-SEP-90	44° 53.1′	130° 10.4′	
FE21C55	24-SEP-90	44° 52.1′	130° 16.3′	
FE21C56	24-SEP-90	44° 51.9′	130° 16.3′	
FE24C57	24-SEP-90	44° 49.2′	130° 18.1′	
FE20C58	24-SEP-90	44° 51.5′	130° 14.1′	
FE20C59	24-SEP-90	44° 51.5′	130° 15.1′	
FE22C60	25-SEP-90	44° 52.6′	130° 18.0′	
FE22C61	25-SEP-90	44° 52.3′	130° 18.0′	
FT6C62*	25-SEP-90	44° 52.9′	130° 16.4′	
FT7C63*	26-SEP-90	44° 58.8′	130° 13.1′	
FT8C64*	27-SEP-90	45° 0.0′	130° 12.5′	
FE26C65	28-SEP-90	45° 0.3′	130° 12.4′	
FE6C66	28-SEP-90	45° 0.4′	130° 16.9′	
FE27C67	28-SEP-90	44° 41.3′	130° 21.7′	

*NOTE: LAT/LONG is approximate, see Table 2.

TABLE 2
VENTS 1990 – LEG IV
(SEPTEMBER, 1990)
TOW NISKIN™ TRIP LOCATIONS

STATION NAME	DATE OCCUPIED	NISKIN NO.	LATITUDE (N)	LONGITUDE (W)
FT1C1	09-SEP-90	9	44° 34.3′	130° 25.3′
FT1C1	09-SEP-90	3	44° 35.9′	130° 24.5′
FT1C1	09-SEP-90	22	44° 38.0′	130° 23.6′
FT1C1	09-SEP-90	26	44° 39.0′	130° 23.6′
FT1C1	09-SEP-90	11	44° 39.0′	130° 23.6′
FT1C1	09-SEP-90	17	44° 39.0′	130° 23.6′
FT1C1	09-SEP-90	6	44° 39.0′	130° 23.6′
FT1C1	09-SEP-90	13	44° 39.0′	130° 23.6′
FT1C1	09-SEP-90	31	44° 39.0′	130° 23.6′
FT1C1	09-SEP-90	25	44° 39.0′	130° 23.6′
FT1C1	09-SEP-90	15	44° 40.1′	130° 22.4′
FT1C1	09-SEP-90	1	44° 41.2′	130° 22.0′
FT2C2	10-SEP-90	12	44° 51.2′	130° 16.6′
FT2C2	10-SEP-90	19	44° 54.4′	130° 15.7′
FT2C2	10-SEP-90	10	44° 57.0′	130° 14.3′
FT2C2	10-SEP-90	16	44° 57.9′	130° 13.8′
FT2C2	10-SEP-90	23	44° 58.6′	130° 13.3′
FT2C2	10-SEP-90	21	44° 58.8′	130° 13.1′
FT2C2	10-SEP-90	30	44° 58.9′	130° 13.1′
FT2C2	10-SEP-90	27	44° 59.0′	130° 13.0′
FT2C2	10-SEP-90	2	44° 59.1′	130° 13.0′
FT2C2	10-SEP-90	18	44° 59.2′	130° 12.9′
FT2C2	10-SEP-90	14	44° 59.2′	130° 12.7′
FT4C7	12-SEP-90	17	44° 55.0′	130° 15.3′
FT4C7	12-SEP-90	15	44° 55.6′	130° 15.0′
FT4C7	12-SEP-90	10	44° 56.1′	130° 14.8′
FT4C7	12-SEP-90	3	44° 56.4′	130° 14.6′
FT4C7	12-SEP-90	13	44° 56.9′	130° 14.4′
FT4C7	12-SEP-90	6	44° 57.2′	130° 14.3′
FT4C7	12-SEP-90	26	44° 57.7′	130° 14.0′
FT4C7	12-SEP-90	9	44° 58.3′	130° 13.7′
FT4C7	12-SEP-90	5	44° 58.7′	130° 13.5′
FT4C7	12-SEP-90	27	44° 58.9′	130° 13.4′
FT4C7	12-SEP-90	11	44° 59.4′	130° 13.0′
FT4C7	12-SEP-90	2	44° 59.8′	130° 12.9′

TABLE 2 (Continued)
VENTS 1990 – LEG IV
(SEPTEMBER, 1990)
TOW NISKIN™ TRIP LOCATIONS

STATION NAME	DATE OCCUPIED	NISKIN NO.	LATITUDE (N)	LONGITUDE (W)
FT5C16	14-SEP-90	26	44° 57.3′	130° 10.7′
FT5C16	14-SEP-90	3	44° 57.3′	130° 11.5′
FT5C16	14-SEP-90	13	44° 57.2′	130° 12.4′
FT5C16	14-SEP-90	9	44° 57.2′	130° 13.3′
FT5C16	14-SEP-90	2	44° 57.2′	130° 14.1′
FT5C16	14-SEP-90	5	44° 57.3′	130° 15.2′
FT5C16	14-SEP-90	22	44° 56.7′	130° 15.9′
FT5C16	14-SEP-90	15	44° 57.4′	130° 17.9′
FT5C16	14-SEP-90	1	44° 57.2′	130° 18.8′
FT5C16	14-SEP-90	10	44° 57.0′	130° 19.9′
FT5C16	14-SEP-90	27	44° 57.2′	130° 21.1′
FT5C16	14-SEP-90	24	44° 57.3′	130° 22.5′
FT6C62	25-SEP-90	23	44° 52.1′	130° 13.1′
FT6C62	25-SEP-90	19	44° 52.5′	130° 14.8′
FT6C62	25-SEP-90	18	44° 52.8′	130° 15.6′
FT6C62	25-SEP-90	24	44° 52.8′	130° 16.3′
FT6C62	25-SEP-90	25	44° 52.9′	130° 16.4′
FT6C62	25-SEP-90	27	44° 53.1′	130° 17.2′
FT6C62	25-SEP-90	6	44° 53.1′	130° 17.6′
FT6C62	25-SEP-90	22	44° 54.3′	130° 21.4′
FT6C62	25-SEP-90	30	44° 56.4′	130° 20.2′
FT6C62	25-SEP-90	16	44° 57.2′	130° 19.6′
FT6C62	25-SEP-90	26	44° 58.2′	130° 19.3′
FT6C62	25-SEP-90	2	44° 59.4′	130° 18.5′
FT7C63	26-SEP-90	1	44° 57.7′	130° 9.1′
FT7C63	26-SEP-90	9	44° 58.5′	130° 11.6′
FT7C63	26-SEP-90	29	44° 58.7′	130° 12.4′
FT7C63	26-SEP-90	21	44° 58.8′	130° 13.0′
FT7C63	26-SEP-90	8	44° 58.8′	130° 13.1′
FT7C63	26-SEP-90	3	44° 58.9′	130° 13.4′
FT7C63	26-SEP-90	10	44° 59.1′	130° 14.3′
FT7C63	26-SEP-90	15	44° 59.5′	130° 15.8′
FT7C63	26-SEP-90	5	44° 59.7′	130° 16.7′
FT7C63	26-SEP-90	12	44° 59.1′	130° 18.4′
FT7C63	26-SEP-90	11	44° 58.3′	130° 18.9′

TABLE 2 (Continued)
VENTS 1990 – LEG IV
(SEPTEMBER, 1990)
TOW NISKIN™ TRIP LOCATIONS

STATION NAME	DATE OCCUPIED	NISKIN NO.	LATITUDE (N)	LONGITUDE (W)
FT8C64	27-SEP-90	30	44° 55.3′	130° 15.3′
FT8C64	27-SEP-90	19	44° 55.3′	130° 15.3′
FT8C64	27-SEP-90	26	44° 57.3′	130° 14.1′
FT8C64	27-SEP-90	22	44° 58.9′	130° 13.3′
FT8C64	27-SEP-90	6	45° 0.0′	130° 12.5′
FT8C64	27-SEP-90	18	45° 2.2′	130° 11.6′
FT8C64	27-SEP-90	27	45° 2.9′	130° 12.4′
FT8C64	27-SEP-90	14	45° 9.4′	130° 8.9′
FT8C64	27-SEP-90	24	45° 10.5′	130° 11.1′
FT8C64	27-SEP-90	23	45° 8.5′	130° 13.5′
FT8C64	27-SEP-90	2	45° 2.9′	130° 16.1′
FT8C64	27-SEP-90	16	45° 2.6′	130° 16.2′

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APPENDIX A:

Station Data Tables

VENTS 1990 - LEG IV
Station FT1 Cast 1 09 SEP 1990
LAT: 44 39.0N LONG: 130 23.6W

Niskin #	Depth (m)	Depth (db)	Insitu Temp.	Potential Temp.	Temp. Anom.	Salinity (CTD)	Salinity (Bottle)	Atten. (1/m)	Sigma-t (CTD)	Sigma-t (Bottle)	Sigma-Theta (CTD)	Sigma-Theta (Bottle)
9	2184.2	2213.6	1.883	1.730	0.022	34.610	34.609	0.383	27.668	27.668	27.680	27.679
3	2115.2	2143.3	1.901	1.754	0.029	34.608	34.608	0.394	27.665	27.665	27.677	27.677
22	2172.5	2201.7	1.886	1.734	0.017	34.608	34.609	0.383	27.667	27.667	27.678	27.679
26	2185.0	2214.5	1.898	1.745	0.027	34.609	34.611	0.389	27.666	27.668	27.678	27.680
11	2147.8	2176.6	1.905	1.755	0.034	34.609	34.608	0.393	27.666	27.665	27.677	27.677
17	2111.6	2139.7	1.906	1.759	0.036	34.609	34.610	0.395	27.666	27.667	27.677	27.678
6	2048.7	2075.7	1.897	1.756	0.023	34.606	34.607	0.387	27.664	27.665	27.675	27.676
13	1998.5	2024.5	1.924	1.787	0.003	34.596	34.598	0.377	27.654	27.656	27.665	27.666
31	1947.7	1972.8	1.952	1.819	-0.000	34.590	34.586	0.375	27.647	27.644	27.657	27.654
25	1899.1	1923.3	1.962	1.833	-0.003	34.587	34.586	0.375	27.644	27.643	27.654	27.653
15	2108.2	2136.2	1.917	1.770	0.039	34.608	34.610	0.401	27.664	27.666	27.675	27.677
1	2114.8	2142.9	1.915	1.768	0.038	34.608	34.607	0.400	27.664	27.664	27.676	27.675

Niskin #	PO4-UNF (umol/l)	PO4-FIL (umol/l)	SiO4-UF/UW (umol/l)	SiO4-F/UW (umol/l)	SiO4/LDGO (umol/l)	TSM (ug/l)
9	2.851	2.827	182.03	181.65	180.745	37.05
3	2.848	2.819	181.94	181.82	180.745	53.51
22	2.850	2.832	181.31	180.53	180.276	27.50
26	2.831	2.819	181.35	181.91	180.276	33.92
11	2.844	2.810	181.66	181.95	180.276	36.05
17	2.841	2.807	181.97	182.13	180.975	35.99
6	2.844	2.815	181.88	180.70	180.276	30.58
13	2.857	2.850	179.38	179.40	177.952	27.69
31	2.881	2.869	177.69	177.97	176.785	22.89
25	2.884	2.882	178.13	178.15	176.316	36.67
15	2.821	2.787	182.31	183.14	180.975	52.50
1	2.818	2.784	182.62	183.45	180.745	46.70

D-Theta = (ptemp + (4.85 * pden)) - 135.957
Additional Samples Collected:
Helium
Particulate Trace Elements
Dissolved Fe and Mn

VENTS 1990 - LEG IV
Station FT2 Cast 2 10 SEP 1990
LAT: 44 59.0N LONG: 130 13.0W

Niskin #	Depth (m)	Depth (db)	Insitu Temp.	Potential Temp.	Temp. Anom.	Salinity (CTD)	Salinity (Bottle)	Atten. (1/m)	Sigma-t (CTD)	Sigma-t (Bottle)	Sigma-Theta (CTD)	Sigma-Theta (Bottle)
12	2187.9	2217.5	1.878	1.725	0.022	34.612	34.612		27.670	27.670	27.682	27.682
19	2170.1	2199.4	1.902	1.750	0.034	34.611	34.612		27.668	27.669	27.679	27.680
10	2165.9	2195.0	1.930	1.778	0.052	34.611	34.613		27.666	27.667	27.677	27.679
16	2198.2	2228.0	1.936	1.781	0.069	34.615	34.614		27.668	27.667	27.680	27.679
23	2163.8	2192.9	1.929	1.777	0.052	34.611	34.611		27.666	27.666	27.677	27.677
21	2225.4	2255.7	1.922	1.765	0.052	34.613	34.611		27.668	27.666	27.680	27.678
30	2199.3	2229.1	1.921	1.766	0.045	34.611	34.612		27.666	27.667	27.678	27.679
27	2099.7	2127.6	1.925	1.779	0.053	34.611	34.611		27.666	27.666	27.677	27.677
2	2050.0	2077.0	1.923	1.781	0.058	34.612	34.613		27.667	27.668	27.678	27.679
18	1901.8	1926.2	1.966	1.836	-0.005	34.587	34.585		27.644	27.642	27.654	27.652
14	2082.7	2110.3	1.924	1.779	0.045	34.609	34.610		27.664	27.665	27.676	27.676

Niskin #	PO4-UNF (umol/l)	PO4-FIL (umol/l)	SiO4-UF/UW (umol/l)	SiO4-F/UW (umol/l)	SiO4/LDGO (umol/l)	TSM (ug/l)
12	2.915	2.903	180.94	180.54	180.306	20.57
19	2.908	2.857	181.68	183.21	180.745	48.07
10	2.901	2.861	184.09	183.42	182.142	54.56
16	2.883	2.816	184.30	182.87	182.611	97.21
23	2.826	2.859	182.33	182.57	181.443	71.00
21	2.907	2.879	183.70	183.17	181.912	25.23
30	2.840	2.883	181.86	182.87	181.673	45.21
27	2.899	2.849	183.49	183.72	182.142	71.29
2	2.903	2.842	183.06	183.55	182.142	74.48
18	2.968	2.950	177.90	178.14	176.555	19.47
14	2.906	2.839	183.10	181.68	181.443	39.05

D-Theta = (ptemp + (4.85 * pden)) - 135.961
Additional Samples Collected:
Helium
Particulate Trace Elements
Dissolved Fe and Mn

VENTS 1990 - LEG IV
Station FE1 Cast 3 11 SEP 1990
LAT: 45 01.4N LONG: 130 11.8W

Niskin #	Depth (m)	Depth (db)	Insitu Temp.	Potential Temp.	Temp. Anom.	Salinity (CTD)	Salinity (Bottle)	Atten. (1/m)	Sigma-t (CTD)	Sigma-t (Bottle)	Sigma-Theta (CTD)	Sigma-Theta (Bottle)
26	2251.6	2282.4	1.894	1.735	0.031	34.614	34.613	0.384	27.671	27.670	27.683	27.682
8	2199.3	2229.1	1.895	1.741	0.026	34.612	34.612	0.389	27.669	27.669	27.681	27.681
11	2173.2	2202.5	1.908	1.756	0.032	34.611	34.611	0.407	27.667	27.667	27.679	27.679
13	2149.6	2178.4	1.911	1.761	0.035	34.611	34.612	0.401	27.667	27.668	27.679	27.679
9	2099.8	2127.8	1.914	1.768	0.040	34.611	34.611	0.403	27.667	27.667	27.678	27.678
6	2050.2	2077.2	1.907	1.766	0.030	34.609	34.607	0.396	27.666	27.664	27.677	27.675
3	1998.8	2024.9	1.910	1.773	0.023	34.606	34.606	0.390	27.663	27.663	27.674	27.674
5	1948.5	1973.7	1.926	1.793	0.005	34.598	34.599	0.375	27.655	27.656	27.666	27.667
31	1900.0	1924.3	1.951	1.822	-0.000	34.592		0.374	27.649		27.659	
1	1751.0	1772.8	2.109	1.990	0.003	34.566	34.567	0.373	27.615	27.616	27.625	27.626
15	1500.1	1517.9	2.462	2.359	0.064	34.524	34.524	0.374	27.553	27.553	27.561	27.561
17	1247.5	1261.6	2.902	2.815	0.089	34.462	34.463	0.375	27.465	27.465	27.472	27.473

Niskin #	PO4-UNF (umol/l)	PO4-FIL (umol/l)	SiO4-UF/UW (umol/l)	SiO4-F/UW (umol/l)	SiO4/LDGO (umol/l)	TSM (ug/l)
26	2.921	2.920	181.34	180.89	180.765	21.78
8	2.918	2.917	180.81	181.24	180.177	39.76
11	2.926	2.908	181.54	180.96	180.645	33.26
13	2.912	2.888	180.39	180.81	181.344	40.37
9	2.909	2.874	181.86	181.79	181.344	45.59
6	2.911	2.899	183.09	180.76	180.406	37.68
3	2.930	2.901	179.68	179.11	179.468	31.98
5	2.949	2.947	177.53	177.58	178.301	22.82
31						
1	3.012	3.016	173.51	176.19	173.383	14.02
15	3.113	3.117	164.63	164.56	164.245	13.67
17	3.187	3.191	152.02	152.08	152.054	19.06

D-Theta = (ptemp + (4.85 * pden)) - 135.967
Additional Samples Collected:
Helium
Particulate Trace Elements

VENTS 1990 - LEG IV
Station FE1 Cast 4 11 SEP 1990
LAT: 45 01.0N LONG: 130 12.2W

Niskin #	Depth (m)	Depth (db)	Insitu Temp.	Potential Temp.	Temp. Anom.	Salinity (CTD)	Salinity (Bottle)	Atten. (1/m)	Sigma-t (CTD)	Sigma-t (Bottle)	Sigma-Theta (CTD)	Sigma-Theta (Bottle)
25	2242.0	2272.6	1.875	1.717	0.025	34.614	34.610	0.378	27.672	27.669	27.684	27.681
27	2229.9	2260.2	1.885	1.728	0.028	34.613	34.613	0.380	27.671	27.671	27.683	27.683
12	2200.2	2230.0	1.894	1.740	0.028	34.611	34.611	0.385	27.668	27.668	27.680	27.680
18	2175.7	2205.1	1.898	1.746	0.024	34.609	34.609	0.386	27.666	27.666	27.678	27.678
23	2149.8	2178.7	1.912	1.762	0.038	34.610	34.610	0.398	27.666	27.666	27.678	27.678
16	2105.4	2133.5	1.911	1.765	0.040	34.610	34.610	0.400	27.666	27.666	27.678	27.678
10	2100.2	2128.2	1.911	1.765	0.040	34.610	34.610	0.401	27.666	27.666	27.677	27.677
19	2075.3	2102.8	1.910	1.766	0.037	34.609	34.610	0.400	27.666	27.666	27.677	27.677
30	2047.6	2074.5	1.907	1.766	0.029	34.607	34.607	0.394	27.664	27.664	27.675	27.675
21	1997.7	2023.8	1.917	1.780	0.018	34.602	34.602	0.385	27.659	27.659	27.670	27.670
2	1897.8	1922.2	1.954	1.825	-0.000	34.590		0.372	27.647		27.657	
14	1801.2	1823.8	2.062	1.939	-0.003	34.571	34.573	0.372	27.623	27.625	27.633	27.634

Niskin #	PO4-UNF (umol/l)	PO4-FIL (umol/l)	SiO4-UF/UW (umol/l)	SiO4-F/UW (umol/l)	SiO4/LDGO (umol/l)	TSM (ug/l)
25	2.881		181.37			
27	2.876		180.86			
12	2.882		180.71			
18	2.888		181.12			
23	2.894		182.02			
16	2.889		181.26			
10	2.884		181.26			
19	2.885		181.01			
30	2.891		180.76			
21	2.924		179.74			
2	2.941		177.19			
14	2.991		175.02			

D-Theta = (ptemp + (4.85 * pden)) - 135.961

VENTS 1990 - LEG IV
Station FE2 Cast 5 11 SEP 1990
LAT: 44 57.6N LONG: 130 08.8W

Niskin #	Depth (m)	Depth (db)	Insitu Temp.	Potential Temp.	Temp. Anom.	Salinity (CTD)	Salinity (Bottle)	Atten. (1/m)	Sigma-t (CTD)	Sigma-t (Bottle)	Sigma-Theta (CTD)	Sigma-Theta (Bottle)
25	2293.2	2324.8	1.844	1.682	0.017	34.616	34.601	0.374	27.676	27.664	27.689	27.677
29	2251.5	2282.3	1.858	1.700	0.016	34.613	34.613	0.372	27.673	27.673	27.685	27.685
12	2200.3	2230.1	1.865	1.711	0.016	34.611	34.610	0.372	27.671	27.670	27.682	27.682
18	2150.3	2179.1	1.875	1.725	0.017	34.609	34.607	0.374	27.668	27.667	27.680	27.678
23	2099.8	2127.7	1.886	1.741	0.007	34.604	34.605	0.371	27.663	27.664	27.675	27.675
16	2048.7	2075.7	1.905	1.764	0.006	34.600	34.600	0.370	27.659	27.659	27.670	27.670
10	2002.2	2028.4	1.931	1.793	0.005	34.595		0.370	27.653		27.663	
19	1947.4	1972.6	1.948	1.815	0.003	34.591	34.592	0.369	27.648	27.649	27.658	27.659
30	1898.3	1922.7	1.982	1.852	-0.000	34.584	34.584	0.369	27.640	27.640	27.650	27.650
21	1754.0	1775.9	2.111	1.992	-0.003	34.561	34.562	0.370	27.611	27.612	27.621	27.621
24	1500.7	1518.5	2.446	2.343	0.032	34.515	34.515	0.370	27.547	27.547	27.555	27.555
14	1249.2	1263.2	2.924	2.836	0.090	34.456	34.456	0.370	27.458	27.458	27.466	27.466

Niskin #	PO4-UNF (umol/l)	PO4-FIL (umol/l)	SiO4-UF/UW (umol/l)	SiO4-F/UW (umol/l)	SiO4/LDGO (umol/l)	TSM (ug/l)
25	2.884	2.8900	178.03	179.92	178.062	18.15
29	2.890	2.8840	180.33	181.09	179.468	39.31
12	2.895	2.8901	180.26	180.54	179.937	13.29
18	2.895	2.8900	179.13	179.37	179.468	16.31
23	2.923	2.9010	178.53	178.63	179.119	12.32
16	2.923	2.9230	178.19	177.63	177.124	10.32
10						
19	2.951	2.9510	177.07	176.78	176.655	14.80
30	2.985	2.9900	176.17	176.81	175.727	13.67
21	3.018	3.0180	172.05	173.01	172.914	9.49
24	3.108	3.1080	163.62	164.14	164.005	16.01
14	3.198	3.1920	150.86	150.19	151.116	13.08

D-Theta = (ptemp + (4.85 * pden)) - 135.955
Additional Samples Collected:
Helium
Particulate Trace Elements
Dissolved Fe and Mn

VENTS 1990 - LEG IV
Station FT4 Cast 7 12 SEP 1990
LAT: 44 57.7N LONG: 130 14.0W

Niskin #	Depth (m)	Depth (db)	Insitu Temp.	Potential Temp.	Temp. Anom.	Salinity (CTD)	Salinity (Bottle)	Atten. (1/m)	Sigma-t (CTD)	Sigma-t (Bottle)	Sigma-Theta (CTD)	Sigma-Theta (Bottle)
17	2079.7	2107.3	1.921	1.777	0.056	34.610	34.612	0.407	27.665	27.667	27.677	27.678
15	2105.9	2133.9	1.918	1.772	0.045	34.608	34.607	0.401	27.664	27.663	27.675	27.675
10	2100.6	2128.5	1.933	1.787	0.063	34.610	34.610	0.406	27.665	27.665	27.676	27.676
3	2098.7	2126.6	1.928	1.782	0.056	34.609	34.610	0.408	27.664	27.665	27.675	27.676
13	2114.4	2142.6	1.920	1.773	0.050	34.609	34.609	0.415	27.665	27.665	27.676	27.676
6	2099.8	2127.8	1.914	1.768	0.043	34.608	34.609	0.393	27.664	27.665	27.676	27.676
26	2098.0	2125.9	1.925	1.779	0.062	34.611	34.612	0.391	27.666	27.667	27.677	27.678
9	2098.8	2126.7	1.928	1.782	0.071	34.613	34.611	0.385	27.667	27.666	27.679	27.677
5	2100.8	2128.8	1.905	1.759	0.037	34.608	34.608	0.392	27.665	27.665	27.676	27.676
27	2102.4	2130.4	1.909	1.763	0.040	34.608	34.607	0.410	27.665	27.664	27.676	27.675
11	2112.4	2140.6	1.906	1.759	0.041	34.609	34.608	0.396	27.666	27.665	27.677	27.676
2	2101.8	2129.8	1.902	1.756	0.035	34.608	34.608	0.392	27.665	27.665	27.677	27.677

Niskin #	PO4-UNF (umol/l)	PO4-FIL (umol/l)	SiO4-UF/UW (umol/l)	SiO4-F/UW (umol/l)	SiO4/LDGO (umol/l)	TSM (ug/l)
17	2.887	2.779	183.48	183.64	180.795	78.36
15	2.905	2.871	182.90	182.44	180.336	43.87
10	2.896	2.855	184.33	183.99	181.733	53.63
3	2.897	2.851	182.63	183.29	181.503	50.67
13	2.893	2.887	183.17	183.09	180.795	39.86
6	2.900	2.888	183.35	183.39	181.034	36.37
26	2.885	2.817	183.52	183.68	181.503	61.96
9	2.904	2.886	184.07	183.98	182.441	26.83
5	2.911	2.893	182.61	182.28	180.336	34.17
27	2.901	2.889	181.66	182.45	180.566	39.41
11	2.903	2.880	181.70	181.62	180.566	37.25
2	2.910	2.887	181.75	181.67	180.336	36.21

D-Theta = (ptemp + (4.85 * pden)) - 135.952
Additional Samples Collected:
Helium
Particulate Trace Elements
Dissolved Fe and Mn

VENTS 1990 - LEG IV
Station FE3 Cast 8 12 SEP 1990
LAT: 44 58.1N LONG: 130 11.3W

Niskin #	Depth (m)	Depth (db)	Insitu Temp.	Potential Temp.	Temp. Anom.	Salinity (CTD)	Salinity (Bottle)	Atten. (1/m)	Sigma-t (CTD)	Sigma-t (Bottle)	Sigma-Theta (CTD)	Sigma-Theta (Bottle)
23	2207.2	2237.1	1.879	1.724	0.031	34.615	34.615	0.376	27.673	27.673	27.685	27.685
22	2200.2	2230.0	1.879	1.725	0.031	34.615	34.614	0.377	27.673	27.672	27.685	27.684
1	2149.8	2178.6	1.889	1.739	0.028	34.612	34.613	0.382	27.670	27.670	27.681	27.682
8	2110.0	2138.1	1.902	1.755	0.031	34.610	34.611	0.391	27.667	27.668	27.678	27.679
18	2100.9	2128.8	1.904	1.758	0.033	34.610	34.608	0.391	27.667	27.665	27.678	27.676
21	2090.3	2118.1	1.908	1.763	0.032	34.609	34.609	0.392	27.666	27.666	27.677	27.677
19	2049.5	2076.5	1.909	1.768	0.027	34.607	34.607	0.389	27.664	27.664	27.675	27.675
16	2000.9	2027.0	1.914	1.777	0.009	34.601	34.601	0.377	27.659	27.659	27.669	27.669
30	1953.0	1978.3	1.936	1.802	0.002	34.595	34.595	0.370	27.652	27.652	27.663	27.663
31	1901.0	1925.3	1.965	1.835	-0.001	34.589	34.582	0.369	27.645	27.640	27.655	27.650
12	1750.6	1772.4	2.126	2.007	-0.003	34.561	34.562	0.370	27.610	27.611	27.619	27.620
29	1501.6	1519.4	2.486	2.383	0.062	34.519	34.520	0.370	27.547	27.547	27.555	27.556

Niskin #	PO4-UNF (umol/l)	PO4-FIL (umol/l)	SiO4-UF/UW (umol/l)	SiO4-F/UW (umol/l)	SiO4/LDGO (umol/l)	TSM (ug/l)
23	2.888	2.867	181.97	181.58	180.795	21.29
22	2.852	2.787	181.98	181.86	180.795	26.02
1	2.860	2.889	181.21	180.83	181.503	26.75
8	2.890	2.874	181.10	179.93	179.867	33.96
18	2.898	2.860	179.41	179.02	179.398	35.98
21	2.900	2.862	178.89	180.34	179.628	35.39
19	2.908	2.859	179.29	179.17	179.628	32.55
16	2.889	2.894	178.25	177.47	177.752	17.59
30	2.941	2.940	177.34	177.47	177.283	11.30
31	2.900	2.960	176.16	176.03	175.418	17.70
12	3.030	3.029	172.60	172.34	171.667	12.98
29	3.105	3.098	162.56	162.43	162.060	20.89

D-Theta = (ptemp + (4.85 * pden)) - 135.964
Additional Samples Collected:
Helium
Particulate Trace Elements
Dissolved Fe and Mn

VENTS 1990 - LEG IV
Station FE3 Cast 9 13 SEP 1990
LAT: 44 58.4N LONG: 130 11.1W

Niskin #	Depth (m)	Depth (db)	Insitu Temp.	Potential Temp.	Temp. Anom.	Salinity (CTD)	Salinity (Bottle)	Atten. (1/m)	Sigma-t (CTD)	Sigma-t (Bottle)	Sigma-Theta (CTD)	Sigma-Theta (Bottle)
32	2197.8	2227.6	1.876	1.722	0.035	34.616	34.595	0.375	27.674	27.657	27.686	27.669
13	2198.6	2228.3	1.876	1.722	0.035	34.616	34.615	0.376	27.674	27.673	27.686	27.685
10	2146.8	2175.6	1.882	1.733	0.034	34.614	34.613	0.378	27.672	27.671	27.683	27.682
6	2144.8	2173.5	1.882	1.733	0.034	34.614	34.614	0.379	27.672	27.672	27.683	27.683
14	2110.4	2138.5	1.898	1.752	0.034	34.611	34.612	0.388	27.668	27.669	27.679	27.680
17	2104.5	2132.5	1.899	1.753	0.035	34.611	34.611	0.389	27.668	27.668	27.679	27.679
11	2074.9	2102.3	1.907	1.763	0.034	34.609	34.609	0.391	27.666	27.666	27.677	27.677
5	2075.3	2102.8	1.907	1.763	0.034	34.609	34.609	0.391	27.666	27.666	27.677	27.677
9	2050.9	2078.0	1.905	1.764	0.030	34.608	34.608	0.386	27.665	27.665	27.676	27.676
2	1999.3	2025.5	1.910	1.773	0.024	34.605	34.605	0.383	27.662	27.662	27.673	27.673
3	1901.4	1925.8	1.969	1.839	0.000	34.588	34.589	0.369	27.644	27.645	27.654	27.655
15	1801.8	1824.5	2.048	1.926	0.003	34.575	34.575	0.369	27.627	27.627	27.637	27.637

Niskin #	PO4-UNF (umol/l)	PO4-FIL (umol/l)	SiO4-UF/UW (umol/l)	SiO4-F/UW (umol/l)	SiO4/LDGO (umol/l)	TSM (ug/l)
32	2.809		163.35			
13	2.870		181.81			
10	2.875		182.30			
6	2.875		180.91			
14	2.864		180.46			
17	2.881		181.06			
11	2.864		180.85			
5	2.886		179.92			
9	2.875		178.76			
2	2.886		178.07			
3	2.931		175.49			
15	2.986		173.25			

D-Theta = (ptemp + (4.85 * pden)) - 135.962

VENTS 1990 - LEG IV
Station FE4 Cast 10 13 SEP 1990
LAT: 44 58.9N LONG: 130 13.3W

Niskin #	Depth (m)	Depth (db)	Insitu Temp.	Potential Temp.	Temp. Anom.	Salinity (CTD)	Salinity (Bottle)	Atten. (1/m)	Sigma-t (CTD)	Sigma-t (Bottle)	Sigma-Theta (CTD)	Sigma-Theta (Bottle)
13	2222.3	2252.5	1.897	1.741	0.043	34.616	34.616	0.376	27.672	27.672	27.684	27.684
26	2196.3	2226.0	1.877	1.723	0.024	34.614	34.614	0.376	27.672	27.672	27.684	27.684
10	2168.6	2197.8	1.915	1.763	0.057	34.616	34.615	0.390	27.671	27.670	27.682	27.682
6	2147.0	2175.9	1.922	1.772	0.063	34.616	34.615	0.387	27.670	27.669	27.682	27.681
14	2118.7	2147.0	1.904	1.757	0.033	34.611	34.613	0.392	27.668	27.669	27.679	27.681
17	2089.0	2116.8	1.905	1.760	0.036	34.611	34.610	0.394	27.668	27.667	27.679	27.678
11	2062.1	2089.4	1.906	1.764	0.034	34.610	34.610	0.395	27.667	27.667	27.678	27.678
5	2041.9	2068.8	1.906	1.765	0.031	34.609	34.609	0.393	27.666	27.666	27.677	27.677
9	2011.0	2037.3	1.909	1.771	0.027	34.607	34.606	0.388	27.664	27.663	27.675	27.674
2	1997.1	2023.2	1.910	1.773	0.024	34.606	34.605	0.386	27.663	27.662	27.674	27.673
3	1962.4	1987.8	1.918	1.784	0.012	34.601	34.601	0.376	27.658	27.658	27.669	27.669
15	1901.5	1925.9	1.972	1.842	-0.002	34.588	34.589	0.369	27.644	27.645	27.654	27.655

Niskin #	PO4-UNF (umol/l)	PO4-FIL (umol/l)	SiO4-UF/UW (umol/l)	SiO4-F/UW (umol/l)	SiO4/LDGO (umol/l)	TSM (ug/l)
13	2.843	2.801	181.78	176.27	179.797	19.90
26	2.855	2.822	181.34	181.62	179.329	17.15
10	2.823	2.779	183.48	183.39	180.965	30.68
6	2.830	2.807	183.28	183.20	180.965	26.62
14	2.853	2.808	181.24	182.26	179.797	29.21
17	2.859	2.815	181.53	181.32	179.099	37.22
11	2.855	2.816	180.59	180.39	179.099	35.92
5	2.867	2.811	180.64	179.94	179.099	34.90
9	2.868	2.818	179.58	179.49	178.860	29.76
2	2.869	2.813	179.75	179.66	178.391	25.97
3	2.867	2.870	178.18	178.72	177.463	20.18
15	2.932	2.932	176.45	176.49	175.827	9.68

D-Theta = (ptemp + (4.85 * pden)) - 135.966
Additional Samples Collected:
Helium
Particulate Trace Elements
Dissolved Fe and Mn

VENTS 1990 - LEG IV
Station FE4 Cast 11 13 SEP 1990
LAT: 44 58.9N LONG: 130 13.2W

Niskin #	Depth (m)	Depth (db)	Insitu Temp.	Potential Temp.	Temp. Anom.	Salinity (CTD)	Salinity (Bottle)	Atten. (1/m)	Sigma-t (CTD)	Sigma-t (Bottle)	Sigma-Theta (CTD)	Sigma-Theta (Bottle)
8	2100.4	2128.3	1.910	1.764	0.031	34.609	34.610	0.394	27.666	27.666	27.677	27.678
31	2100.4	2128.3	1.910	1.764	0.031	34.609	34.606	0.394	27.666	27.663	27.677	27.674
30	2096.5	2124.4	1.910	1.765	0.032	34.609	34.608	0.394	27.666	27.665	27.677	27.676
12	2095.1	2122.9	1.910	1.765	0.032	34.609	34.610	0.394	27.666	27.666	27.677	27.678
18	2094.4	2122.2	1.910	1.765	0.032	34.609	34.609	0.394	27.666	27.666	27.677	27.677
29	1850.3	1873.8	2.024	1.898	-0.001	34.579	34.585	0.370	27.633	27.637	27.642	27.647
21	400.2	403.9	5.226	5.194		33.960	33.960	0.378	26.825	26.825	26.829	26.829
16	249.0	251.2	6.534	6.512		33.868	33.867	0.379	26.590	26.589	26.593	26.592
19	100.3	101.1	8.435	8.425		32.634	32.638	0.384	25.352	25.355	25.354	25.357

Niskin #	PO4-UNF (umol/l)	PO4-FIL (umol/l)	SiO4-UF/UW (umol/l)	SiO4-F/UW (umol/l)	SiO4/LDGO (umol/l)	TSM (ug/l)
8	2.835	2.823	178.74	178.31		36.50
31	2.835		177.66		179.189	
30	2.831	2.825	176.39	178.98	178.959	34.76
12	2.838	2.826	179.01	178.83	179.099	34.27
18	2.844	2.822	177.86	177.94	179.099	42.59
29	2.898	2.900	173.49	173.89	175.358	13.48
21	2.578	2.578	67.66	67.61	69.912	28.39
16	1.029	1.905	11.31	39.67	41.849	20.23
19	1.030	1.029	12.17	11.36	13.089	25.16

D-Theta = (ptemp + (4.85 *pden)) - 135.965
Additional Samples Collected:
Helium
Particulate Trace Elements
Dissolved Fe and Mn

VENTS 1990 - LEG IV
Station FE4 Cast 12 13 SEP 1990
LAT: 44 59.1N LONG: 130 13.3W

Niskin #	Depth (m)	Depth (db)	Insitu Temp.	Potential Temp.	Temp. Anom.	Salinity (CTD)	Salinity (Bottle)	Atten. (1/m)	Sigma-t (CTD)	Sigma-t (Bottle)	Sigma-Theta (CTD)	Sigma-Theta (Bottle)
13	2202.9	2232.7	1.907	1.752	0.043	34.613	34.612	0.381	27.669	27.668	27.681	27.680
26	2204.5	2234.4	1.903	1.748	0.041	34.613	34.613	0.381	27.669	27.669	27.681	27.681
2	2199.1	2228.9	1.908	1.754	0.044	34.613	34.613	0.381	27.669	27.669	27.681	27.681
9	2150.1	2179.0	1.917	1.767	0.049	34.612	34.612	0.395	27.667	27.667	27.679	27.679
5	2150.0	2178.8	1.918	1.768	0.049	34.612	34.611	0.398	27.667	27.666	27.679	27.678
22	2101.2	2129.1	1.920	1.774	0.057	34.613	34.612	0.390	27.668	27.667	27.679	27.678
32	2101.9	2129.9	1.919	1.773	0.056	34.613	34.602	0.390	27.668	27.659	27.679	27.670
10	2050.4	2077.4	1.908	1.767	0.033	34.608	34.608	0.391	27.665	27.665	27.676	27.676
1	2051.2	2078.3	1.908	1.766	0.033	34.608	34.607	0.391	27.665	27.664	27.676	27.675
15	2001.1	2027.2	1.909	1.772	0.025	34.605	34.607	0.385	27.662	27.664	27.673	27.675
11	1899.4	1923.7	1.973	1.843	-0.000	34.587	34.587	0.368	27.643	27.643	27.653	27.653
3	1799.4	1822.0	2.070	1.947	-0.002	34.570	34.570	0.368	27.622	27.622	27.631	27.631

Niskin #	PO4-UNF (umol/l)	PO4-FIL (umol/l)	SiO4-UF/UW (umol/l)	SiO4-F/UW (umol/l)	SiO4/LDGO (umol/l)	TSM (ug/l)
13	2.834		183.16			
26	2.834		182.77			
2	2.834		183.77			
9	2.834		181.50			
5	2.835		183.62			
22	2.835		182.48			
32	2.841		180.71			
10	2.846		179.32			
1	2.852		180.69			
15	2.858		179.80			
11	2.907		176.78			
3	2.946		173.89			

D-Theta = (ptemp + (4.85 * pden)) - 135.961

VENTS 1990 - LEG IV
Station FE5 Cast 13 13 SEP 1990
LAT: 44 59.3N LONG: 130 14.3W

Niskin #	Depth (m)	Depth (db)	Insitu Temp.	Potential Temp.	Temp. Anom.	Salinity (CTD)	Salinity (Bottle)	Atten. (1/m)	Sigma-t (CTD)	Sigma-t (Bottle)	Sigma-Theta (CTD)	Sigma-Theta (Bottle)
13	2199.4	2229.2	1.910	1.756	0.046	34.613	34.612	0.386	27.669	27.668	27.681	27.680
26	2131.0	2159.5	1.912	1.763	0.039	34.610	34.610	0.392	27.666	27.666	27.678	27.678
2	2111.0	2139.2	1.910	1.763	0.035	34.609	34.608	0.392	27.666	27.665	27.677	27.676
9	2099.6	2127.5	1.911	1.765	0.032	34.608	34.609	0.392	27.665	27.665	27.676	27.677
5	2074.5	2102.0	1.911	1.767	0.030	34.607	34.607	0.390	27.664	27.664	27.675	27.675
22	2051.6	2078.7	1.912	1.770	0.028	34.606	34.605	0.387	27.663	27.662	27.674	27.673
32	2000.6	2026.7	1.918	1.781	0.015	34.601		0.378	27.658		27.669	
10	1950.4	1975.7	1.943	1.810	0.006	34.594	34.594	0.370	27.651	27.651	27.661	27.661
1	1899.6	1923.9	1.975	1.845	0.001	34.587	34.587	0.369	27.643	27.643	27.653	27.653
15	1751.3	1773.1	2.106	1.987	0.003	34.565	34.565	0.369	27.615	27.615	27.624	27.624
24	1501.9	1519.7	2.506	2.402	0.076	34.519	34.519	0.370	27.545	27.545	27.554	27.554
3	1251.9	1265.9	2.933	2.845	0.104	34.460	34.461	0.370	27.460	27.461	27.468	27.469

Niskin #	PO4-UNF (umol/l)	PO4-FIL (umol/l)	SiO4-UF/UW (umol/l)	SiO4-F/UW (umol/l)	SiO4/LDGO (umol/l)	TSM (ug/l)
13	2.877	2.865	179.62	179.12	180.825	32.02
26	2.878	2.866	179.48	179.36	180.127	35.45
2	2.879	2.868	178.58	179.59	180.127	45.44
9	2.887	2.869	179.38	178.95	180.127	33.92
5	2.888	2.871	178.92	178.68	179.628	33.77
22	2.889	2.878	178.02	178.91	179.428	43.67
32						
10	2.941	2.940	175.98	176.37	176.855	13.56
1	2.948	2.947	175.71	174.71	176.156	12.44
15	3.000	2.999	172.14	171.78	173.114	10.66
24	3.107	3.106	162.12	162.26	162.609	27.75
3	3.170	3.169	150.92	150.19	150.458	9.08

D-Theta = (ptemp + (4.85 * pden)) - 135.961
Additional Samples Collected:
Helium
Particulate Trace Elements
Dissolved Fe and Mn

VENTS 1990 - LEG IV
Station FE5 Cast 14 14 SEP 1990
LAT: 44 59.5N LONG: 130 13.9W

Niskin #	Depth (m)	Depth (db)	Insitu Temp.	Potential Temp.	Temp. Anom.	Salinity (CTD)	Salinity (Bottle)	Atten. (1/m)	Sigma-t (CTD)	Sigma-t (Bottle)	Sigma-Theta (CTD)	Sigma-Theta (Bottle)
25	2199.0	2228.8	1.911	1.757	0.046	34.613	34.610	0.386	27.669	27.666	27.681	27.678
30	2198.9	2228.7	1.911	1.757	0.046	34.613	34.612	0.385	27.669	27.668	27.681	27.680
8	2148.6	2177.4	1.911	1.761	0.045	34.612	34.611	0.390	27.668	27.667	27.679	27.679
12	2148.3	2177.2	1.912	1.762	0.042	34.611	34.611	0.391	27.667	27.667	27.679	27.679
19	2097.7	2125.6	1.915	1.769	0.035	34.608	34.608	0.390	27.664	27.664	27.676	27.676
17	2095.1	2122.9	1.915	1.770	0.035	34.608	34.608	0.390	27.664	27.664	27.676	27.676
14	2047.4	2074.4	1.916	1.775	0.030	34.606	34.606	0.386	27.663	27.663	27.674	27.674
16	2050.3	2077.4	1.916	1.774	0.030	34.606	34.605	0.386	27.663	27.662	27.674	27.673
23	2003.1	2029.3	1.920	1.782	0.016	34.601	34.600	0.375	27.658	27.658	27.669	27.668
6	1901.7	1926.1	1.977	1.847	0.002	34.587	34.587	0.367	27.643	27.643	27.653	27.653
29	1800.6	1823.3	2.066	1.943	-0.000	34.571	34.570	0.368	27.623	27.622	27.632	27.632
21	1701.4	1722.4	2.187	2.071	0.009	34.553	34.555	0.368	27.599	27.600	27.608	27.610

Niskin #	PO4-UNF (umol/l)	PO4-FIL (umol/l)	SiO4-UF/UW (umol/l)	SiO4-F/UW (umol/l)	SiO4/LDGO (umol/l)	TSM (ug/l)
25	2.865		180.83			
30	2.977		173.77			
8	2.872		181.19			
12	2.878		181.31			
19	2.879		181.06			
17	2.880		180.44			
14	2.886		180.55			
16	2.881		180.80			
23	2.910		177.06			
6	2.944		174.81			
29	2.872		179.78			
21	3.029		171.18			

D-Theta = (ptemp + (4.85 * pden)) - 135.961

VENTS 1990 - LEG IV
Station FE6 Cast 15 14 SEP 1990
LAT: 45 01.4N LONG: 130 16.7W

Niskin #	Depth (m)	Depth (db)	Insitu Temp.	Potential Temp.	Temp. Anom.	Salinity (CTD)	Salinity (Bottle)	Atten. (1/m)	Sigma-t (CTD)	Sigma-t (Bottle)	Sigma-Theta (CTD)	Sigma-Theta (Bottle)
25	2215.8	2245.9	1.886	1.730	0.028	34.614	34.610	0.378	27.671	27.668	27.683	27.680
30	2203.7	2233.6	1.895	1.740	0.030	34.613	34.612	0.380	27.670	27.669	27.682	27.681
8	2147.6	2176.4	1.914	1.764	0.037	34.611	34.610	0.391	27.667	27.666	27.678	27.678
12	2099.6	2127.6	1.913	1.767	0.027	34.608	34.607	0.386	27.664	27.664	27.676	27.675
19	2041.1	2068.0	1.920	1.779	0.012	34.602	34.602	0.374	27.659	27.659	27.670	27.670
17	1996.2	2022.2	1.929	1.792	0.004	34.598	34.599	0.369	27.655	27.656	27.666	27.667
14	1953.4	1978.7	1.942	1.808	0.003	34.595	34.594	0.368	27.652	27.651	27.662	27.661
16	1902.6	1927.0	1.982	1.852	0.003	34.588	34.587	0.368	27.643	27.642	27.653	27.652
23	1748.4	1770.1	2.139	2.020	0.010	34.563	34.563	0.368	27.610	27.610	27.620	27.620
6	1501.7	1519.5	2.549	2.445	0.084	34.516	34.470	0.369	27.539	27.502	27.548	27.511
29	1254.0	1268.1	2.940	2.852	0.141	34.470	34.392	0.370	27.468	27.405	27.475	27.413
21	1002.8	1013.5	3.471	3.399	0.136	34.391	34.517	0.371	27.355	27.455	27.362	27.462

Niskin #	PO4-UNF (umol/l)	PO4-FIL (umol/l)	SiO4-UF/UW (umol/l)	SiO4-F/UW (umol/l)	SiO4/LDGO (umol/l)	TSM (ug/l)
25	2.885	2.880	180.55	181.71	179.658	20.72
30	2.885	2.874	181.10	181.08	179.658	23.16
8	2.885	2.846	181.38	181.24	178.969	55.61
12	2.891	2.880	181.02	179.97	179.448	27.84
19	2.902	2.908	179.48	179.99	178.022	19.58
17	2.935	2.930	178.59	178.58	177.323	11.81
14	2.935	2.935	178.74	178.34	176.386	15.49
16	2.947	2.947	176.94	176.41	175.218	10.41
23	3.002	3.002	172.52	172.64	171.946	9.81
6	3.102	3.108	162.33	162.33	161.671	19.52
29	3.164	3.164	150.95	151.74	149.291	11.34
21	3.203	3.208	135.48	134.85	134.107	12.20

D-Theta = (ptemp + (4.85 * pden)) - 135.967
Additional Samples Collected:
Helium
Particulate Trace Elements
Dissolved Fe and Mn

VENTS 1990 - LEG IV
Station FT5 Cast 16 14 SEP 1990
LAT: 44 57.2N LONG: 130 13.3W

Niskin #	Depth (m)	Depth (db)	Insitu Temp.	Potential Temp.	Temp. Anom.	Salinity (CTD)	Salinity (Bottle)	Atten. (1/m)	Sigma-t (CTD)	Sigma-t (Bottle)	Sigma-Theta (CTD)	Sigma-Theta (Bottle)
26	2093.7	2121.5	1.899	1.754	0.025	34.608	34.609	0.384	27.666	27.666	27.677	27.678
3	2096.0	2123.8	1.903	1.758	0.031	34.609	34.610	0.390	27.666	27.667	27.677	27.678
13	2094.4	2122.2	1.905	1.760	0.033	34.609	34.609	0.391	27.666	27.666	27.677	27.677
9	2139.4	2168.1	1.917	1.768	0.049	34.612	34.612	0.411	27.667	27.667	27.679	27.679
2	2114.3	2142.5	1.924	1.777	0.051	34.611	34.610	0.405	27.666	27.665	27.677	27.677
5	2114.3	2142.5	1.924	1.777	0.051	34.611	34.612	0.405	27.666	27.667	27.677	27.678
22	2090.2	2117.9	1.916	1.771	0.047	34.611	34.610	0.401	27.667	27.666	27.678	27.677
15	2074.9	2102.4	1.906	1.762	0.030	34.608	34.609	0.389	27.665	27.666	27.676	27.677
1	2094.5	2122.4	1.906	1.761	0.037	34.610	34.609	0.394	27.667	27.666	27.678	27.677
10	2098.7	2126.6	1.891	1.746	0.020	34.608	34.608	0.378	27.666	27.666	27.677	27.677
27	2101.1	2129.1	1.879	1.734	0.012	34.608	34.606	0.371	27.667	27.666	27.678	27.677
24	2100.9	2128.9	1.897	1.751	0.023	34.608	34.608	0.368	27.666	27.666	27.677	27.677

Niskin #	PO4-UNF (umol/l)	PO4-FIL (umol/l)	SiO4-UF/UW (umol/l)	SiO4-F/UW (umol/l)	SiO4/LDGO (umol/l)	TSM (ug/l)
26	2.878	2.843	179.55	179.65	179.668	31.68
3	2.868	2.845	179.58	179.69	179.438	30.65
13	2.858	2.841	178.49	179.60	179.668	36.01
9	2.848	2.825	180.91	179.89	179.668	34.04
2	2.850	2.838	179.70	180.93	181.314	46.02
5	2.851	2.800	179.99	179.84	181.084	60.57
22	2.853	2.807	179.90	179.88	180.915	46.49
15	2.865	2.853	178.68	178.79	179.967	27.66
1	2.855	2.838	179.85	178.70	180.675	38.72
10	2.868	2.856	178.76	178.61	179.738	22.57
27	2.875	2.874	178.22	178.83	179.738	13.89
24	2.887	2.892	177.25	178.11	179.029	14.15

D-Theta = (ptemp + (4.85 * pden)) - 135.961
Additional Samples Collected:
Helium
Particulate Trace Elements
Dissolved Fe and Mn

VENTS 1990 - LEG IV
Station FE7 Cast 17 15 SEP 1990
LAT: 44 57.3N LONG: 130 14.2W

Niskin #	Depth (m)	Depth (db)	Insitu Temp.	Potential Temp.	Temp. Anom.	Salinity (CTD)	Salinity (Bottle)	Atten. (1/m)	Sigma-t (CTD)	Sigma-t (Bottle)	Sigma-Theta (CTD)	Sigma-Theta (Bottle)
18	2237.2	2267.7	1.924	1.766	0.052	34.613	34.611	0.395	27.668	27.666	27.680	27.678
23	2201.0	2230.8	1.928	1.773	0.057	34.613	34.615	0.399	27.667	27.669	27.679	27.681
6	2177.7	2207.1	1.928	1.775	0.058	34.613	34.613	0.403	27.667	27.667	27.679	27.679
16	2150.3	2179.2	1.926	1.776	0.058	34.613	34.612	0.402	27.667	27.667	27.679	27.678
14	2124.1	2152.5	1.932	1.784	0.063	34.613	34.613	0.418	27.667	27.667	27.678	27.678
17	2115.9	2144.1	1.934	1.786	0.065	34.613	34.612	0.421	27.667	27.666	27.678	27.677
19	2079.6	2107.2	1.933	1.789	0.062	34.612	34.612	0.414	27.666	27.666	27.677	27.677
12	2050.7	2077.7	1.931	1.789	0.063	34.612	34.613	0.418	27.666	27.667	27.677	27.678
8	1999.7	2025.8	1.919	1.782	0.035	34.606	34.609	0.396	27.662	27.665	27.673	27.675
30	1952.7	1978.0	1.922	1.789	0.012	34.599	34.599	0.375	27.657	27.657	27.667	27.667
21	1899.6	1924.0	1.961	1.832	0.000	34.589	34.590	0.368	27.646	27.646	27.656	27.656
29	1800.8	1823.5	2.028	1.906	-0.000	34.577	34.575	0.368	27.631	27.629	27.640	27.639

Niskin #	PO4-UNF (umol/l)	PO4-FIL (umol/l)	SiO4-UF/UW (umol/l)	SiO4-F/UW (umol/l)	SiO4/LDGO (umol/l)	TSM (ug/l)
18	2.903	2.877	180.05	179.80	179.947	47.44
23	2.897	2.840	180.46	180.34	179.568	59.17
6	2.897	2.834	180.79	180.91	181.204	53.57
16	2.886	2.830	180.92	181.98	180.845	69.22
14	2.883	2.826	181.70	182.57	181.204	67.61
17	2.884	2.829	182.29	182.34	181.583	64.87
19	2.879	2.828	182.92	183.06	181.314	59.06
12	2.918	2.848	181.13	180.62	181.753	90.11
8	2.943	2.901	179.49	179.81	179.837	39.71
30	2.956	2.948	177.93	177.81	178.311	17.26
21	2.998	2.987	175.05	175.46	176.505	9.05
29	3.011	3.002	173.53	174.00	173.991	14.83

D-Theta = (ptemp + (4.85 * pden)) - 135.961
Additional Samples Collected:
Helium
Particulate Trace Elements
Dissolved Fe and Mn

VENTS 1990 - LEG IV
Station FE7 Cast 18 15 SEP 1990
LAT: 44 57.3N LONG: 130 14.1W

Niskin #	Depth (m)	Depth (db)	Insitu Temp.	Potential Temp.	Temp. Anom.	Salinity (CTD)	Salinity (Bottle)	Atten. (1/m)	Sigma-t (CTD)	Sigma-t (Bottle)	Sigma-Theta (CTD)	Sigma-Theta (Bottle)
20	2242.4	2273.0	1.927	1.768	0.058	34.614	34.614	0.397	27.668	27.668	27.680	27.680
25	2241.6	2272.1	1.928	1.769	0.058	34.614	34.613	0.397	27.668	27.667	27.680	27.680
26	2218.7	2248.8	1.932	1.775	0.062	34.614	34.612	0.398	27.668	27.666	27.680	27.678
22	2218.6	2248.7	1.932	1.775	0.062	34.614	34.612	0.398	27.668	27.666	27.680	27.678
2	2152.9	2181.8	1.926	1.775	0.058	34.613	34.613	0.406	27.667	27.667	27.679	27.679
5	2121.3	2149.6	1.923	1.775	0.050	34.611	34.612	0.406	27.666	27.667	27.678	27.678
9	2101.0	2129.0	1.926	1.780	0.053	34.611	34.610	0.410	27.666	27.665	27.677	27.676
13	2050.1	2077.1	1.921	1.779	0.041	34.608	34.608	0.399	27.664	27.664	27.675	27.675
1	2000.2	2026.3	1.917	1.780	0.026	34.604	34.604	0.385	27.661	27.661	27.672	27.672
15	1900.1	1924.4	1.970	1.840	0.002	34.588	34.589	0.368	27.644	27.645	27.654	27.655
32	1801.3	1824.0	2.048	1.926	0.000	34.574		0.369	27.627		27.636	

Niskin #	PO4-UNF (umol/l)	PO4-FIL (umol/l)	SiO4-UF/UW (umol/l)	SiO4-F/UW (umol/l)	SiO4/LDGO (umol/l)	TSM (ug/l)
20	2.855		180.60			
25	2.849		180.73			
26	2.855		180.61			
22	2.844		180.74			
2	2.855		180.63			
5	2.883		180.27			
9	2.861		179.44			
13	2.889		179.81			
1	2.900		178.74			
15	2.945		175.27			
32						

D-Theta = (ptemp + (4.85 * pden)) - 135.961

VENTS 1990 - LEG IV
Station FE7 Cast 19 15 SEP 1990
LAT: 44 57.2N LONG: 130 14.2W

Niskin #	Depth (m)	Depth (db)	Insitu Temp.	Potential Temp.	Temp. Anom.	Salinity (CTD)	Salinity (Bottle)	Atten. (1/m)	Sigma-t (CTD)	Sigma-t (Bottle)	Sigma-Theta (CTD)	Sigma-Theta (Bottle)
3	2076.7	2104.2	1.933	1.789	0.062	34.613	34.612	0.403	27.667	27.666	27.678	27.677
26	2071.0	2098.5	1.924	1.780	0.052	34.612	34.612	0.403	27.667	27.667	27.678	27.678
22	1501.6	1519.4	2.451	2.348	0.062	34.525	34.524	0.369	27.554	27.553	27.563	27.562
2	1252.4	1266.5	2.912	2.824	0.146	34.475	34.476	0.369	27.474	27.475	27.482	27.483
5	1050.2	1061.5	3.364	3.289	0.140	34.407	34.409	0.370	27.378	27.379	27.385	27.387
9	951.0	961.0	3.588	3.519	0.104	34.366	34.366	0.370	27.323	27.323	27.330	27.330
13	849.6	858.3	3.775	3.713	-0.007	34.311	34.311	0.369	27.261	27.261	27.267	27.267
1	601.3	607.1	4.284	4.239		34.109	34.107	0.368	27.048	27.046	27.053	27.051
15	11.3	11.4	18.180	18.178		32.434	32.438	0.429	23.265	23.268	23.266	23.269

Niskin #	PO4-UNF (umol/l)	PO4-FIL (umol/l)	SiO4-UF/UW (umol/l)	SiO4-F/UW (umol/l)	SiO4/LDGO (umol/l)	TSM (ug/l)
3	2.818	2.762	181.01	179.95		60.00
26	2.843	2.797	180.91	181.20		51.07
22	3.045	3.038	163.06	162.99	163.696	8.69
2	3.136	3.135	150.51	150.56	150.318	8.06
5	3.160	3.159	137.23	137.28	137.399	8.16
9	3.179	3.144	131.33	131.14	130.346	9.70
13	3.147	3.146	124.45	124.01	124.012	24.19
1	2.965	2.970	98.03	99.06	99.351	9.54
15	0.371		1.41			45.81

D-Theta = (ptemp + (4.85 * pden)) - 135.966
Additional Samples Collected:
Helium
Particulate Trace Elements

VENTS 1990 - LEG IV
Station FE8 Cast 20 15 SEP 1990
LAT: 44 55.1N LONG: 130 09.9W

Niskin #	Depth (m)	Depth (db)	Insitu Temp.	Potential Temp.	Temp. Anom.	Salinity (CTD)	Salinity (Bottle)	Atten. (1/m)	Sigma-t (CTD)	Sigma-t (Bottle)	Sigma-Theta (CTD)	Sigma-Theta (Bottle)
23	2348.6	2381.3	1.832	1.666	0.016	34.620	34.620	0.372	27.680	27.680	27.693	27.693
29	2299.2	2330.9	1.833	1.671	0.015	34.619	34.618	0.370	27.680	27.679	27.692	27.691
21	2249.7	2280.4	1.845	1.687	0.014	34.616	34.612	0.369	27.676	27.673	27.688	27.685
24	2199.9	2229.7	1.861	1.707	0.019	34.614	34.613	0.370	27.673	27.673	27.685	27.684
12	2148.3	2177.1	1.874	1.725	0.018	34.611	34.610	0.372	27.670	27.669	27.681	27.681
10	2098.9	2126.8	1.883	1.738	0.019	34.609	34.608	0.373	27.668	27.667	27.679	27.678
19	2049.4	2076.4	1.900	1.759	0.013	34.604	34.600	0.369	27.662	27.659	27.673	27.670
17	1998.4	2024.5	1.922	1.785	0.013	34.600	34.601	0.372	27.657	27.658	27.668	27.669
14	1899.8	1924.2	1.966	1.836	0.003	34.589	34.589	0.368	27.645	27.645	27.655	27.655
16	1749.6	1771.4	2.089	1.970	-0.003	34.566	34.567	0.368	27.617	27.618	27.626	27.627
6	1498.8	1516.6	2.439	2.336	0.060	34.525	34.525	0.369	27.555	27.555	27.564	27.564
18	1250.1	1264.1	2.921	2.833	0.132	34.469	34.470	0.369	27.468	27.469	27.476	27.477

Niskin #	PO4-UNF (umol/l)	PO4-FIL (umol/l)	SiO4-UF/UW (umol/l)	SiO4-F/UW (umol/l)	SiO4/LDGO (umol/l)	TSM (ug/l)
23	2.848	2.847	179.75	179.73		15.07
29	2.844	2.849	179.91	179.39	179.428	15.65
21	2.851	2.851	179.57	179.06	178.720	12.04
24	2.864	2.858	178.74	179.84	178.491	17.40
12	2.866	2.865	177.94	178.76	178.491	14.77
10	2.890	2.867	179.18	179.29	178.491	15.20
19	2.903	2.896	178.60	178.46	177.543	10.90
17	2.910	2.898	177.39	177.50	177.074	12.55
14	2.917	2.917	175.44	175.43	175.647	7.97
16	2.969	2.969	172.50	172.51	172.814	7.83
6	3.077	3.077	164.09	163.46	164.315	8.49
18	3.135	3.145	150.60	149.89	150.867	7.46

D-Theta = (ptemp + (4.85 * pden)) - 135.961
Additional Samples Collected:
Helium
Particulate Trace Elements

VENTS 1990 - LEG IV
Station FE8 Cast 21 15 SEP 1990
LAT: 44 55.1N LONG: 130 10.1W

Niskin #	Depth (m)	Depth (db)	Insitu Temp.	Potential Temp.	Temp. Anom.	Salinity (CTD)	Salinity (Bottle)	Atten. (1/m)	Sigma-t (CTD)	Sigma-t (Bottle)	Sigma-Theta (CTD)	Sigma-Theta (Bottle)
20	2299.9	2331.6	1.835	1.673	0.016	34.618	34.618	0.369	27.679	27.679	27.691	27.691
5	2200.1	2229.9	1.877	1.723	0.036	34.615	34.614	0.374	27.673	27.672	27.685	27.684
30	2198.5	2228.2	1.876	1.722	0.035	34.615	34.616	0.374	27.673	27.674	27.685	27.686
15	2151.0	2179.9	1.885	1.735	0.032	34.612	34.611	0.378	27.670	27.669	27.681	27.681
3	2151.0	2179.9	1.884	1.734	0.031	34.612	34.614	0.377	27.670	27.672	27.681	27.683
31	2100.2	2128.2	1.892	1.747	0.012	34.605	34.605	0.368	27.664	27.664	27.675	27.675
26	2100.4	2128.3	1.893	1.747	0.008	34.604	34.605	0.368	27.663	27.664	27.674	27.675
22	2048.8	2075.8	1.908	1.767	0.013	34.602	34.601	0.369	27.660	27.659	27.671	27.670
8	2049.2	2076.2	1.908	1.767	0.013	34.602	34.601	0.369	27.660	27.659	27.671	27.670
27	1999.7	2025.8	1.939	1.801	0.007	34.595	34.595	0.368	27.652	27.652	27.663	27.663
2	1900.7	1925.0	1.992	1.859			34.582	0.367		27.637		27.648

Niskin #	PO4-UNF (umol/l)	PO4-FIL (umol/l)	SiO4-UF/UW (umol/l)	SiO4-F/UW (umol/l)	SiO4/LDGO (umol/l)	TSM (ug/l)
20	2.879		181.47			
5	2.880		181.08			
30	2.880		180.31			
15	2.886		179.27			
3	2.892		180.42			
31	2.920		178.36			
26	2.914		178.35			
22	2.920		178.22			
8	2.926		178.47			
27	2.937		177.30			
2	2.982		175.87			

D-Theta = (ptemp + (4.85 * pden)) - 135.958

VENTS 1990 - LEG IV
Station FE9 Cast 22 15 SEP 1990
LAT: 44 55.7N LONG: 130 12.0W

Niskin #	Depth (m)	Depth (db)	Insitu Temp.	Potential Temp.	Temp. Anom.	Salinity (CTD)	Salinity (Bottle)	Atten. (1/m)	Sigma-t (CTD)	Sigma-t (Bottle)	Sigma-Theta (CTD)	Sigma-Theta (Bottle)
5	2256.0	2286.8	1.876	1.717	0.031	34.616	34.615	0.374	27.674	27.673	27.686	27.685
30	2200.1	2229.9	1.879	1.725	0.032	34.615	34.618	0.375	27.673	27.675	27.685	27.687
15	2173.0	2202.3	1.880	1.728	0.034	34.615	34.615	0.375	27.673	27.673	27.684	27.684
3	2149.2	2178.0	1.882	1.732	0.029	34.613	34.615	0.378	27.671	27.673	27.682	27.684
31	2124.8	2153.2	1.886	1.738	0.025	34.611	34.608	0.379	27.669	27.667	27.680	27.678
26	2091.2	2119.0	1.901	1.756	0.028	34.609	34.609	0.385	27.666	27.666	27.677	27.677
22	2074.9	2102.4	1.903	1.760	0.027	34.608	34.607	0.384	27.665	27.664	27.676	27.676
8	2050.4	2077.4	1.907	1.766	0.019	34.605	34.604	0.376	27.663	27.662	27.673	27.673
27	2000.6	2026.7	1.923	1.786	0.008	34.599	34.597	0.370	27.656	27.655	27.667	27.665
2	1900.1	1924.4	1.976	1.846	-0.000	34.587	34.589	0.367	27.643	27.644	27.653	27.654
13	1750.3	1772.1	2.105	1.986	-0.003	34.564	34.565	0.368	27.614	27.615	27.623	27.624
1	1500.0	1517.8	2.448	2.345	0.060	34.524	34.524	0.369	27.554	27.554	27.562	27.562

Niskin #	PO4-UNF (umol/l)	PO4-FIL (umol/l)	SiO4-UF/UW (umol/l)	SiO4-F/UW (umol/l)	SiO4/LDGO (umol/l)	TSM (ug/l)
5	2.866	2.854	182.17	180.69	178.959	18.89
30	2.856	2.850	180.76	182.03	179.428	19.80
15	2.863	2.857	180.10	180.87	179.658	21.93
3	2.875	2.863	179.56	179.08	179.428	25.98
31	2.876	2.859	177.76	177.91	178.251	24.78
26	2.879	2.866	180.54	177.99	178.491	26.57
22	2.879	2.867	177.17	178.20	178.251	28.80
8	2.908	2.891	176.63	175.89	178.720	21.85
27	2.915	2.914	175.82	176.23	176.126	15.14
2	2.955	2.954	173.63	174.41	174.949	10.94
13	2.990	2.995	172.82	171.58	171.877	12.91
1	3.086	3.085	162.87	162.65	164.055	12.94

D-Theta = (ptemp + (4.85 * pden)) - 135.963
Additional Samples Collected:
Helium
Particulate Trace Elements
Dissolved Fe and Mn

VENTS 1990 - LEG IV
Station FE9 Cast 23 16 SEP 1990
LAT: 44 55.7N LONG: 130 12.0W

Niskin #	Depth (m)	Depth (db)	Insitu Temp.	Potential Temp.	Temp. Anom.	Salinity (CTD)	Salinity (Bottle)	Atten. (1/m)	Sigma-t (CTD)	Sigma-t (Bottle)	Sigma-Theta (CTD)	Sigma-Theta (Bottle)
25	2255.9	2286.7	1.877	1.718	0.032	34.615	34.616	0.373	27.673	27.674	27.685	27.686
23	2200.0	2229.8	1.883	1.729	0.035	34.614	34.615	0.373	27.672	27.672	27.683	27.684
9	2200.0	2229.8	1.883	1.729	0.035	34.614	34.615	0.374	27.672	27.672	27.683	27.684
24	2174.8	2204.1	1.885	1.733	0.029	34.612	34.610	0.377	27.670	27.668	27.682	27.680
10	2150.3	2179.1	1.887	1.737	0.028	34.611	34.612	0.377	27.669	27.670	27.680	27.681
19	2101.1	2129.0	1.901	1.755	0.032	34.609	34.608	0.383	27.666	27.665	27.677	27.677
12	2102.7	2130.7	1.901	1.755	0.028	34.608	34.608	0.383	27.665	27.665	27.677	27.677
21	2051.6	2078.7	1.904	1.762	0.025	34.606	34.606	0.379	27.664	27.664	27.674	27.674
6	2052.7	2079.7	1.904	1.762	0.025	34.606	34.606	0.380	27.664	27.664	27.674	27.674
16	2001.7	2027.8	1.915	1.778	0.011	34.600	34.605	0.371	27.658	27.662	27.669	27.673
14	1901.0	1925.4	1.985	1.855	0.001	34.585	34.589	0.367	27.640	27.644	27.651	27.654
32	1902.6	1927.0	1.982	1.852	0.003	34.586	34.583	0.367	27.641	27.639	27.652	27.649

Niskin #	PO4-UNF (umol/l)	PO4-FIL (umol/l)	SiO4-UF/UW (umol/l)	SiO4-F/UW (umol/l)	SiO4/LDGO (umol/l)	TSM (ug/l)
25	2.857		181.52			
23	2.852		181.26			
9	2.853		181.36			
24	2.859		179.49			
10	2.877		179.59			
19	2.872		180.20			
12	2.883		180.06			
21	2.890		180.17			
6	2.896		177.78			
16	2.902		177.64			
14	2.947		175.50			
32	2.948		175.60			

D-Theta = (ptemp + (4.85 * pden)) - 135.959

VENTS 1990 - LEG IV
Station FE14 Cast 24 16 SEP 1990
LAT: 44 53.1N LONG: 130 10.6W

Niskin #	Depth (m)	Depth (db)	Insitu Temp.	Potential Temp.	Temp. Anom.	Salinity (CTD)	Salinity (Bottle)	Atten. (1/m)	Sigma-t (CTD)	Sigma-t (Bottle)	Sigma-Theta (CTD)	Sigma-Theta (Bottle)
25	2250.7	2281.4	1.836	1.678	0.008	34.617	34.616	0.368	27.678	27.677	27.690	27.689
23	2201.9	2231.7	1.858	1.704	0.009	34.613		0.368	27.673		27.685	
9	2147.3	2176.1	1.878	1.729	0.009	34.609	34.610	0.370	27.668	27.669	27.679	27.680
24	2096.9	2124.8	1.896	1.751	0.007	34.605	34.605	0.369	27.663	27.663	27.675	27.675
10	2048.6	2075.6	1.907	1.766	0.009	34.603	34.603	0.369	27.661	27.661	27.672	27.672
19	2002.9	2029.1	1.921	1.783	0.005	34.599	34.599	0.369	27.657	27.657	27.667	27.667
12	1947.1	1972.3	1.952	1.819	0.004	34.593	34.593	0.368	27.649	27.649	27.660	27.660
21	1896.5	1920.8	1.977	1.848	0.002	34.588	34.585	0.367	27.643	27.641	27.654	27.651
6	1746.1	1767.8	2.118	1.999	-0.005	34.562	34.562	0.368	27.611	27.611	27.621	27.621
16	1506.4	1524.3	2.465	2.362	0.060	34.522	34.522	0.368	27.551	27.551	27.559	27.559
14	1247.6	1261.6	2.929	2.842	0.121	34.466	34.467	0.369	27.465	27.466	27.473	27.474
32	1006.1	1016.9	3.457	3.384	0.107	34.385	34.325	0.369	27.351	27.303	27.358	27.310

Niskin #	PO4-UNF (umol/l)	PO4-FIL (umol/l)	SiO4-UF/UW (umol/l)	SiO4-F/UW (umol/l)	SiO4/LDGO (umol/l)	TSM (ug/l)
25	2.864	2.869	179.500	179.68	179.738	10.32
23						
9	2.872	2.905	179.740	178.72	179.259	10.54
24	2.885	2.912	177.810	177.75	179.029	11.62
10	2.920	2.914	176.720	176.78	179.029	10.42
19	2.922	2.921	176.590	176.78	177.383	8.77
12	2.940	2.928	175.620	175.69	176.675	8.89
21	2.931	2.947	174.530	174.96	175.498	8.82
6	3.005	3.005	171.020	170.84	172.675	8.58
16	3.091	3.074	161.450	162.48	162.798	6.77
14	3.172	3.171	148.720	148.55	150.328	7.10
32	3.168	3.150	130.273	127.69	129.858	13.57

D-Theta = (ptemp + (4.85 * pden)) - 135.965
Additional Samples Collected:
Helium
Particulate Trace Elements
Dissolved Fe and Mn

VENTS 1990 - LEG IV
Station FE7 Cast 25 16 SEP 1990
LAT: 44 57.0N LONG: 130 14.3W

Niskin #	Depth (m)	Depth (db)	Insitu Temp.	Potential Temp.	Temp. Anom.	Salinity (CTD)	Salinity (Bottle)	Atten. (1/m)	Sigma-t (CTD)	Sigma-t (Bottle)	Sigma-Theta (CTD)	Sigma-Theta (Bottle)
30	2102.2	2130.2	1.912	1.766	0.042	34.611	34.610	0.391	27.667	27.666	27.678	27.677
5	1801.3	1824.0	2.051	1.929	0.004	34.575	34.580	0.367	27.627	27.631	27.637	27.641
15	13.0	13.1	18.172	18.170		32.419	32.427	0.409	23.256	23.262	23.256	23.262

Niskin #	PO4-UNF (umol/l)	PO4-FIL (umol/l)	SiO4-UF/UW (umol/l)	SiO4-F/UW (umol/l)	SiO4/LDGO (umol/l)	TSM (ug/l)
30	2.847	2.863	179.27	179.21		31.42
5	2.966	2.966	173.26	173.32		7.25
15	0.351	0.350				

D-Theta = (ptemp + (4.85 * pden)) - 135.963

VENTS 1990 - LEG IV
Station FE10 Cast 26 17 SEP 1990
LAT: 44 56.2N LONG: 130 14.1W

Niskin #	Depth (m)	Depth (db)	Insitu Temp.	Potential Temp.	Temp. Anom.	Salinity (CTD)	Salinity (Bottle)	Atten. (1/m)	Sigma-t (CTD)	Sigma-t (Bottle)	Sigma-Theta (CTD)	Sigma-Theta (Bottle)
5	2228.7	2259.0	1.926	1.769	0.055	34.614	34.616	0.403	27.668	27.670	27.680	27.682
30	2194.5	2224.2	1.925	1.771	0.056	34.614	34.614	0.404	27.668	27.668	27.680	27.680
10	2174.5	2203.8	1.929	1.776	0.060	34.614	34.613	0.409	27.668	27.667	27.680	27.679
14	2150.8	2179.7	1.937	1.786	0.062	34.613	34.614	0.415	27.667	27.667	27.678	27.679
16	2128.4	2156.9	1.935	1.786	0.062	34.613	34.612	0.412	27.667	27.666	27.678	27.677
12	2104.0	2132.0	1.929	1.783	0.060	34.613	34.612	0.411	27.667	27.666	27.679	27.678
19	2075.2	2102.7	1.930	1.786	0.058	34.612	34.612	0.412	27.666	27.666	27.677	27.677
9	2050.1	2077.1	1.927	1.785	0.053	34.611	34.610	0.408	27.666	27.665	27.677	27.676
21	2028.7	2055.4	1.911	1.771	0.029	34.607	34.606	0.393	27.664	27.663	27.675	27.674
6	1999.9	2026.0	1.915	1.778	0.022	34.604	34.603	0.389	27.661	27.660	27.672	27.671
24	1899.3	1923.6	1.957	1.828	0.002	34.591	34.591	0.375	27.647	27.647	27.657	27.657
25	1748.3	1770.1	2.110	1.991	-0.001	34.564	34.565	0.376	27.614	27.614	27.623	27.624

Niskin #	PO4-UNF (umol/l)	PO4-FIL (umol/l)	SiO4-UF/UW (umol/l)	SiO4-F/UW (umol/l)	SiO4/LDGO (umol/l)	TSM (ug/l)
5	2.902	2.857	182.41	183.50	179.728	46.15
30	2.914	2.869	183.70	182.61	179.967	51.53
10	2.909	2.858	182.02	183.89	180.196	64.87
14	2.916	2.869	183.24	183.89	179.967	55.90
16	2.913	2.869	184.48	183.91	180.436	62.11
12	2.922	2.871	183.75	184.46	180.895	56.11
19	2.908	2.845	183.86	183.93	180.665	56.07
9	2.971	2.874	182.65	182.73	179.967	46.55
21	2.966	2.931	181.97	180.86	178.560	32.13
6	2.972	2.949	181.03	180.31	178.331	27.31
24	3.007	3.001	177.56	182.14	175.767	9.43
25	3.019	3.030	173.81	175.09	172.026	16.97

D-Theta = (ptemp + (4.85 * pden)) - 135.964
Additional Samples Collected:
Helium
Particulate Trace Elements
Dissolved Fe and Mn

VENTS 1990 - LEG IV
Station FE10 Cast 27 17 SEP 1990
LAT: 44 56.2N LONG: 130 14.1W

Niskin #	Depth (m)	Depth (db)	Insitu Temp.	Potential Temp.	Temp. Anom.	Salinity (CTD)	Salinity (Bottle)	Atten. (1/m)	Sigma-t (CTD)	Sigma-t (Bottle)	Sigma-Theta (CTD)	Sigma-Theta (Bottle)
1	2130.0	2158.5	1.926	1.777	0.061	34.614	34.614	0.413	27.668	27.668	27.680	27.680
32	2132.9	2161.4	1.929	1.780	0.067	34.615	34.608	0.410	27.669	27.663	27.680	27.675
8	2119.7	2148.0	1.928	1.780	0.063	34.614	34.614	0.411	27.668	27.668	27.680	27.680
22	2109.7	2137.8	1.925	1.778	0.062	34.614	34.609	0.416	27.668	27.664	27.680	27.676
26	1799.0	1821.7	2.056	1.934	-0.000	34.573	34.573	0.377	27.625	27.625	27.635	27.635
29	1701.1	1722.1	2.172	2.056	0.005	34.555	34.555	0.377	27.601	27.601	27.611	27.611
3	1599.7	1619.0	2.317	2.208	0.031	34.538	34.538	0.377	27.576	27.576	27.585	27.585
17	1399.9	1416.1	2.643	2.546	0.097	34.503	34.503	0.377	27.520	27.520	27.529	27.529
18	1151.2	1163.8	3.127	3.045	0.153	34.444	34.443	0.378	27.430	27.429	27.437	27.436

Niskin #	PO4-UNF (umol/l)	PO4-FIL (umol/l)	SiO4-UF/UW (umol/l)	SiO4-F/UW (umol/l)	SiO4/LDGO (umol/l)	TSM (ug/l)
1	2.872	2.833	170.58	182.730		58.10
32	2.913	2.839	182.61	181.120		53.36
8	2.869	2.807	183.11	183.480		61.67
22	2.876	2.820	182.23	182.360		57.54
26	2.878	2.984	183.10	176.265		8.55
29	3.008	3.002	171.63	171.760		7.64
3	3.088	3.053	168.75	167.380		9.52
17	3.117	3.116	158.73	159.370		7.47
18	3.203	3.174	144.94	144.830		7.54

D-Theta = (ptemp + (4.85 * pden)) - 135.963
Additional Samples Collected:
Helium
Particulate Trace Elements

VENTS 1990 - LEG IV
Station FE10 Cast 28 17 SEP 1990
LAT: 44 56.2N LONG: 130 14.1W

Niskin #	Depth (m)	Depth (db)	Insitu Temp.	Potential Temp.	Temp. Anom.	Salinity (CTD)	Salinity (Bottle)	Atten. (1/m)	Sigma-t (CTD)	Sigma-t (Bottle)	Sigma-Theta (CTD)	Sigma-Theta (Bottle)
2	2235.7	2266.1	1.924	1.766	0.054	34.614	34.609	0.401	27.668	27.664	27.681	27.677
31	2202.5	2232.3	1.930	1.775	0.060	34.614	34.613	0.405	27.668	27.667	27.680	27.679
6	2202.8	2232.7	1.930	1.775	0.060	34.614	34.614	0.405	27.668	27.668	27.680	27.680
13	2149.7	2178.6	1.931	1.781	0.059	34.613	34.612	0.408	27.667	27.666	27.679	27.678
24	2149.9	2178.7	1.931	1.781	0.059	34.613	34.610	0.408	27.667	27.665	27.679	27.676
25	2100.2	2128.1	1.936	1.790	0.065	34.613	34.612	0.415	27.667	27.666	27.678	27.677
5	2100.1	2128.1	1.935	1.789	0.064	34.613	34.611	0.416	27.667	27.665	27.678	27.676
27	2050.1	2077.1	1.933	1.791	0.066	34.613	34.612	0.415	27.667	27.666	27.678	27.677
16	2000.5	2026.6	1.919	1.782	0.017	34.602	34.601	0.383	27.659	27.658	27.670	27.669
12	1950.0	1975.2	1.934	1.801	0.010	34.597	34.598	0.377	27.654	27.655	27.664	27.665
19	1900.6	1924.9	1.975	1.845	0.003	34.588	34.588	0.375	27.644	27.644	27.654	27.654
9	1900.7	1925.0	1.974	1.844	0.002	34.588	34.589	0.375	27.644	27.644	27.654	27.655

Niskin #	PO4-UNF (umol/l)	PO4-FIL (umol/l)	SiO4-UF/UW (umol/l)	SiO4-F/UW (umol/l)	SiO4/LDGO (umol/l)	TSM (ug/l)
2	2.874		182.12			
31	2.881		182.99			
6	2.877		183.38			
13	2.895		181.93			
24	2.880		183.05			
25	2.881		183.31			
5	2.877		183.33			
27	2.890		183.10			
16	2.920		180.20			
12	2.933		179.48			
19	2.985		180.11			
9	2.953		177.57			

D-Theta = (ptemp + (4.85 * pden)) - 135.963

VENTS 1990 - LEG IV
Station FE10 Cast 29 17 SEP 1990
LAT: 44 55.3N LONG: 130 14.3W

Niskin #	Depth (m)	Depth (db)	Insitu Temp.	Potential Temp.	Temp. Anom.	Salinity (CTD)	Salinity (Bottle)	Atten. (1/m)	Sigma-t (CTD)	Sigma-t (Bottle)	Sigma-Theta (CTD)	Sigma-Theta (Bottle)
2	2234.7	2265.2	1.927	1.769	0.060	34.614	34.613	0.391	27.668	27.667	27.680	27.680
31	2202.6	2232.4	1.941	1.786	0.063	34.612		0.404	27.666		27.678	
6	2175.2	2204.6	1.937	1.784	0.062	34.612	34.611	0.405	27.666	27.665	27.678	27.677
13	2149.6	2178.4	1.939	1.788	0.064	34.612	34.611	0.407	27.666	27.665	27.677	27.677
24	2125.3	2153.7	1.931	1.783	0.057	34.611	34.611	0.412	27.665	27.665	27.677	27.677
25	2099.8	2127.7	1.930	1.784	0.058	34.611		0.409	27.666		27.677	
5	2074.3	2101.7	1.938	1.794	0.068	34.612	34.615	0.408	27.666	27.668	27.677	27.679
27	2057.3	2084.4	1.937	1.794	0.068	34.612		0.407	27.666		27.677	
16	2024.5	2051.0	1.936	1.796	0.069	34.612	34.612	0.409	27.666	27.666	27.677	27.677
12	2005.7	2031.9	1.934	1.796	0.069	34.612	34.612	0.407	27.666	27.666	27.677	27.677
19	1951.2	1976.5	1.929	1.796	0.011	34.597	34.598	0.371	27.654	27.655	27.665	27.666
9	1900.2	1924.6	1.975	1.845	0.003	34.587		0.367	27.643		27.653	

Niskin #	PO4-UNF (umol/l)	PO4-FIL (umol/l)	SiO4-UF/UW (umol/l)	SiO4-F/UW (umol/l)	SiO4/LDGO (umol/l)	TSM (ug/l)
2	2.920	2.903	183.19	183.18		
31						
6	2.931	2.909	182.94	184.48		
13	2.942	2.880	183.20	183.84		
24	2.925	2.897	182.83	183.46		
25						
5	2.913	2.896	182.83	183.09		
27						
16	2.941	2.907	183.10	183.22		
12	2.907	2.907	182.98	182.98		
19	2.980	2.968	179.26	179.39		
9						

D-Theta = (ptemp + (4.85 * pden)) - 135.959
Additional Samples Collected:
Particulate Trace Elements

VENTS 1990 - LEG IV
Station FE13 Cast 32 18 SEP 1990
LAT: 44 57.9N LONG: 130 21.6W

Niskin #	Depth (m)	Depth (db)	Insitu Temp.	Potential Temp.	Temp. Anom.	Salinity (CTD)	Salinity (Bottle)	Atten. (1/m)	Sigma-t (CTD)	Sigma-t (Bottle)	Sigma-Theta (CTD)	Sigma-Theta (Bottle)
18	2489.6	2525.0	1.832	1.653	0.016	34.623		0.380	27.683		27.696	
10	2450.0	2484.6	1.833	1.657	0.019	34.623	34.621	0.379	27.683	27.681	27.696	27.694
30	2424.2	2458.4	1.835	1.662	0.018	34.622		0.378	27.682		27.695	
19	2374.9	2408.1	1.841	1.672	0.017	34.620	34.619		27.680	27.679	27.693	27.692
24	2322.5	2354.6	1.847	1.683	0.016	34.618		0.378	27.678		27.690	
13	2273.1	2304.3	1.852	1.692	0.014	34.616	34.617	0.378	27.676	27.676	27.688	27.689
16	2224.3	2254.5	1.851	1.695	0.012	34.615		0.378	27.675		27.687	
21	2173.5	2202.8	1.857	1.706	0.015	34.614	34.614	0.379	27.674	27.674	27.685	27.685
17	2145.4	2174.1	1.863	1.714	0.016	34.613	34.613	0.380	27.672	27.672	27.684	27.684
3	2126.9	2155.3	1.865	1.718	0.015	34.612	34.610	0.380	27.671	27.670	27.683	27.681
15	2106.9	2134.9	1.868	1.722	0.010	34.610	34.610	0.377	27.670	27.670	27.681	27.681
14	1937.7	1962.7	1.946	1.814	-0.003	34.592	34.592	0.375	27.649	27.649	27.659	27.659

Niskin #	PO4-UNF (umol/l)	PO4-FIL (umol/l)	SiO4-UF/UW (umol/l)	SiO4-F/UW (umol/l)	SiO4/LDGO (umol/l)	TSM (ug/l)
18						
10	2.896	2.901	183.26	184.09		
30						
19	2.904	2.909	182.58	182.92		
24						
13	2.911	2.910	182.49	182.12		
16						
21	2.912	2.912	181.81	182.03		
17	2.914	2.913	181.00	181.71		
3	2.916	2.920	181.87	180.90		
15	2.923	2.933	180.71	181.68		
14	2.970	2.969	177.75	177.98		

D-Theta = (ptemp + (4.85 * pden)) - 135.964
Additional Samples Collected:
Particulate Trace Elements

VENTS 1990 - LEG IV
Station FE12 Cast 33 19 SEP 1990
LAT: 44 57.4N LONG: 130 18.7W

Niskin #	Depth (m)	Depth (db)	Insitu Temp.	Potential Temp.	Temp. Anom.	Salinity (CTD)	Salinity (Bottle)	Atten. (1/m)	Sigma-t (CTD)	Sigma-t (Bottle)	Sigma-Theta (CTD)	Sigma-Theta (Bottle)
14	2302.7	2334.5	1.861	1.698	0.016	34.616	34.616	0.382	27.675	27.675	27.687	27.687
30	2249.1	2279.8	1.863	1.705	0.016	34.615	34.615	0.381	27.674	27.674	27.686	27.686
18	2202.2	2232.0	1.868	1.714	0.018	34.614	34.608	0.381	27.673	27.668	27.685	27.680
1	2152.4	2181.3	1.875	1.725	0.017	34.612	34.612	0.382	27.671	27.671	27.682	27.682
24	2092.1	2119.9	1.898	1.753	0.023	34.609	34.610	0.390	27.666	27.667	27.678	27.678
9	2050.4	2077.4	1.908	1.767	0.028	34.608	34.608	0.397	27.665	27.665	27.676	27.676
12	1996.1	2022.1	1.914	1.777	0.004	34.600	34.601	0.378	27.658	27.659	27.669	27.669
19	1951.4	1976.7	1.935	1.802	-0.000	34.595	34.595	0.378	27.652	27.652	27.663	27.663
21	1904.6	1929.0	1.972	1.842	-0.002	34.588	34.587	0.376	27.644	27.643	27.654	27.653
17	1753.3	1775.2	2.096	1.977	0.004	34.568	34.568	0.377	27.618	27.618	27.627	27.627
3	1502.3	1520.2	2.469	2.366	0.069	34.524	34.524	0.377	27.552	27.552	27.561	27.561
15	1249.4	1263.5	2.969	2.881	0.131	34.463	34.463	0.378	27.459	27.459	27.467	27.467

Niskin #	PO4-UNF (umol/l)	PO4-FIL (umol/l)	SiO4-UF/UW (umol/l)	SiO4-F/UW (umol/l)	SiO4/LDGO (umol/l)	TSM (ug/l)
14	2.955	2.938	178.32	179.09	179.418	14.39
30	2.956	2.950	178.30	178.06	179.768	16.34
18	2.950	2.944	177.13	177.40	178.940	18.13
1	2.956	2.956	179.30	177.24	179.648	16.74
24	2.962	2.951	177.70	177.34	179.179	23.52
9	2.957	2.940	178.31	178.19	179.179	28.28
12	2.974	2.980	176.88	176.77	177.283	21.31
19	3.008	2.997	174.56	174.57	176.815	44.75
21	3.014	3.014	173.37	173.39	176.106	10.80
17	3.065	3.065	170.79	171.06	173.034	11.02
3	3.151	3.145	161.30	160.95	163.576	8.65
15	3.236	3.242	147.58	147.36	149.161	11.48

D-Theta = (ptemp + (4.85 * pden)) - 135.966
Additional Samples Collected:
Helium
Particulate Trace Elements

VENTS 1990 - LEG IV
Station FE12 Cast 34 19 SEP 1990
LAT: 44 57.8N LONG: 130 18.2W

Niskin #	Depth (m)	Depth (db)	Insitu Temp.	Potential Temp.	Temp. Anom.	Salinity (CTD)	Salinity (Bottle)	Atten. (1/m)	Sigma-t (CTD)	Sigma-t (Bottle)	Sigma-Theta (CTD)	Sigma-Theta (Bottle)
25	2315.2	2347.2	1.859	1.695	0.024	34.619	34.597	0.381	27.677	27.660	27.690	27.672
8	2200.4	2230.2	1.870	1.716	0.021	34.615	34.616	0.380	27.673	27.674	27.685	27.686
29	2151.4	2180.3	1.886	1.736	0.022	34.612	34.611	0.384	27.670	27.669	27.681	27.680
26	2123.4	2151.8	1.899	1.751	0.028	34.611	34.609	0.390	27.668	27.666	27.679	27.678
27	2099.8	2127.7	1.911	1.765	0.037	34.611	34.607	0.400	27.667	27.664	27.678	27.675
20	2099.5	2127.4	1.911	1.765	0.037	34.611	34.608	0.401	27.667	27.665	27.678	27.676
2	2047.6	2074.6	1.909	1.768	0.015	34.605	34.604	0.386	27.662	27.662	27.673	27.672
6	2046.8	2073.8	1.910	1.769	0.016	34.605	34.607	0.386	27.662	27.664	27.673	27.675
22	1998.3	2024.4	1.939	1.802	0.001	34.596	34.595	0.378	27.653	27.652	27.663	27.663
10	1902.9	1927.3	1.997	1.867	-0.000	34.585	34.588	0.376	27.639	27.642	27.650	27.652
11	50.8	51.2	11.651	11.645		32.566	32.568	0.514	24.764	24.766	24.765	24.767
5	24.0	24.2	18.091	18.087		32.416	32.422	0.417	23.273	23.278	23.274	23.279

Niskin #	PO4-UNF (umol/l)	PO4-FIL (umol/l)	SiO4-UF/UW (umol/l)	SiO4-F/UW (umol/l)	SiO4/LDGO (umol/l)	TSM (ug/l)
25	2.954		179.35			
8	2.954		179.99			
29	2.960		179.03			
26	2.960		179.17			
27	2.954		179.20			
20	2.954		179.22			
2	2.965		177.77			
6	2.965		177.79			
22	2.999		176.83			
10	3.016		174.52			
11	0.595		0.63			131.59
5	0.408					33.19

D-Theta = (ptemp + (4.85 * pden)) - 135.968

VENTS 1990 - LEG IV
Station FE12 Cast 35 19 SEP 1990
LAT: 44 57.8N LONG: 130 18.1W

Niskin #	Depth (m)	Depth (db)	Insitu Temp.	Potential Temp.	Temp. Anom.	Salinity (CTD)	Salinity (Bottle)	Atten. (1/m)	Sigma-t (CTD)	Sigma-t (Bottle)	Sigma-Theta (CTD)	Sigma-Theta (Bottle)
26	2368.3	2401.4	1.862	1.693	0.019	34.618	34.619	0.380	27.676	27.677	27.689	27.690
29	2207.7	2237.7	1.871	1.716	0.018	34.614	34.613	0.381	27.673	27.672	27.684	27.684
8	2149.9	2178.7	1.882	1.732	0.020	34.612	34.614	0.384	27.670	27.672	27.682	27.683
27	2123.3	2151.7	1.901	1.753	0.025	34.610	34.608	0.395	27.667	27.665	27.678	27.677
6	2099.2	2127.1	1.908	1.762	0.031	34.610	34.610	0.401	27.666	27.666	27.678	27.678
2	2072.8	2100.3	1.908	1.765	0.029	34.609	34.609	0.398	27.666	27.666	27.677	27.677
22	2047.6	2074.6	1.902	1.761	0.015	34.606	34.606	0.387	27.664	27.664	27.675	27.675
10	2022.9	2049.5	1.909	1.770	0.016	34.605	34.600	0.388	27.662	27.658	27.673	27.669
25	1996.4	2022.4	1.913	1.776	0.005	34.601		0.379	27.659		27.669	

Niskin #	PO4-UNF (umol/l)	PO4-FIL (umol/l)	SiO4-UF/UW (umol/l)	SiO4-F/UW (umol/l)	SiO4/LDGO (umol/l)	TSM (ug/l)
26	2.960	2.943	182.94	183.20		
29	2.960	2.932	181.93	182.31		
8	2.955	2.932	182.94	182.82		
27	2.926	2.915	182.31	182.31		
6	2.943	2.915	182.78	183.20		
2	2.943	2.915	183.02	182.78		
22	2.955	2.915	180.97	181.81		
10	2.960	2.938	180.48	180.48		
25						

D-Theta = (ptemp + (4.85 * pden)) - 135.968
Additional Samples Collected:
Particulate Trace Elements

VENTS 1990 - LEG IV
Station FE11 Cast 36 20 SEP 1990
LAT: 44 56.9N LONG: 130 15.6W

Niskin #	Depth (m)	Depth (db)	Insitu Temp.	Potential Temp.	Temp. Anom.	Salinity (CTD)	Salinity (Bottle)	Atten. (1/m)	Sigma-t (CTD)	Sigma-t (Bottle)	Sigma-Theta (CTD)	Sigma-Theta (Bottle)
12	2143.3	2172.1	1.912	1.762	0.040	34.611	34.613	0.402	27.667	27.669	27.678	27.680
26	2131.3	2159.8	1.915	1.766	0.043	34.611	34.612	0.410	27.667	27.668	27.678	27.679
22	2121.4	2149.7	1.917	1.769	0.044	34.611	34.609	0.416	27.667	27.665	27.678	27.676
24	2109.2	2137.3	1.920	1.773	0.043	34.610	34.610	0.423	27.666	27.666	27.677	27.677
1	2097.9	2125.8	1.919	1.773	0.043	34.610	34.610	0.424	27.666	27.666	27.677	27.677
10	2048.8	2075.8	1.918	1.777	0.030	34.606	34.607	0.401	27.662	27.663	27.673	27.674
30	2039.6	2066.4	1.916	1.775	0.029	34.606	34.605	0.396	27.663	27.662	27.673	27.673
18	1998.6	2024.7	1.925	1.788	0.009	34.599	34.595	0.382	27.656	27.653	27.667	27.664
23	1893.6	1917.9	1.998	1.869	-0.002	34.583	34.582	0.376	27.638	27.637	27.648	27.647
2	1757.7	1779.6	2.126	2.006	0.002	34.562	34.561	0.377	27.611	27.610	27.620	27.620
25	1499.5	1517.3	2.512	2.409	0.078	34.519	34.500	0.377	27.544	27.529	27.553	27.538
3	1251.6	1265.7	2.951	2.863	0.147	34.469	34.468	0.377	27.466	27.465	27.474	27.473

Niskin #	PO4-UNF (umol/l)	PO4-FIL (umol/l)	SiO4-UF/UW (umol/l)	SiO4-F/UW (umol/l)	SiO4/LDGO (umol/l)	TSM (ug/l)
12	2.944	2.927	181.60	182.21	180.835	34.12
26	2.949	2.927	181.80	181.38	181.304	42.96
22	2.944	2.921	182.14	182.10	180.356	41.63
24	2.944	2.915	181.43	181.01	180.127	49.13
1	2.944	2.915	181.64	181.47	180.356	45.61
10	2.972	2.938	180.14	179.98	179.648	31.98
30	2.972	2.932	179.55	179.65	178.700	29.57
18	2.983	2.983	178.18	178.02	176.575	15.79
23	3.028	3.034	176.40	176.24	174.690	10.60
2	3.079	3.079	173.31	173.81	171.847	9.76
25	3.153	3.153	160.05	160.57	159.087	12.62
3	3.243	3.226	150.71	150.57	148.443	11.41

D-Theta = (ptemp + (4.85 * pden)) - 135.963
Additional Samples Collected:
Helium
Particulate Trace Elements
Dissolved Fe and Mn

VENTS 1990 - LEG IV
Station FE11 Cast 37 20 SEP 1990
LAT: 44 56.6N LONG: 130 16.0W

Niskin #	Depth (m)	Depth (db)	Insitu Temp.	Potential Temp.	Temp. Anom.	Salinity (CTD)	Salinity (Bottle)	Atten. (1/m)	Sigma-t (CTD)	Sigma-t (Bottle)	Sigma-Theta (CTD)	Sigma-Theta (Bottle)
21	2154.1	2183.0	1.918	1.767	0.047	34.611	34.611	0.402	27.666	27.666	27.678	27.678
31	2131.8	2160.3	1.923	1.774	0.052	34.611	34.610	0.416	27.666	27.665	27.678	27.677
8	2123.1	2151.5	1.920	1.772	0.050	34.611	34.611	0.414	27.666	27.666	27.678	27.678
19	2123.3	2151.7	1.921	1.773	0.051	34.611	34.611	0.416	27.666	27.666	27.678	27.678
5	2101.3	2129.2	1.924	1.778	0.054	34.611	34.611	0.415	27.666	27.666	27.677	27.677
9	2101.1	2129.1	1.925	1.779	0.054	34.611	34.610	0.414	27.666	27.665	27.677	27.676
15	2050.0	2077.0	1.924	1.782	0.053	34.610	34.611	0.427	27.665	27.666	27.676	27.677
6	2049.8	2076.9	1.924	1.782	0.053	34.610	34.611	0.425	27.665	27.666	27.676	27.677
17	2001.5	2027.6	1.914	1.777	0.034	34.606	34.607	0.400	27.663	27.664	27.673	27.674
14	2001.6	2027.8	1.914	1.777	0.034	34.606	34.607	0.400	27.663	27.664	27.673	27.674
29	1899.6	1924.0	1.965	1.836	0.001	34.588	34.589	0.377	27.644	27.645	27.654	27.655
27	1800.1	1822.7	2.035	1.913	-0.002	34.575	34.572	0.377	27.628	27.626	27.638	27.636

Niskin #	PO4-UNF (umol/l)	PO4-FIL (umol/l)	SiO4-UF/UW (umol/l)	SiO4-F/UW (umol/l)	SiO4/LDGO (umol/l)	TSM (ug/l)
21	2.949		182.41			
31	2.938		181.79			
8	2.950		182.04			
19	2.944		181.80			
5	2.944		182.06			
9	2.945		181.94			
15	2.939		182.19			
6	2.945		180.56			
17	2.974		180.69			
14	2.963		180.19			
29	3.014		177.30			
27	3.048		175.04			

D-Theta = (ptemp + (4.85 * pden)) - 135.959

VENTS 1990 - LEG IV
Station FE11 Cast 38 20 SEP 1990
LAT: 44 56.7N LONG: 130 16.1W

Niskin #	Depth (m)	Depth (db)	Insitu Temp.	Potential Temp.	Temp. Anom.	Salinity (CTD)	Salinity (Bottle)	Atten. (1/m)	Sigma-t (CTD)	Sigma-t (Bottle)	Sigma-Theta (CTD)	Sigma-Theta (Bottle)
21	2167.4	2196.6	1.912	1.760	0.048	34.612	34.610	0.395	27.668	27.666	27.679	27.678
31	2125.1	2153.5	1.923	1.775	0.053	34.611	34.608	0.413	27.666	27.664	27.678	27.675
8	2101.8	2129.8	1.922	1.776	0.054	34.611	34.611	0.415	27.666	27.666	27.677	27.677
19	2077.3	2104.8	1.923	1.779	0.056	34.611	34.610	0.420	27.666	27.665	27.677	27.676
5	2049.5	2076.5	1.920	1.778	0.051	34.610	34.608	0.415	27.666	27.664	27.676	27.675
9	2024.4	2051.0	1.917	1.778	0.043	34.608	34.608	0.405	27.664	27.664	27.675	27.675
15	1999.2	2025.4	1.914	1.777	0.019	34.602	34.601	0.384	27.660	27.659	27.670	27.669
6	1975.6	2001.2	1.922	1.787	0.014	34.599		0.381	27.657		27.667	
17	1953.3	1978.6	1.929	1.796	0.011	34.597		0.379	27.654		27.665	
14	1901.2	1925.6	1.964	1.834	0.005	34.589	34.588	0.375	27.645	27.644	27.655	27.655
29	75.1	75.7	9.053	9.045		32.617	32.619	0.421	25.245	25.246	25.246	25.247
27	35.6	35.9	16.661	16.655		32.534	32.550	0.446	23.702	23.714	23.703	23.716

Niskin #	PO4-UNF (umol/l)	PO4-FIL (umol/l)	SiO4-UF/UW (umol/l)	SiO4-F/UW (umol/l)	SiO4/LDGO (umol/l)	TSM (ug/l)
21	2.955	2.943	180.64	181.06		
31	2.944	2.927	180.76	181.19		
8	2.945	2.916	181.01	180.70		
19	2.957	2.894	181.13	180.70		
5	2.975	2.917	179.78	180.21		
9	2.981	2.941	180.28	180.21		
15	2.993	2.987	178.43	178.37		
6						
17						
14	3.005	3.005	175.85	175.92		
29	0.982	1.005	9.24	9.23		38.90
27	0.453	0.453				85.63

D-Theta = (ptemp + (4.85 * pden)) - 135.958
Additional Samples Collected:
Particulate Trace Elements

VENTS 1990 - LEG IV
Station FE18 Cast 39 20 SEP 1990
LAT: 44 55.9N LONG: 130 19.3W

Niskin #	Depth (m)	Depth (db)	Insitu Temp.	Potential Temp.	Temp. Anom.	Salinity (CTD)	Salinity (Bottle)	Atten. (1/m)	Sigma-t (CTD)	Sigma-t (Bottle)	Sigma-Theta (CTD)	Sigma-Theta (Bottle)
21	2299.4	2331.0	1.880	1.717	0.024	34.613	34.614	0.386	27.671	27.672	27.684	27.684
31	2251.1	2281.8	1.887	1.728	0.024	34.611	34.612	0.384	27.669	27.670	27.681	27.682
15	2200.4	2230.2	1.893	1.739	0.026	34.610	34.610	0.388	27.668	27.668	27.679	27.679
9	2147.5	2176.3	1.902	1.752	0.027	34.608	34.608	0.392	27.665	27.665	27.677	27.677
27	2109.7	2137.8	1.909	1.762	0.033	34.608	34.607	0.399	27.665	27.664	27.676	27.675
29	2099.9	2127.9	1.908	1.762	0.029	34.607	34.605	0.397	27.664	27.662	27.675	27.674
11	2049.9	2076.9	1.913	1.772	0.020	34.603	34.605	0.391	27.660	27.662	27.671	27.673
14	2003.4	2029.6	1.917	1.779	0.009	34.599	34.599	0.380	27.657	27.657	27.668	27.668
5	1904.8	1929.2	1.968	1.838	-0.001	34.587	34.586	0.376	27.643	27.643	27.653	27.653
19	1750.7	1772.5	2.117	1.998	0.013	34.565	34.564	0.379	27.614	27.613	27.623	27.623
8	1500.7	1518.5	2.486	2.383	0.068	34.519	34.519	0.377	27.547	27.547	27.555	27.555
13	1250.8	1264.8	2.956	2.868	0.132	34.463	34.463	0.378	27.460	27.460	27.468	27.468

Niskin #	PO4-UNF (umol/l)	PO4-FIL (umol/l)	SiO4-UF/UW (umol/l)	SiO4-F/UW (umol/l)	SiO4/LDGO (umol/l)	TSM (ug/l)
21	2.975	2.974	180.53	180.88	179.967	25.80
31	2.982	2.975	180.34	180.44	180.027	19.13
15	2.966	2.971	179.89	180.36	179.259	24.12
9	2.984	2.955	179.82	179.30	179.538	25.87
27	2.985	2.945	180.49	180.22	179.488	35.53
29	2.986	2.946	179.30	179.52	178.780	34.62
11	2.988	2.976	178.11	178.95	178.540	24.34
14	2.994	2.994	178.04	177.52	177.832	12.46
5	3.041	3.041	176.23	175.96	176.176	12.03
19	3.105	3.104	172.69	172.17	172.146	9.17
8	3.186	3.196	163.32	163.42		13.07
13	3.272	3.272	149.86	149.84	149.411	10.21

D-Theta = (ptemp + (4.85 * pden)) - 135.958
Additional Samples Collected:
Helium
Particulate Trace Elements

VENTS 1990 - LEG IV
Station FE18 Cast 40 21 SEP 1990
LAT: 44 55.6N LONG: 130 19.7W

Niskin #	Depth (m)	Depth (db)	Insitu Temp.	Potential Temp.	Temp. Anom.	Salinity (CTD)	Salinity (Bottle)	Atten. (1/m)	Sigma-t (CTD)	Sigma-t (Bottle)	Sigma-Theta (CTD)	Sigma-Theta (Bottle)
18	2336.1	2368.5	1.868	1.702	0.022	34.614	34.614	0.385	27.673	27.673	27.685	27.685
23	2299.3	2331.0	1.881	1.718	0.024	34.612	34.612	0.382	27.670	27.670	27.683	27.683
10	2297.4	2329.1	1.882	1.719	0.021	34.611	34.612	0.383	27.669	27.670	27.682	27.683
17	2198.8	2228.6	1.899	1.745	0.025	34.608	34.608	0.390	27.666	27.666	27.677	27.677
24	2196.0	2225.8	1.899	1.745	0.029	34.609	34.608	0.391	27.666	27.666	27.678	27.677
6	2151.5	2180.4	1.907	1.757	0.033	34.608	34.606	0.396	27.665	27.663	27.677	27.675
26	2109.6	2137.7	1.911	1.764	0.030	34.606	34.606	0.399	27.663	27.663	27.674	27.674
3	2099.1	2127.0	1.910	1.764	0.030	34.606	34.607	0.397	27.663	27.664	27.674	27.675
1	1998.9	2024.9	1.927	1.790	0.003	34.595	34.595	0.377	27.653	27.653	27.664	27.664
30	1997.4	2023.5	1.928	1.791	0.004	34.595	34.595	0.377	27.653	27.653	27.663	27.663
22	1995.1	2021.1	1.929	1.792	0.004	34.595	34.595	0.377	27.653	27.653	27.663	27.663
2	1897.7	1922.0	1.992	1.862	0.002	34.583	34.583	0.376	27.638	27.638	27.648	27.648

Niskin #	PO4-UNF (umol/l)	PO4-FIL (umol/l)	SiO4-UF/UW (umol/l)	SiO4-F/UW (umol/l)	SiO4/LDGO (umol/l)	TSM (ug/l)
18	2.971		169.73			
23	2.977		169.21			
10	2.971		169.99			
17	2.977		170.05			
24	2.971		170.83			
6	2.977		171.12			
26	2.971		171.17			
3	2.977		171.83			
1	3.005		170.28			
30	3.005		170.80			
22	3.005		171.45			
2	3.039		170.73			

D-Theta = (ptemp + (4.85 * pden)) - 135.955

VENTS 1990 - LEG IV
Station FE17 Cast 42 21 SEP 1990
LAT: 44 55.1N LONG: 130 16.9W

Niskin #	Depth (m)	Depth (db)	Insitu Temp.	Potential Temp.	Temp. Anom.	Salinity (CTD)	Salinity (Bottle)	Atten. (1/m)	Sigma-t (CTD)	Sigma-t (Bottle)	Sigma-Theta (CTD)	Sigma-Theta (Bottle)
14	2218.4	2248.5	1.905	1.749	0.032	34.609	34.608	0.389	27.666	27.665	27.678	27.677
29	2203.8	2233.7	1.904	1.749	0.032	34.609	34.609	0.390	27.666	27.666	27.678	27.678
5	2158.3	2187.3	1.901	1.750	0.029	34.608	34.608	0.390	27.665	27.665	27.677	27.677
8	2102.6	2130.5	1.908	1.762	0.025	34.605	34.605	0.390	27.662	27.662	27.674	27.674
11	2051.2	2078.2	1.908	1.766	0.020	34.603	34.603	0.388	27.661	27.661	27.672	27.672
9	1999.9	2026.0	1.919	1.782	0.010	34.598	34.598	0.379	27.656	27.656	27.667	27.667
21	1898.9	1923.3	1.979	1.849	0.002	34.585	34.584	0.375	27.641	27.640	27.651	27.650
15	1498.3	1516.1	2.471	2.368	0.070	34.521	34.522	0.377	27.549	27.550	27.558	27.559
12	1246.2	1260.2	2.966	2.878	0.141	34.463	34.463	0.377	27.460	27.460	27.467	27.467
13	1001.0	1011.7	3.534	3.461	0.177	34.390	34.391	0.378	27.348	27.349	27.355	27.356

Niskin #	PO4-UNF (umol/l)	PO4-FIL (umol/l)	SiO4-UF/UW (umol/l)	SiO4-F/UW (umol/l)	SiO4/LDGO (umol/l)	TSM (ug/l)
14	2.954	2.942	179.79	179.940	179.488	26.40
29	2.954	2.943	180.11	180.130	179.488	23.08
5	2.955	2.949	179.93	179.830	178.780	24.93
8	2.968	2.956	179.25	179.150	179.159	26.29
11	2.963	2.957	179.57	179.350	178.311	21.05
9	2.981	2.980	177.64	177.922	177.124	13.87
21	3.016	3.021	174.84	176.370	175.228	7.17
15	3.164	3.152	163.78	164.070	162.898	7.95
12	3.244	3.243	149.33	149.240	149.141	8.36
13	3.273	3.255	132.84	132.770	132.312	9.48

D-Theta = (ptemp + (4.85 * pden)) - 135.955
Additional Samples Collected:
Helium
Particulate Trace Elements

VENTS 1990 - LEG IV
Station FE17 Cast 43 21 SEP 1990
LAT: 44 55.1N LONG: 130 17.6W

Niskin #	Depth (m)	Depth (db)	Insitu Temp.	Potential Temp.	Temp. Anom.	Salinity (CTD)	Salinity (Bottle)	Atten. (1/m)	Sigma-t (CTD)	Sigma-t (Bottle)	Sigma-Theta (CTD)	Sigma-Theta (Bottle)
1	2219.8	2250.0	1.900	1.744	0.034	34.610	34.609	0.387	27.667	27.666	27.679	27.678
26	2201.9	2231.7	1.899	1.744	0.031	34.609	34.609	0.387	27.666	27.666	27.678	27.678
3	2205.1	2235.0	1.899	1.744	0.035	34.610	34.610	0.387	27.667	27.667	27.679	27.679
10	2150.2	2179.0	1.898	1.748	0.033	34.609	34.609	0.389	27.666	27.666	27.678	27.678
17	2150.9	2179.8	1.898	1.748	0.033	34.609	34.609	0.390	27.666	27.666	27.678	27.678
24	2121.9	2150.2	1.898	1.751	0.035	34.609	34.603	0.391	27.666	27.662	27.678	27.673
2	2101.6	2129.5	1.908	1.762	0.038	34.608	34.607	0.400	27.665	27.664	27.676	27.675
16	2051.5	2078.6	1.915	1.773	0.026	34.603	34.604	0.392	27.660	27.661	27.671	27.672
23	1999.0	2025.0	1.918	1.781	0.015	34.599	34.617	0.384	27.657	27.671	27.667	27.682
30	1901.5	1925.8	1.972	1.842	0.003	34.586	34.586	0.376	27.642	27.642	27.652	27.652
22	9.9	10.0	18.038	18.036		32.403	34.599	0.420	23.276	24.957	23.276	24.957
19	9.9	10.0	18.037	18.035		32.402	32.411	0.421	23.275	23.282	23.276	23.283

Niskin #	PO4-UNF (umol/l)	PO4-FIL (umol/l)	SiO4-UF/UW (umol/l)	SiO4-F/UW (umol/l)	SiO4/LDGO (umol/l)	TSM (ug/l)
1	2.955		170.05			
26	2.949		181.01			
3	2.949		180.89			
10	2.949		181.38			
17	2.949		181.26			
24	2.949		180.64			
2	2.955		181.14			
16	2.955		179.91			
23	2.978		179.54			
30	3.006		176.46			
22	3.401		177.07			
19	0.407					

D-Theta = (ptemp + (4.85 * pden)) - 135.953

VENTS 1990 - LEG IV
Station FE23 Cast 44 21 SEP 1990
LAT: 44 53.6N LONG: 130 20.6W

Niskin #	Depth (m)	Depth (db)	Insitu Temp.	Potential Temp.	Temp. Anom.	Salinity (CTD)	Salinity (Bottle)	Atten. (1/m)	Sigma-t (CTD)	Sigma-t (Bottle)	Sigma-Theta (CTD)	Sigma-Theta (Bottle)
1	2293.4	2325.0	1.850	1.688	0.019	34.618	34.618	0.379	27.677	27.677	27.690	27.690
26	2253.2	2284.0	1.852	1.694	0.019	34.617	34.618	0.379	27.676	27.677	27.688	27.689
3	2200.6	2230.4	1.866	1.712	0.019	34.614	34.614	0.376	27.673	27.673	27.685	27.685
10	2150.3	2179.2	1.874	1.724	0.015	34.611	34.610	0.379	27.670	27.669	27.681	27.681
17	2100.2	2128.2	1.898	1.752	0.013	34.606	34.605	0.381	27.664	27.663	27.675	27.674
24	2073.2	2100.6	1.903	1.760	0.010	34.604	34.604	0.379	27.662	27.662	27.673	27.673
2	2049.0	2076.0	1.908	1.767	0.007	34.602	34.603	0.377	27.660	27.661	27.671	27.672
16	1999.6	2025.7	1.922	1.785	0.006	34.599	34.598	0.376	27.657	27.656	27.667	27.666
23	1900.6	1925.0	1.973	1.843	0.001	34.588	34.588	0.375	27.644	27.644	27.654	27.654
30	1748.0	1769.7	2.113	1.994	0.009	34.566	34.566	0.376	27.615	27.615	27.624	27.624
31	1500.8	1518.6	2.500	2.397	0.070	34.519	34.519	0.377	27.545	27.545	27.554	27.554
27	1248.9	1263.0	2.952	2.864	0.143	34.468	34.470	0.377	27.465	27.466	27.473	27.474

Niskin #	PO4-UNF (umol/l)	PO4-FIL (umol/l)	SiO4-UF/UW (umol/l)	SiO4-F/UW (umol/l)	SiO4/LDGO (umol/l)	TSM (ug/l)
1	2.963	2.963	183.50	184.20	179.359	12.65
26	2.958	2.958	182.65	183.90	179.009	14.84
3	2.970	2.970	180.39	180.44	178.062	10.46
10	2.976	2.970	179.76	179.77	178.062	11.54
17	3.005	2.971	179.36	180.23	177.822	22.88
24	3.011	3.005	179.34	180.32	177.114	18.08
2	3.017	3.011	179.31	179.44	177.114	10.75
16	3.018	3.018	178.43	179.17	177.114	9.33
23	3.030	3.030	176.82	176.95	175.687	7.66
30	3.081	3.075	172.77	172.30	172.136	60.47
31	3.190	3.190	163.00	163.38	162.429	9.30
27	3.247	3.247	150.06	149.95	149.411	9.34

D-Theta = (ptemp + (4.85 * pden)) - 135.964
Additional Samples Collected:
Helium
Particulate Trace Elements

VENTS 1990 - LEG IV
Station FE23 Cast 45 22 SEP 1990
LAT: 44 53.3N LONG: 130 20.7W

Niskin #	Depth (m)	Depth (db)	Insitu Temp.	Potential Temp.	Temp. Anom.	Salinity (CTD)	Salinity (Bottle)	Atten. (1/m)	Sigma-t (CTD)	Sigma-t (Bottle)	Sigma-Theta (CTD)	Sigma-Theta (Bottle)
13	2294.1	2325.7	1.850	1.688	0.017	34.616	34.617	0.379	27.676	27.677	27.688	27.689
29	2245.1	2275.8	1.857	1.699	0.017	34.614	34.612	0.377	27.674	27.672	27.686	27.684
21	2251.0	2281.8	1.857	1.699	0.017	34.614	34.611	0.377	27.674	27.671	27.686	27.683
9	2199.7	2229.5	1.864	1.710	0.016	34.612	34.611	0.379	27.671	27.671	27.683	27.682
15	2199.5	2229.3	1.864	1.710	0.016	34.612	34.616	0.379	27.671	27.675	27.683	27.686
5	2153.0	2181.9	1.877	1.727	0.019	34.610	34.609	0.381	27.669	27.668	27.680	27.680
8	2153.7	2182.6	1.877	1.727	0.019	34.610	34.609	0.381	27.669	27.668	27.680	27.680
11	2099.0	2126.9	1.888	1.743	0.013	34.606	34.606	0.381	27.665	27.665	27.676	27.676
1	2047.9	2074.9	1.905	1.764	0.015	34.603	34.602	0.382	27.661	27.660	27.672	27.671
3	2003.4	2029.6	1.924	1.786	0.006	34.597	34.598	0.376	27.655	27.656	27.665	27.666
14	1900.1	1924.5	1.984	1.854	0.006	34.586	34.588	0.375	27.641	27.643	27.651	27.653
12	57.1	57.6	10.999	10.992		32.553	32.559	0.552	24.871	24.876	24.872	24.877

Niskin #	PO4-UNF (umol/l)	PO4-FIL (umol/l)	SiO4-UF/UW (umol/l)	SiO4-F/UW (umol/l)	SiO4/LDGO (umol/l)	TSM (ug/l)
13	2.955		182.35			
29	2.961		181.26			
21	2.961		180.29			
9	2.966		180.43			
15	2.961		180.58			
5	2.961		180.48			
8	2.961		179.51			
11	2.961		178.65			
1	2.978		178.55			
3	3.000		177.70			
14	3.017		176.34			
12	0.667		2.18			

D-Theta = (ptemp + (4.85 * pden)) - 135.958

VENTS 1990 - LEG IV
Station FE16 Cast 46 22 SEP 1990
LAT: 44 54.1N LONG: 130 15.5W

Niskin #	Depth (m)	Depth (db)	Insitu Temp.	Potential Temp.	Temp. Anom.	Salinity (CTD)	Salinity (Bottle)	Atten. (1/m)	Sigma-t (CTD)	Sigma-t (Bottle)	Sigma-Theta (CTD)	Sigma-Theta (Bottle)
13	2239.3	2269.8	1.898	1.740	0.040	34.615	34.615	0.383	27.671	27.671	27.683	27.683
29	2242.1	2272.7	1.898	1.740	0.039	34.615	34.613	0.384	27.671	27.670	27.683	27.682
21	2199.3	2229.0	1.894	1.740	0.039	34.615	34.611	0.385	27.672	27.668	27.683	27.680
9	2150.7	2179.6	1.899	1.749	0.041	34.614	34.613	0.387	27.670	27.670	27.682	27.681
15	2126.6	2155.0	1.900	1.752	0.032	34.611	34.612	0.394	27.668	27.669	27.679	27.680
5	2101.7	2129.7	1.906	1.760	0.037	34.611	34.612	0.398	27.667	27.668	27.679	27.679
8	2077.0	2104.5	1.910	1.766	0.033	34.609	34.607	0.395	27.666	27.664	27.677	27.675
11	2051.2	2078.3	1.910	1.768	0.026	34.607	34.607	0.390	27.664	27.664	27.675	27.675
1	1999.5	2025.6	1.922	1.785	0.013	34.601	34.603	0.382	27.658	27.660	27.669	27.670
3	1898.3	1922.7	1.986	1.856	-0.000	34.586	34.585	0.375	27.641	27.640	27.651	27.650
14	1750.5	1772.3	2.117	1.998	-0.002	34.563	34.564	0.376	27.612	27.613	27.622	27.623
19	1500.3	1518.0	2.490	2.387	0.067	34.520	34.519	0.377	27.547	27.546	27.556	27.555

Niskin #	PO4-UNF (umol/l)	PO4-FIL (umol/l)	SiO4-UF/UW (umol/l)	SiO4-F/UW (umol/l)	SiO4/LDGO (umol/l)	TSM (ug/l)
13	2.950	2.939	179.62	180.63	179.957	22.97
29	2.951	2.928	180.40	179.70	180.187	17.14
21	2.951	2.939	179.47	179.75	179.388	28.88
9	2.940	2.940	180.49	179.91	179.718	28.20
15	2.951	2.929	179.19	179.59	179.239	25.92
5	2.952	2.918	179.47	179.02	179.239	34.29
8	2.952	2.946	179.39	178.58	177.822	18.94
11	2.958	2.935	178.21	179.36	177.353	21.40
1	2.981	2.969	178.38	178.30	176.874	13.50
3	3.015	3.021	176.09	175.15	174.740	7.96
14	3.066	3.066	172.21	171.88	171.188	7.23
19	3.174	3.168	161.81	161.49	161.482	8.22

D-Theta = (ptemp + (4.85 * pden)) - 135.965
Additional Samples Collected:
Helium
Particulate Trace Elements
Dissolved Fe and Mn

VENTS 1990 - LEG IV
Station FE16 Cast 47 22 SEP 1990
LAT: 44 54.3N LONG: 130 14.9W

Niskin #	Depth (m)	Depth (db)	Insitu Temp.	Potential Temp.	Temp. Anom.	Salinity (CTD)	Salinity (Bottle)	Atten. (1/m)	Sigma-t (CTD)	Sigma-t (Bottle)	Sigma-Theta (CTD)	Sigma-Theta (Bottle)
17	2201.2	2231.0	1.897	1.743	0.038	34.614	34.616	0.386	27.671	27.672	27.682	27.684
27	2098.2	2126.1	1.901	1.756	0.035	34.611	34.609	0.398	27.668	27.666	27.679	27.677
24	2089.6	2117.4	1.902	1.757	0.032	34.610	34.610	0.398	27.667	27.667	27.678	27.678
10	2049.3	2076.3	1.906	1.765	0.033	34.609	34.609	0.397	27.666	27.666	27.677	27.677
23	1899.6	1924.0	1.974	1.844	0.001	34.588	34.587	0.376	27.644	27.643	27.654	27.653
2	1899.7	1924.0	1.974	1.844	0.001	34.588	34.589	0.376	27.644	27.644	27.654	27.655
26	1900.2	1924.6	1.974	1.844	0.001	34.588	34.587	0.376	27.644	27.643	27.654	27.653
16	1900.1	1924.5	1.975	1.845	0.002	34.588	34.588	0.376	27.644	27.644	27.654	27.654
22	1249.3	1263.4	2.906	2.819	0.133	34.472	34.470	0.377	27.472	27.471	27.480	27.478

Niskin #	PO4-UNF (umol/l)	PO4-FIL (umol/l)	SiO4-UF/UW (umol/l)	SiO4-F/UW (umol/l)	SiO4/LDGO (umol/l)	TSM (ug/l)
17	2.950	2.938	180.04	180.19		20.00
27	2.950	2.927	179.63	179.65		30.89
24	2.951	2.945	179.33	179.72		29.29
10	2.951	2.939	178.43	179.54		29.21
23	3.014		175.76			
2	3.019		176.09			
26	3.020		175.82			
16	3.020		176.27			
22	3.236	3.235	151.13	149.96	149.640	9.92

D-Theta = (ptemp + (4.85 * pden)) - 135.964
Additional Samples Collected:
Helium
Particulate Trace Elements

VENTS 1990 - LEG IV
Station FE16 Cast 48 23 SEP 1990
LAT: 44 54.1N LONG: 130 15.4W

Niskin #	Depth (m)	Depth (db)	Insitu Temp.	Potential Temp.	Temp. Anom.	Salinity (CTD)	Salinity (Bottle)	Atten. (1/m)	Sigma-t (CTD)	Sigma-t (Bottle)	Sigma-Theta (CTD)	Sigma-Theta (Bottle)
1	2242.1	2272.7	1.895	1.737	0.038	34.613	34.611	0.384	27.670	27.668	27.682	27.680
29	2202.0	2231.8	1.895	1.741	0.036	34.612	34.612	0.386	27.669	27.669	27.681	27.681
3	2202.0	2231.9	1.895	1.741	0.036	34.612	34.613	0.386	27.669	27.670	27.681	27.682
30	2148.6	2177.4	1.893	1.743	0.038	34.612	34.613	0.386	27.669	27.670	27.681	27.682
11	2147.8	2176.6	1.893	1.743	0.038	34.612	34.612	0.387	27.669	27.669	27.681	27.681
8	2098.7	2126.6	1.902	1.756	0.038	34.610	34.610	0.399	27.667	27.667	27.678	27.678
5	2097.8	2125.7	1.902	1.757	0.035	34.609	34.611	0.399	27.666	27.668	27.677	27.679
15	2046.6	2073.5	1.906	1.765	0.032	34.607	34.607	0.396	27.664	27.664	27.675	27.675
9	2046.8	2073.7	1.906	1.765	0.032	34.607	34.607	0.394	27.664	27.664	27.675	27.675
21	2004.6	2030.8	1.916	1.778	0.013	34.600	34.601	0.382	27.658	27.659	27.668	27.669
13	1901.7	1926.1	1.979	1.849	0.003	34.586	34.585	0.376	27.642	27.641	27.652	27.651
19	1800.1	1822.7	2.052	1.930	0.003	34.573	34.572	0.375	27.625	27.625	27.635	27.634

Niskin #	PO4-UNF (umol/l)	PO4-FIL (umol/l)	SiO4-UF/UW (umol/l)	SiO4-F/UW (umol/l)	SiO4/LDGO (umol/l)	TSM (ug/l)
1	2.875		180.59			
29	2.910		180.33			
3	2.843		180.45			
30	2.917		181.09			
11	2.907		180.83			
8	2.829		180.83			
5	2.914		180.95			
15	2.836		179.91			
9	2.916		179.64			
21	2.939		178.47			
13	2.923		176.00			
19	3.003		173.78			

D-Theta = (ptemp + (4.85 * pden)) - 135.957

VENTS 1990 - LEG IV
Station FE15 Cast 49 23 SEP 1990
LAT: 44 54.2N LONG: 130 13.0W

Niskin #	Depth (m)	Depth (db)	Insitu Temp.	Potential Temp.	Temp. Anom.	Salinity (CTD)	Salinity (Bottle)	Atten. (1/m)	Sigma-t (CTD)	Sigma-t (Bottle)	Sigma-Theta (CTD)	Sigma-Theta (Bottle)
1	2250.7	2281.5	1.872	1.714	0.031	34.616	34.617	0.382	27.674	27.675	27.686	27.687
29	2204.1	2234.0	1.876	1.722	0.032	34.615	34.615	0.383	27.673	27.673	27.685	27.685
3	2149.3	2178.2	1.876	1.726	0.023	34.612	34.612	0.383	27.671	27.671	27.682	27.682
30	2098.7	2126.6	1.890	1.745	0.023	34.609	34.609	0.387	27.667	27.667	27.678	27.678
11	2090.6	2118.4	1.889	1.744	0.019	34.608	34.602	0.384	27.666	27.662	27.677	27.673
8	2080.2	2107.7	1.890	1.746	0.016	34.607	34.607	0.383	27.665	27.665	27.677	27.677
5	2048.6	2075.6	1.899	1.758	0.008	34.603	34.604	0.379	27.662	27.662	27.672	27.673
15	1999.9	2026.0	1.925	1.788	0.007	34.598	34.597	0.377	27.656	27.655	27.666	27.665
9	1902.6	1927.0	1.997	1.867	-0.001	34.583	34.583	0.376	27.638	27.638	27.648	27.648
21	1749.4	1771.1	2.109	1.990	0.001	34.564	34.563	0.376	27.614	27.613	27.623	27.622
13	1498.9	1516.7	2.478	2.375	0.068	34.521	34.522	0.377	27.549	27.550	27.557	27.558
19	1248.4	1262.5	2.949	2.861	0.137	34.466	34.468	0.377	27.464	27.465	27.471	27.473

Niskin #	PO4-UNF (umol/l)	PO4-FIL (umol/l)	SiO4-UF/UW (umol/l)	SiO4-F/UW (umol/l)	SiO4/LDGO (umol/l)	TSM (ug/l)
1	2.919	2.890	180.51	180.21	180.416	17.33
29	2.920	2.897	180.74	180.44	180.645	26.07
3	2.920	2.920	180.98	179.83	180.177	16.06
30	2.938	2.921	180.36	180.06	179.708	18.75
11	2.939	2.922	180.10	179.44	179.239	17.54
8	2.940	2.934	179.60	179.42	179.239	17.10
5	2.941	2.940	177.74	178.67	178.530	10.36
15	2.981	2.958	177.59	177.79	177.593	9.89
9	2.999	2.999	175.96	175.55	175.717	7.55
21	3.051	3.050	172.72	172.31	172.665	7.07
13	3.137	3.125	163.03	163.37	163.976	7.77
19	3.217	3.228	149.94	149.44	150.348	7.91

D-Theta = (ptemp + (4.85 * pden)) - 135.961
Additional Samples Collected:
Helium
Particulate Trace Elements
Dissolved Fe and Mn

VENTS 1990 - LEG IV
Station FE15 Cast 50 23 SEP 1990
LAT: 44 54.1N LONG: 130 12.8W

Niskin #	Depth (m)	Depth (db)	Insitu Temp.	Potential Temp.	Temp. Anom.	Salinity (CTD)	Salinity (Bottle)	Atten. (1/m)	Sigma-t (CTD)	Sigma-t (Bottle)	Sigma-Theta (CTD)	Sigma-Theta (Bottle)
10	2267.9	2299.0	1.851	1.691	0.023	34.617	34.615	0.382	27.677	27.675	27.689	27.687
31	2199.6	2229.4	1.874	1.720	0.030	34.614	34.613	0.382	27.672	27.672	27.684	27.683
23	2198.6	2228.3	1.875	1.721	0.031	34.614	34.614	0.382	27.672	27.672	27.684	27.684
14	2149.2	2178.1	1.872	1.723	0.028	34.613	34.613	0.382	27.672	27.672	27.683	27.683
6	2148.1	2176.9	1.872	1.723	0.028	34.613	34.613	0.382	27.672	27.672	27.683	27.683
24	2097.8	2125.7	1.884	1.739	0.022	34.609	34.610	0.384	27.668	27.668	27.679	27.679
27	2096.1	2123.9	1.884	1.739	0.023	34.609	34.609	0.384	27.668	27.668	27.679	27.679
18	2052.8	2079.9	1.892	1.751	0.010	34.604	34.603	0.377	27.663	27.662	27.674	27.673
17	2052.2	2079.2	1.892	1.751	0.010	34.604	34.604	0.378	27.663	27.663	27.674	27.674
16	2001.7	2027.8	1.907	1.770	0.011	34.601	34.604	0.379	27.659	27.662	27.670	27.672
26	1903.6	1928.0	1.970	1.840	0.001	34.587	34.588	0.374	27.643	27.644	27.653	27.654
2	1801.9	1824.6	2.028	1.906	-0.001	34.576	34.577	0.376	27.630	27.631	27.639	27.640

Niskin #	PO4-UNF (umol/l)	PO4-FIL (umol/l)	SiO4-UF/UW (umol/l)	SiO4-F/UW (umol/l)	SiO4/LDGO (umol/l)	TSM (ug/l)
10	2.926		181.06			
31	2.927		180.83			
23	2.934		181.22			
14	2.935		180.10			
6	2.936		180.37			
24	2.938		180.13			
27	2.939		179.39			
18	2.951		178.27			
17	2.958		178.28			
16	2.982		177.28			
26	3.005		175.65			
2	3.029		174.53			

D-Theta = (ptemp + (4.85 * pden)) - 135.958

VENTS 1990 - LEG IV
Station FE19 Cast 51 23 SEP 1990
LAT: 44 50.6N LONG: 130 12.0W

Niskin #	Depth (m)	Depth (db)	Insitu Temp.	Potential Temp.	Temp. Anom.	Salinity (CTD)	Salinity (Bottle)	Atten. (1/m)	Sigma-t (CTD)	Sigma-t (Bottle)	Sigma-Theta (CTD)	Sigma-Theta (Bottle)
10	2351.2	2383.8	1.825	1.658	0.013	34.620	34.620	0.381	27.681	27.681	27.694	27.694
31	2296.6	2328.2	1.842	1.680	0.011	34.616	34.616	0.376	27.676	27.676	27.689	27.689
23	2246.9	2277.6	1.856	1.698	0.019	34.615	34.614	0.379	27.675	27.674	27.687	27.686
14	2186.1	2215.7	1.877	1.724	0.032	34.614	34.615	0.383	27.672	27.673	27.684	27.685
6	2151.4	2180.3	1.880	1.730	0.032	34.613	34.613	0.384	27.671	27.671	27.683	27.683
24	2115.7	2143.9	1.894	1.747	0.031	34.610	34.611	0.392	27.668	27.668	27.679	27.680
27	2051.2	2078.3	1.904	1.763	0.029	34.607	34.606	0.392	27.664	27.664	27.675	27.674
18	2000.6	2026.7	1.914	1.777	0.010	34.600	34.598	0.378	27.658	27.656	27.669	27.667
17	1896.8	1921.1	1.981	1.852	0.003	34.586	34.587	0.376	27.642	27.642	27.652	27.652
16	1749.2	1771.0	2.139	2.020	0.002	34.559	34.559	0.376	27.607	27.607	27.617	27.617
26	1499.7	1517.4	2.498	2.395	0.074	34.519	34.520	0.377	27.546	27.546	27.554	27.555
2	1249.8	1263.8	2.979	2.891	0.151	34.465	34.464	0.378	27.460	27.459	27.468	27.467

Niskin #	PO4-UNF (umol/l)	PO4-FIL (umol/l)	SiO4-UF/UW (umol/l)	SiO4-F/UW (umol/l)	SiO4/LDGO (umol/l)	TSM (ug/l)
10	2.917	2.911	179.14	179.26	180.885	13.08
31	2.923	2.917	178.54	178.78	180.177	7.35
23	2.924	2.889	179.68	178.67	179.947	10.69
14	2.924	2.918	179.07	179.06	180.416	16.26
6	2.925	2.919	178.96	178.96	180.645	18.46
24	2.925	2.919	178.73	178.85	180.885	25.10
27	2.937	2.920	177.75	178.62	180.177	24.18
18	2.966	2.949	176.65	177.26	178.062	11.97
17	2.989	2.995	175.17	175.16	176.186	7.01
16	3.047	3.046	171.32	171.31	172.196	8.71
26	3.149	3.149	162.35	162.72	163.267	7.29
2	3.212	3.217	147.77	148.63	148.702	8.12

D-Theta = (ptemp + (4.85 * pden)) - 135.959
Additional Samples Collected:
Helium
Particulate Trace Elements

VENTS 1990 - LEG IV
Station FE19 Cast 52 23 SEP 1990
LAT: 44 50.7N LONG: 130 11.9W

Niskin #	Depth (m)	Depth (db)	Insitu Temp.	Potential Temp.	Temp. Anom.	Salinity (CTD)	Salinity (Bottle)	Atten. (1/m)	Sigma-t (CTD)	Sigma-t (Bottle)	Sigma-Theta (CTD)	Sigma-Theta (Bottle)
19	2354.1	2386.9	1.821	1.654	0.014	34.622	34.622	0.3810	27.683	27.683	27.695	27.695
29							34.621					
22	2301.0	2332.7	1.847	1.685	0.010	34.616	34.616	0.3763	27.676	27.676	27.688	27.688
8	2199.6	2229.3	1.880	1.726	0.033	34.615	34.614	0.3830	27.673	27.672	27.684	27.684
1	2200.0	2229.8	1.880	1.726	0.033	34.615	34.616	0.3830	27.673	27.673	27.684	27.685
5	2172.0	2201.2	1.881	1.729	0.031	34.614	34.613	0.3830	27.672	27.671	27.683	27.683
3	2171.9	2201.2	1.881	1.729	0.031	34.614	34.614	0.3840	27.672	27.672	27.683	27.683
30	2150.3	2179.1	1.887	1.737	0.032	34.613	34.613	0.3870	27.671	27.671	27.682	27.682
11	2150.0	2178.8	1.886	1.736	0.031	34.613	34.614	0.3870	27.671	27.671	27.682	27.683
9	2102.7	2130.7	1.902	1.756	0.032	34.610	34.611	0.3940	27.667	27.668	27.678	27.679
15	2001.1	2027.2	1.925	1.788	0.005	34.598	34.597	0.3760	27.656	27.655	27.666	27.665
21	1898.1	1922.4	1.980	1.850	0.002	34.587	34.586	0.3760	27.642	27.642	27.653	27.652

Niskin #	PO4-UNF (umol/l)	PO4-FIL (umol/l)	SiO4-UF/UW (umol/l)	SiO4-F/UW (umol/l)	SiO4/LDGO (umol/l)	TSM (ug/l)
19	2.902		180.17			
29	2.902		180.27			
22	2.936		178.70			
8	2.942		179.39			
1	2.947		179.36			
5	2.947		179.22			
3	2.942		180.62			
30	2.942		179.64			
11	2.942		179.38			
9	2.942		178.76			
15	2.964		176.95			
21	3.004		175.37			

D-Theta = (ptemp + (4.85 * pden)) - 135.963
Additional Samples Collected:
Helium
Particulate Trace Elements

VENTS 1990 - LEG IV
Station FE25 Cast 53 23 SEP 1990
LAT: 44 54.0N LONG: 130 05.9W

Niskin #	Depth (m)	Depth (db)	Insitu Temp.	Potential Temp.	Temp. Anom.	Salinity (CTD)	Salinity (Bottle)	Atten. (1/m)	Sigma-t (CTD)	Sigma-t (Bottle)	Sigma-Theta (CTD)	Sigma-Theta (Bottle)
19	2461.4	2496.2	1.796	1.620	0.011	34.626	34.629	0.380	27.688	27.690	27.701	27.704
29	2400.2	2433.9	1.797	1.626	0.007	34.624	34.625	0.377	27.686	27.687	27.699	27.700
22	2300.1	2331.8	1.825	1.663	0.011	34.619	34.614	0.380	27.680	27.676	27.692	27.688
8	2252.4	2283.2	1.843	1.685	0.017	34.617	34.617	0.379	27.677	27.677	27.689	27.689
1	2200.6	2230.4	1.852	1.698	0.014	34.614	34.614	0.377	27.674	27.674	27.686	27.686
5	2151.1	2180.0	1.866	1.716	0.010	34.610	34.611	0.378	27.670	27.671	27.681	27.682
3	2103.2	2131.2	1.878	1.732	0.009	34.607	34.602	0.375	27.666	27.662	27.678	27.674
30	2049.0	2076.0	1.892	1.751	0.005	34.603	34.603	0.376	27.662	27.662	27.673	27.673
11	2004.1	2030.3	1.919	1.781	0.008	34.599	34.597	0.379	27.657	27.655	27.667	27.666
9	1901.2	1925.6	1.980	1.850	0.001	34.586	34.584	0.376	27.642	27.640	27.652	27.650
15	1750.7	1772.5	2.106	1.987	-0.003	34.563	34.564	0.375	27.613	27.614	27.623	27.623
21	1500.0	1517.8	2.469	2.366	0.063	34.521	34.520	0.376	27.550	27.549	27.558	27.557

Niskin #	PO4-UNF (umol/l)	PO4-FIL (umol/l)	SiO4-UF/UW (umol/l)	SiO4-F/UW (umol/l)	SiO4/LDGO (umol/l)	TSM (ug/l)
19	2.892	2.903	180.50	182.43	181.513	13.56
29	2.870	2.892	180.64	179.34	181.044	11.17
22	2.905	2.916	179.61	180.51	179.867	14.25
8	2.911	2.917	178.57	179.22	179.748	13.64
1	2.901	2.912	178.06	178.70	179.628	13.35
5	2.907	2.924	176.89	177.67	179.388	12.01
3	2.959	2.958	177.53	177.54	178.680	8.04
30	2.965	2.959	177.01	177.40	178.211	10.89
11	2.966	2.966	177.40	177.01	177.503	12.73
9	2.995	3.017	175.05	175.83	175.847	8.51
15	3.063	3.046	172.30	172.18	172.545	9.79
21	3.143	3.142	163.67	163.41	163.576	14.42

D-Theta = (ptemp + (4.85 *pden)) - 135.960

VENTS 1990 - LEG IV
Station FE14 Cast 54 24 SEP 1990
LAT: 44 53.1N LONG: 130 10.4W

Niskin #	Depth (m)	Depth (db)	Insitu Temp.	Potential Temp.	Temp. Anom.	Salinity (CTD)	Salinity (Bottle)	Atten. (1/m)	Sigma-t (CTD)	Sigma-t (Bottle)	Sigma-Theta (CTD)	Sigma-Theta (Bottle)
2	2375.1	2408.2	1.805	1.637	0.013	34.623	34.624	0.381	27.685	27.686	27.698	27.698
31	2298.4	2330.1	1.821	1.659	0.012	34.619	34.617	0.378	27.680	27.679	27.693	27.691
10	2298.4	2330.1	1.821	1.659	0.012	34.619	34.616	0.378	27.680	27.678	27.693	27.690
6	2201.6	2231.5	1.846	1.692	0.010	34.613	34.613	0.376	27.674	27.674	27.685	27.685
23	2203.0	2232.9	1.846	1.692	0.009	34.613	34.613	0.376	27.674	27.674	27.685	27.685
27	2100.2	2128.2	1.874	1.729	0.009	34.607	34.606	0.376	27.667	27.666	27.678	27.677
14	2100.3	2128.2	1.874	1.729	0.009	34.607	34.605	0.376	27.667	27.665	27.678	27.676
18	2022.2	2048.7	1.908	1.769	0.019	34.603	34.604	0.385	27.661	27.662	27.672	27.672
24	2021.4	2047.9	1.909	1.770	0.020	34.603	34.604	0.385	27.661	27.662	27.671	27.672
26	1999.8	2025.9	1.913	1.776	0.012	34.600	34.600	0.381	27.658	27.658	27.669	27.669
16	1899.7	1924.1	1.964	1.835	0.002	34.588	34.590	0.375	27.644	27.646	27.655	27.656
17	1797.3	1819.9	2.057	1.935	0.002	34.572	34.572	0.376	27.624	27.624	27.634	27.634

Niskin #	PO4-UNF (umol/l)	PO4-FIL (umol/l)	SiO4-UF/UW (umol/l)	SiO4-F/UW (umol/l)	SiO4/LDGO (umol/l)	TSM (ug/l)
2	2.911		184.24			
31	2.911		182.98			
10	2.911		181.72			
6	2.928		181.36			
23	2.899		181.37			
27	2.905		180.50			
14	2.956		180.51			
18	2.950		180.53			
24	2.961		180.55			
26	2.961		179.29			
16	3.012		176.88			
17	3.051		175.36			

D-Theta = (ptemp + (4.85 * pden)) - 135.957

VENTS 1990 - LEG IV
Station FE21 Cast 55 24 SEP 1990
LAT: 44 52.1N LONG: 130 16.3W

Niskin #	Depth (m)	Depth (db)	Insitu Temp.	Potential Temp.	Temp. Anom.	Salinity (CTD)	Salinity (Bottle)	Atten. (1/m)	Sigma-t (CTD)	Sigma-t (Bottle)	Sigma-Theta (CTD)	Sigma-Theta (Bottle)
2	2240.0	2270.5	1.890	1.732	0.031	34.613	34.614	0.383	27.670	27.671	27.682	27.683
31	2201.5	2231.3	1.885	1.731	0.030	34.613	34.614	0.383	27.671	27.671	27.682	27.683
6	2150.3	2179.1	1.886	1.736	0.026	34.611	34.610	0.385	27.669	27.668	27.680	27.680
23	2099.9	2127.9	1.894	1.748	0.014	34.606	34.604	0.382	27.664	27.663	27.676	27.674
27	2089.9	2117.6	1.896	1.751	0.012	34.605	34.608	0.382	27.663	27.666	27.675	27.677
14	2079.9	2107.4	1.897	1.753	0.013	34.605	34.606	0.382	27.663	27.664	27.674	27.675
18	2069.1	2096.4	1.906	1.763	0.015	34.604	34.602	0.383	27.662	27.660	27.673	27.671
24	2050.3	2077.3	1.915	1.773	0.010	34.601	34.601	0.381	27.659	27.659	27.670	27.670
26	1999.0	2025.1	1.931	1.794	0.003	34.596	34.597	0.377	27.653	27.654	27.664	27.665

Niskin #	PO4-UNF (umol/l)	PO4-FIL (umol/l)	SiO4-UF/UW (umol/l)	SiO4-F/UW (umol/l)	SiO4/LDGO (umol/l)	TSM (ug/l)
2	2.908	2.908	179.33	180.47	179.867	17.30
31	2.908	2.914	178.28	179.42	179.867	16.41
6	2.942	2.903	179.71	178.75	178.680	19.07
23	2.948	2.942	178.16	178.57	178.670	15.14
27	2.948	2.943	178.98	178.76	178.451	16.17
14	2.949	2.948	176.80	178.20	178.451	16.28
18	2.949	2.943	179.12	177.77	177.493	16.49
24	2.955	2.893	177.81	178.34	177.742	14.97
26	2.966	2.961	178.00	177.02	177.264	10.55

D-Theta = (ptemp + (4.85 * pden)) - 135.961
Additional Samples Collected:
Helium
Particulate Trace Elements

VENTS 1990 - LEG IV
Station FE21 Cast 56 24 SEP 1990
LAT: 44 51.9N LONG: 130 16.3W

Niskin #	Depth (m)	Depth (db)	Insitu Temp.	Potential Temp.	Temp. Anom.	Salinity (CTD)	Salinity (Bottle)	Atten. (1/m)	Sigma-t (CTD)	Sigma-t (Bottle)	Sigma-Theta (CTD)	Sigma-Theta (Bottle)
10	2245.2	2275.8	1.890	1.732	0.039	34.614	34.613	0.381	27.671	27.670	27.683	27.682
29	2201.4	2231.2	1.886	1.732	0.035	34.613	34.614	0.382	27.671	27.671	27.682	27.683
16	2149.5	2178.3	1.882	1.732	0.028	34.611	34.612	0.382	27.669	27.670	27.681	27.682
19	2100.4	2128.4	1.892	1.746	0.018	34.606	34.605	0.381	27.665	27.664	27.676	27.675
17	2049.8	2076.8	1.919	1.777	0.014	34.600	34.600	0.378	27.658	27.658	27.669	27.669
22	1999.4	2025.5	1.933	1.796	0.010	34.596	34.596	0.375	27.653	27.653	27.664	27.664
8	1951.0	1976.3	1.955	1.821	0.006	34.591	34.591	0.375	27.648	27.648	27.658	27.658
1	1898.3	1922.6	1.983	1.853	0.003	34.585	34.585	0.377	27.641	27.641	27.651	27.651
5	1898.2	1922.5	1.982	1.852	0.003	34.585	34.584	0.375	27.641	27.640	27.651	27.650
30	1748.4	1770.2	2.117	1.998	0.004	34.562	34.562	0.376	27.611	27.611	27.621	27.621
11	1501.4	1519.2	2.491	2.388	0.076	34.520	34.521	0.376	27.547	27.548	27.556	27.556
3	1246.9	1260.9	3.005	2.917	0.154	34.461	34.461	0.377	27.454	27.454	27.462	27.462

Niskin #	PO4-UNF (umol/l)	PO4-FIL (umol/l)	SiO4-UF/UW (umol/l)	SiO4-F/UW (umol/l)	SiO4/LDGO (umol/l)	TSM (ug/l)
10	2.928		180.97			
29	2.928		180.13			
16	2.928		179.52			
19	2.963		178.67			
17	2.968		176.48			
22	2.980		175.36			
8	2.991		176.37			
1	3.020		175.28			
5	3.020	3.020	175.42	175.29	176.086	9.59
30	3.060	3.066	171.88	171.87	172.315	8.13
11	3.145	3.145	161.98	162.09	162.429	8.44
3	3.225	3.219	148.28	147.29	148.074	10.65

D-Theta = (ptemp + (4.85 * pden)) - 135.956
Additional Samples Collected:
Helium
Particulate Trace Elements

VENTS 1990 - LEG IV
Station FE24 Cast 57 24 SEP 1990
LAT: 44 49.2N LONG: 130 18.1W

Niskin #	Depth (m)	Depth (db)	Insitu Temp.	Potential Temp.	Temp. Anom.	Salinity (CTD)	Salinity (Bottle)	Atten. (1/m)	Sigma-t (CTD)	Sigma-t (Bottle)	Sigma-Theta (CTD)	Sigma-Theta (Bottle)
10	2250.4	2281.1	1.885	1.726	0.021	34.612	34.611	0.378	27.670	27.669	27.682	27.681
29	2199.8	2229.6	1.892	1.738	0.028	34.612	34.612	0.379	27.669	27.669	27.681	27.681
16	2151.4	2180.2	1.890	1.740	0.026	34.611	34.611	0.381	27.669	27.669	27.680	27.680
19	2100.1	2128.0	1.892	1.747	0.022	34.609	34.608	0.383	27.667	27.666	27.678	27.677
17	2050.8	2077.8	1.910	1.768	0.017	34.604	34.604	0.387	27.662	27.662	27.672	27.672
22	2037.1	2063.9	1.910	1.770	0.017	34.604	34.603	0.386	27.662	27.661	27.672	27.672
8	1999.4	2025.5	1.913	1.776	0.006	34.600	34.600	0.377	27.658	27.658	27.669	27.669
1	1900.2	1924.6	1.974	1.844	-0.002	34.587	34.588	0.375	27.643	27.644	27.653	27.654
9	1748.7	1770.5	2.088	1.969	-0.002	34.567	34.567	0.376	27.618	27.618	27.627	27.627
12	1499.1	1516.9	2.442	2.339	0.060	34.525	34.525	0.377	27.555	27.555	27.564	27.564
21	1249.6	1263.6	2.975	2.887	0.145	34.465	34.465	0.377	27.460	27.460	27.468	27.468
15	1000.3	1010.9	3.554	3.481	0.149	34.382	34.383	0.377	27.339	27.340	27.347	27.347

Niskin #	PO4-UNF (umol/l)	PO4-FIL (umol/l)	SiO4-UF/UW (umol/l)	SiO4-F/UW (umol/l)	SiO4/LDGO (umol/l)	TSM (ug/l)
10	2.955	2.955	178.62	179.41	178.830	12.87
29	2.955	2.955	179.57	179.60	180.476	16.69
16	2.955	2.944	180.02	180.30	179.538	16.38
19	2.961	2.955	179.59	180.25	179.538	19.13
17	2.961	2.944	179.53	179.43	178.590	24.14
22	2.961	2.961	180.61	179.75	179.059	21.72
8	2.972	2.967	179.42	178.44	177.643	12.05
1	3.017	3.012	176.72	176.87	176.226	15.00
9	3.063	3.063	173.01	173.29	173.862	11.14
12	3.141	3.136	163.14	164.05	164.634	10.22
21	3.237	3.243	147.88	149.03	149.490	10.10
15	3.254	3.271	131.61	131.63	132.940	30.27

D-Theta = (ptemp + (4.85 *pden)) - 135.963
Additional Samples Collected:
Helium
Particulate Trace Elements

VENTS 1990 - LEG IV
Station FE20 Cast 58 24 SEP 1990
LAT: 44 51.5N LONG: 130 14.1W

Niskin #	Depth (m)	Depth (db)	Insitu Temp.	Potential Temp.	Temp. Anom.	Salinity (CTD)	Salinity (Bottle)	Atten. (1/m)	Sigma-t (CTD)	Sigma-t (Bottle)	Sigma-Theta (CTD)	Sigma-Theta (Bottle)
14	2237.1	2267.6	1.872	1.715	0.027	34.613	34.613	0.380	27.672	27.672	27.684	27.684
27	2209.9	2239.8	1.873	1.718	0.029	34.613	34.613	0.382	27.672	27.672	27.683	27.683
6	2200.3	2230.1	1.873	1.719	0.029	34.613	34.614	0.382	27.672	27.672	27.683	27.684
31	2174.2	2203.5	1.872	1.720	0.023	34.611	34.610	0.379	27.670	27.669	27.682	27.681
2	2151.5	2180.4	1.870	1.720	0.023	34.611	34.610	0.379	27.670	27.669	27.682	27.681
24	2099.9	2127.8	1.887	1.742	0.013	34.605	34.605	0.376	27.664	27.664	27.675	27.675
23	2049.6	2076.6	1.901	1.760	0.009	34.601	34.599	0.375	27.660	27.658	27.671	27.669
18	2001.4	2027.5	1.922	1.785	0.009	34.597	34.596	0.376	27.655	27.654	27.666	27.665
26	1901.7	1926.0	1.964	1.834	0.001	34.587	34.584	0.375	27.644	27.641	27.654	27.651
30	1750.7	1772.5	2.093	1.974	0.003	34.565	34.565	0.376	27.616	27.616	27.625	27.625
20	1499.4	1517.2	2.465	2.362	0.075	34.523	34.524	0.377	27.552	27.552	27.560	27.561
25	1249.9	1264.0	2.920	2.832	0.143	34.470	34.469	0.377	27.469	27.469	27.477	27.476

Niskin #	PO4-UNF (umol/l)	PO4-FIL (umol/l)	SiO4-UF/UW (umol/l)	SiO4-F/UW (umol/l)	SiO4/LDGO (umol/l)	TSM (ug/l)
14	2.902	2.907	184.68	184.66	180.007	19.05
27	2.897	2.908	183.94	184.44	180.476	20.12
6	2.892	2.903	184.75	185.12	179.299	17.58
31	2.904	2.920	184.27	183.21	179.299	14.21
2	2.916	2.927	183.14	183.64	178.830	15.38
24	2.955	2.944	182.27	182.38	178.351	11.24
23	2.962	2.961	181.14	181.12	176.695	14.69
18	2.957	2.956	179.87	179.85	176.934	9.14
26	2.974	2.979	178.35	178.72	175.987	10.70
30	3.036	3.036	174.75	174.60	172.675	10.24
20	3.127	3.132	165.42	165.66	161.791	17.00
25	3.189	3.206	152.33	151.79	149.730	16.34

D-Theta = (ptemp + (4.85 * pden)) - 135.954
Additional Samples Collected:
Helium
Particulate Trace Elements

VENTS 1990 - LEG IV
Station FE20 Cast 59 24 SEP 1990
LAT: 44 51.5N LONG: 130 15.1W

Niskin #	Depth (m)	Depth (db)	Insitu Temp.	Potential Temp.	Temp. Anom.	Salinity (CTD)	Salinity (Bottle)	Atten. (1/m)	Sigma-t (CTD)	Sigma-t (Bottle)	Sigma-Theta (CTD)	Sigma-Theta (Bottle)
1	2207.2	2237.1	1.876	1.721	0.031	34.613	34.612	0.379	27.671	27.671	27.683	27.682
32	2176.1	2205.5	1.863	1.711	0.021	34.612	34.604	0.379	27.672	27.665	27.683	27.677
9	2177.9	2207.3	1.863	1.711	0.021	34.612	34.611	0.378	27.672	27.671	27.683	27.682
17	2150.7	2179.5	1.881	1.731	0.029	34.611	34.611	0.379	27.669	27.669	27.681	27.681
13	2152.7	2181.6	1.880	1.730	0.029	34.611	34.608	0.380	27.669	27.667	27.681	27.679
10	2104.3	2132.3	1.894	1.748	0.013	34.604	34.605	0.377	27.663	27.664	27.674	27.675
5	2102.1	2130.0	1.894	1.748	0.013	34.604	34.604	0.376	27.663	27.663	27.674	27.674
3	2048.0	2074.9	1.918	1.777	0.007	34.598	34.599	0.376	27.656	27.657	27.667	27.668
21	2048.4	2075.4	1.918	1.777	0.007	34.598	34.594	0.375	27.656	27.653	27.667	27.664
11	2002.8	2029.0	1.930	1.792	0.006	34.595	34.593	0.375	27.653	27.651	27.663	27.662
15	1900.2	1924.5	1.992	1.862	0.003	34.583	34.582	0.376	27.638	27.637	27.648	27.648

Niskin #	PO4-UNF (umol/l)	PO4-FIL (umol/l)	SiO4-UF/UW (umol/l)	SiO4-F/UW (umol/l)	SiO4/LDGO (umol/l)	TSM (ug/l)
1	2.910		180.47			
32	2.915		179.12			
9	2.910		180.14			
17	2.927		180.16			
13	2.921		180.19			
10	2.910		178.83			
5	2.915		178.35			
3	2.966		177.50			
21	2.972		177.90			
11	2.978		177.54			
15	3.006		175.68			

D-Theta = (ptemp + (4.85 * pden)) - 135.954

VENTS 1990 - LEG IV
Station FE22 Cast 60 25 SEP 1990
LAT: 44 52.6N LONG: 130 18.0W

Niskin #	Depth (m)	Depth (db)	Insitu Temp.	Potential Temp.	Temp. Anom.	Salinity (CTD)	Salinity (Bottle)	Atten. (1/m)	Sigma-t (CTD)	Sigma-t (Bottle)	Sigma-Theta (CTD)	Sigma-Theta (Bottle)
1	2150.3	2179.1	1.897	1.747	0.030	34.611	34.611	0.388	27.668	27.668	27.680	27.680
29	2097.6	2125.5	1.904	1.759	0.034	34.610	34.610	0.400	27.667	27.667	27.678	27.678
9	2081.4	2109.0	1.904	1.760	0.035	34.610	34.610	0.400	27.667	27.667	27.678	27.678
17	2068.8	2096.2	1.905	1.762	0.036	34.610	34.609	0.402	27.667	27.666	27.678	27.677
8	2046.7	2073.6	1.905	1.764	0.033	34.609	34.608	0.400	27.666	27.665	27.677	27.676
10	2024.5	2051.1	1.908	1.769	0.029	34.607	34.606	0.397	27.664	27.663	27.675	27.674
5	2003.2	2029.3	1.909	1.772	0.019	34.604	34.603	0.388	27.662	27.661	27.672	27.671
3	1901.6	1926.0	1.957	1.827	-0.001	34.590	34.593	0.376	27.647	27.649	27.657	27.659
21	1748.1	1769.9	2.123	2.004	0.008	34.564	34.564	0.376	27.613	27.613	27.622	27.622
11	1498.6	1516.3	2.461	2.358	0.064	34.523	34.523	0.377	27.552	27.552	27.560	27.560
15	1248.3	1262.3	2.968	2.880	0.138	34.464	34.465	0.378	27.460	27.461	27.468	27.469
12	1006.4	1017.1	3.515	3.442	0.163	34.391	34.390	0.378	27.350	27.350	27.358	27.357

Niskin #	PO4-UNF (umol/l)	PO4-FIL (umol/l)	SiO4-UF/UW (umol/l)	SiO4-F/UW (umol/l)	SiO4/LDGO (umol/l)	TSM (ug/l)
1	2.905	2.933	178.41	179.43	179.388	22.07
29	2.939	2.899	179.57	179.85	179.857	34.73
9	2.933	2.899	180.11	179.78	180.336	39.14
17	2.939	2.899	178.93	180.20	179.857	40.52
8	2.916	2.905	180.09	179.88	180.097	32.74
10	2.950	2.916	180.14	179.19	179.628	31.53
5	2.956	2.950	179.20	178.00	179.159	23.12
3	3.001	3.001	176.90	176.82	177.034	9.81
21	3.057	3.057	173.37	172.55	173.034	11.13
11	3.136	3.125	163.66	163.45	163.856	11.57
15	3.220	3.226	148.86	149.03	149.490	11.36
12	3.243	3.254	133.04	132.97	133.249	10.14

D-Theta = (ptemp = (4.85 * pden)) - 135.963
Additional Samples Collected:
Helium
Particulate Trace Elements

VENTS 1990 - LEG IV
Station FE22 Cast 61 25 SEP 1990
LAT: 44 52.3N LONG: 130 18.0W

Niskin #	Depth (m)	Depth (db)	Insitu Temp.	Potential Temp.	Temp. Anom.	Salinity (CTD)	Salinity (Bottle)	Atten. (1/m)	Sigma-t (CTD)	Sigma-t (Bottle)	Sigma-Theta (CTD)	Sigma-Theta (Bottle)
18	2141.4	2170.1	1.894	1.745	0.029	34.610	34.610	0.386	27.668	27.668	27.679	27.679
27	2100.0	2127.9	1.901	1.755	0.032	34.609	34.609	0.397	27.666	27.666	27.677	27.677
19	2098.5	2126.4	1.902	1.756	0.033	34.609	34.610	0.397	27.666	27.667	27.677	27.678
16	2048.1	2075.1	1.907	1.766	0.035	34.608	34.609	0.399	27.665	27.666	27.676	27.677
23	2048.1	2075.1	1.906	1.765	0.034	34.608	34.608	0.399	27.665	27.665	27.676	27.676
22	2001.0	2027.1	1.911	1.774	0.020	34.603		0.388	27.661		27.671	
30	2000.4	2026.5	1.912	1.775	0.021	34.603	34.604	0.389	27.661	27.661	27.671	27.672
25	1948.9	1974.1	1.945	1.812	0.001	34.592	34.591	0.377	27.649	27.648	27.659	27.659
26	1948.5	1973.7	1.945	1.812	0.005	34.593	34.592	0.378	27.650	27.649	27.660	27.659
2	1900.0	1924.3	1.980	1.850	-0.002	34.585	34.582	0.376	27.641	27.638	27.651	27.649
24	1806.8	1829.5	2.052	1.929	0.001	34.573	34.573	0.376	27.625	27.625	27.635	27.635
14	10.3	10.4	18.127	18.125		32.322	34.001	0.417	23.192	24.477	23.193	24.477

Niskin #	PO4-UNF (umol/l)	PO4-FIL (umol/l)	SiO4-UF/UW (umol/l)	SiO4-F/UW (umol/l)	SiO4/LDGO (umol/l)	TSM (ug/l)
18	2.945		178.21			
27	2.945		178.25			
19	2.945		178.42			
16	2.928		178.22			
23	2.917		178.26			
22						
30	2.911		177.19			
25	2.995		175.86			
26	2.956		175.66			
2	2.995		174.59			
24	3.024		173.14			
14	0.371					

D-Theta = (ptemp + (4.85 * pden)) - 135.959

VENTS 1990 - LEG IV
Station FT6 Cast 62 25 SEP 1990
LAT: 44 52.9N LONG: 130 16.4W

Niskin #	Depth (m)	Depth (db)	Insitu Temp.	Potential Temp.	Temp. Anom.	Salinity (CTD)	Salinity (Bottle)	Atten. (1/m)	Sigma-t (CTD)	Sigma-t (Bottle)	Sigma-Theta (CTD)	Sigma-Theta (Bottle)
23	2107.0	2135.1	1.904	1.758	0.028	34.609	34.610		27.666	27.667	27.677	27.678
19	2079.2	2106.7	1.893	1.749	0.011	34.606	34.606		27.664	27.664	27.675	27.675
18	2181.8	2211.2	1.877	1.725	0.023	34.613	34.610		27.671	27.669	27.683	27.681
24	2042.0	2068.8	1.907	1.766	0.018	34.605	34.603		27.663	27.661	27.673	27.672
25	2219.0	2249.2	1.894	1.738	0.031	34.613	34.611		27.670	27.668	27.682	27.680
27	2059.3	2086.5	1.902	1.760	0.030	34.609	34.608		27.666	27.665	27.677	27.676
6	2060.6	2087.9	1.906	1.764	0.036	34.610	34.610		27.667	27.667	27.678	27.678
22	1844.0	1866.9	2.049	1.923	0.028	34.582	34.580		27.633	27.631	27.643	27.641
30	2143.0	2171.6	1.873	1.724	0.020	34.612	34.611		27.671	27.670	27.682	27.681
16	2163.0	2192.5	1.865	1.714	0.018	34.613	34.612		27.672	27.671	27.684	27.683
26	2108.0	2136.0	1.888	1.742	0.015	34.608	34.608		27.666	27.666	27.678	27.678
2	2060.0	2086.9	1.909	1.767	0.035	34.609	34.610		27.666	27.666	27.677	27.677

Niskin #	PO4-UNF (umol/l)	PO4-FIL (umol/l)	SiO4-UF/UW (umol/l)	SiO4-F/UW (umol/l)	SiO4/LDGO (umol/l)	TSM (ug/l)
23	2.913	2.912	180.08	180.86	179.139	27.71
19	2.958	2.958	179.66	179.29	178.910	11.51
18	2.913	2.919	180.38	180.53	180.316	16.43
24	2.953	2.952	178.42	178.57	178.201	15.27
25	2.914	2.913	180.03	180.82	179.538	22.41
27	2.919	2.914	179.86	179.50	179.159	29.14
6	2.920	2.903	179.94	179.58	178.920	35.33
22	3.021	2.903	172.96	180.18	173.981	8.94
30	2.926	2.926	178.95	178.59	178.920	13.33
16	2.926	2.926	178.26	178.80	179.388	14.29
26	2.938	2.937	178.08	178.49	178.680	13.17
2	2.932	2.904	179.71	179.35	179.857	36.42

D-Theta = (ptemp + (4.85 * pden)) - 135.964 for Niskin #'s 23 to 6.
D-Theta = (ptemp + (4.85 * pden)) - 135.963 for Niskin #'s 22 to 2.
Additional Samples Collected:
Helium
Particulate Trace Elements
Dissolved Fe and Mn

VENTS 1990 - LEG IV
Station FT7 Cast 63 26 SEP 1990
LAT: 44 58.8N LONG: 130 13.1W

Niskin #	Depth (m)	Depth (db)	Insitu Temp.	Potential Temp.	Temp. Anom.	Salinity (CTD)	Salinity (Bottle)	Atten. (1/m)	Sigma-t (CTD)	Sigma-t (Bottle)	Sigma-Theta (CTD)	Sigma-Theta (Bottle)
1	2073.9	2101.4	1.924	1.780	0.045	34.609	34.612		27.664	27.667	27.676	27.678
9	2082.6	2110.3	1.934	1.789	0.058	34.611	34.612	0.436	27.665	27.666	27.676	27.677
29	2149.7	2178.6	1.924	1.774	0.044	34.610	34.612	0.418	27.665	27.667	27.677	27.678
21	2109.2	2137.3	1.934	1.787	0.060	34.612	34.613	0.424	27.666	27.667	27.677	27.678
8	2051.0	2078.1	1.933	1.791	0.063	34.612	34.613	0.429	27.666	27.667	27.677	27.678
3	2062.6	2089.8	1.935	1.792	0.064	34.612	34.612	0.424	27.666	27.666	27.677	27.677
10	2114.0	2142.2	1.920	1.773	0.044	34.610	34.611	0.418	27.666	27.666	27.677	27.678
15	2090.1	2117.9	1.923	1.778	0.047	34.610	34.610	0.424	27.665	27.665	27.677	27.677
5	2094.6	2122.5	1.924	1.778	0.047	34.610	34.609	0.424	27.665	27.664	27.676	27.676
12	2088.4	2116.2	1.898	1.753	0.024	34.608	34.606	0.402	27.666	27.664	27.677	27.675
11	2058.9	2086.0	1.907	1.765	0.019	34.605	34.604	0.398	27.663	27.662	27.673	27.673

Niskin #	PO4-UNF (umol/l)	PO4-FIL (umol/l)	SiO4-UF/UW (umol/l)	SiO4-F/UW (umol/l)	SiO4/LDGO (umol/l)	TSM (ug/l)
1	2.931	2.909	182.01	180.94	180.566	54.05
9	2.926	2.869	181.63	182.20	181.513	75.28
29	2.937	2.909	181.36	181.80	181.274	46.41
21	2.926	2.869	182.24	181.54	181.513	72.19
8	2.926	2.869	182.48	182.42	182.102	63.37
3	2.920	2.875	182.98	182.79	181.982	57.77
10	2.931	2.903	181.82	182.02	181.224	49.11
15	2.931	2.914	182.06	181.88	181.224	56.05
5	2.926	2.880	181.79	182.50	181.224	51.35
12	2.954	2.920	179.59	179.66	179.807	31.03
11	2.960	2.937	178.54	179.64	179.099	26.45

D-Theta = (ptemp + (4.85 * pden)) - 135.962
Additional Samples Collected:
Helium
Particulate Trace Elements

VENTS 1990 - LEG IV
Station FT8 Cast 64 27 SEP 1990
LAT: 45 00.0N LONG: 130 12.5W

Niskin #	Depth (m)	Depth (db)	Insitu Temp.	Potential Temp.	Temp. Anom.	Salinity (CTD)	Salinity (Bottle)	Atten. (1/m)	Sigma-t (CTD)	Sigma-t (Bottle)	Sigma-Theta (CTD)	Sigma-Theta (Bottle)
30	2130.2	2158.7	1.935	1.786	0.057	34.613	34.616	0.428	27.667	27.669	27.678	27.681
19	2097.2	2125.1	1.939	1.793	0.065	34.614	34.615	0.449	27.667	27.668	27.679	27.679
26	2145.3	2174.0	1.933	1.783	0.051	34.612	34.613	0.420	27.666	27.667	27.678	27.679
22	2108.6	2136.6	1.931	1.784	0.052	34.612	34.615	0.415	27.666	27.669	27.678	27.680
6	2083.0	2110.6	1.923	1.778	0.040	34.610	34.612	0.450	27.665	27.667	27.676	27.678
18	2066.8	2094.1	1.927	1.784	0.044	34.610	34.610	0.433	27.665	27.665	27.676	27.676
27	2129.7	2158.2	1.893	1.745	0.015	34.609	34.611	0.397	27.667	27.668	27.678	27.680
14	2088.1	2115.8	1.911	1.766	0.017	34.606	34.610	0.402	27.663	27.666	27.674	27.677
24	2190.3	2219.9	1.868	1.715	0.012	34.613	34.615	0.409	27.672	27.674	27.684	27.685
23	2077.0	2104.5	1.906	1.762	0.026	34.609	34.610	0.407	27.666	27.667	27.677	27.678
2	2055.0	2082.1	1.913	1.771	0.028	34.608	34.609	0.419	27.664	27.665	27.675	27.676
16	2037.2	2064.0	1.923	1.782	0.043	34.610	34.612	0.423	27.665	27.667	27.676	27.678

Niskin #	PO4-UNF (umol/l)	PO4-FIL (umol/l)	SiO4-UF/UW (umol/l)	SiO4-F/UW (umol/l)	SiO4/LDGO (umol/l)	TSM (ug/l)
30	2.916	2.836	185.01	184.64	181.453	66.77
19	2.876	2.768	185.13	185.01	181.693	111.06
26	2.871	2.808	184.51	184.51	180.745	97.11
22	2.922	2.871	184.39	184.26	180.985	49.94
6	2.922	2.871	183.89	184.14	180.037	67.66
18	2.923	2.866	183.51	183.26	179.807	66.31
27	2.929	2.923	182.63	182.39	178.630	28.85
14	2.935	2.923	182.50	182.38	178.391	30.29
24	2.923	2.867	182.74	182.87	178.151	52.76
23	2.929	2.912	182.23	182.61	179.099	35.48
2	2.924	2.879	182.34	182.35	179.099	47.86
16	2.924	2.879	182.71	183.21	179.807	55.25

D-Theta = (ptemp + (4.85 * pden)) - 135.969
Additional Samples Collected:
Helium
Particulate Trace Elements

VENTS 1990 - LEG IV
Station FE26 Cast 65 28 SEP 1990
LAT: 45 00.3N LONG: 130 12.4W

Niskin #	Depth (m)	Depth (db)	Insitu Temp.	Potential Temp.	Temp. Anom.	Salinity (CTD)	Salinity (Bottle)	Atten. (1/m)	Sigma-t (CTD)	Sigma-t (Bottle)	Sigma-Theta (CTD)	Sigma-Theta (Bottle)
21	2214.4	2244.4	1.904	1.748	0.043	34.612		0.399	27.668		27.680	
29	2200.0	2229.8	1.912	1.757	0.045	34.611	34.613	0.422	27.667	27.669	27.679	27.680
17	2180.5	2209.9	1.917	1.764	0.049	34.611	34.612	0.416	27.667	27.667	27.678	27.679
8	2149.5	2178.4	1.920	1.770	0.053	34.611	34.613	0.421	27.666	27.668	27.678	27.680
25	2108.9	2137.0	1.915	1.768	0.044	34.609	34.610	0.414	27.665	27.666	27.676	27.677
5	2101.8	2129.8	1.916	1.770	0.049	34.610	34.611	0.416	27.666	27.667	27.677	27.678
15	2091.2	2119.0	1.914	1.769	0.044	34.609	34.610	0.414	27.665	27.666	27.676	27.677
10	2051.6	2078.7	1.917	1.775	0.045	34.608	34.609	0.414	27.664	27.665	27.675	27.676
3	2019.5	2046.0	1.917	1.778	0.031	34.604	34.606	0.405	27.661	27.663	27.672	27.673

Niskin #	PO4-UNF (umol/l)	PO4-FIL (umol/l)	SiO4-UF/UW (umol/l)	SiO4-F/UW (umol/l)	SiO4/LDGO (umol/l)	TSM (ug/l)
21						
29	2.921	2.904	181.96	182.31	180.516	35.40
17	2.915	2.876	181.74	181.85	180.276	46.15
8	2.910	2.870	181.99	182.11	180.745	51.45
25	2.915	2.898	182.25	182.12	178.860	41.97
5	2.910	2.893	181.90	182.50	179.339	44.02
15	2.915	2.893	181.79	181.67	179.339	41.82
10	2.927	2.904	182.05	181.68	179.349	41.84
3	2.944	2.915	180.97	180.85	177.922	31.54

D-Theta = (ptemp + (4.85 * pden)) - 135.955
Additional Samples Collected:
Helium
Particulate Trace Elements

VENTS 1990 - LEG IV
Station FE6 Cast 66 28 SEP 1990
LAT: 45 00.4N LONG: 130 16.9W

Niskin #	Depth (m)	Depth (db)	Insitu Temp.	Potential Temp.	Temp. Anom.	Salinity (CTD)	Salinity (Bottle)	Atten. (1/m)	Sigma-t (CTD)	Sigma-t (Bottle)	Sigma-Theta (CTD)	Sigma-Theta (Bottle)
9	2218.6	2248.8	1.893	1.737	0.030	34.612	34.613	0.396	27.669	27.670	27.681	27.682
27	2202.3	2232.1	1.906	1.751	0.035	34.611	34.610	0.401	27.667	27.667	27.679	27.679
19	2174.7	2204.0	1.911	1.759	0.044	34.612	34.611	0.405	27.668	27.667	27.680	27.679
30	2151.3	2180.2	1.911	1.761	0.041	34.611	34.611	0.407	27.667	27.667	27.679	27.679
21	2125.5	2153.9	1.912	1.764	0.043	34.611	34.610	0.410	27.667	27.666	27.678	27.678
18	2099.8	2127.8	1.914	1.768	0.042	34.610	34.610	0.414	27.666	27.666	27.677	27.677
24	2084.7	2112.3	1.917	1.772	0.045	34.610	34.610	0.415	27.666	27.666	27.677	27.677
14	2049.6	2076.6	1.913	1.772	0.036	34.608	34.608	0.408	27.664	27.664	27.675	27.675
23	2002.3	2028.5	1.913	1.776	0.019	34.603	34.603	0.395	27.660	27.660	27.671	27.671
6	1951.7	1977.0	1.931	1.798	0.010	34.597	34.596	0.386	27.654	27.653	27.665	27.664
22	1901.0	1925.4	1.959	1.829	0.007	34.591	34.591	0.384	27.647	27.647	27.657	27.657
26	1801.7	1824.4	2.022	1.900	0.004	34.579	34.579	0.384	27.633	27.633	27.642	27.642

Niskin #	PO4-UNF (umol/l)	PO4-FIL (umol/l)	SiO4-UF/UW (umol/l)	SiO4-F/UW (umol/l)	SiO4/LDGO (umol/l)	TSM (ug/l)
9	2.910		183.06			
27	2.905		182.83			
19	2.906		182.83			
30	2.906		182.96			
21	2.901		182.13			
18	2.907		182.02			
24	2.908		182.26			
14	2.908		181.91			
23	2.954		180.84			
6	2.960		180.37			
22	2.977		178.36			
26	3.017		177.18			

D-Theta = (ptemp + (4.85 * pden)) - 135.961

VENTS 1990 - LEG IV
Station FE27 Cast 67 28 SEP 1990
LAT: 44 41.3N LONG: 130 21.7W

Niskin #	Depth (m)	Depth (db)	Insitu Temp.	Potential Temp.	Temp. Anom.	Salinity (CTD)	Salinity (Bottle)	Atten. (1/m)	Sigma-t (CTD)	Sigma-t (Bottle)	Sigma-Theta (CTD)	Sigma-Theta (Bottle)
27	2182.9	2212.3	1.897	1.744	0.023	34.610	34.610	0.382	27.667	27.667	27.679	27.679
26	2151.7	2180.6	1.911	1.761	0.033	34.610	34.612	0.392	27.666	27.668	27.678	27.679
30	2100.0	2127.9	1.912	1.766	0.037	34.610	34.608	0.398	27.666	27.665	27.677	27.676
21	2078.9	2106.4	1.911	1.767	0.037	34.610	34.611	0.400	27.666	27.667	27.677	27.678
18	2069.3	2096.6	1.911	1.768	0.026	34.607	34.603	0.394	27.664	27.661	27.675	27.672
24	2059.8	2087.0	1.911	1.769	0.023	34.606	34.607	0.391	27.663	27.664	27.674	27.675
14	2052.5	2079.5	1.909	1.767	0.018	34.605	34.604	0.389	27.662	27.662	27.673	27.673
23	1999.0	2025.1	1.916	1.779	0.002	34.599	34.600	0.378	27.657	27.658	27.668	27.668
6	1951.3	1976.6	1.956	1.822	0.002	34.592	34.590	0.377	27.648	27.647	27.659	27.657

Niskin #	PO4-UNF (umol/l)	PO4-FIL (umol/l)	SiO4-UF/UW (umol/l)	SiO4-F/UW (umol/l)	SiO4/LDGO (umol/l)	TSM (ug/l)
27	2.894	2.911	180.54	181.38	178.860	18.33
26	2.894	2.894	181.77	181.60	179.787	25.92
30	2.900	2.889	181.86	181.31	180.017	35.80
21	2.906	2.894	181.57	181.27	180.017	35.80
18	2.928	2.889	180.26	180.21	178.630	30.35
24	2.939	2.906	180.72	180.43	178.860	34.07
14	2.917	2.911	180.68	180.51	178.630	21.53
23	2.951	2.951	178.97	179.06	178.391	9.11
6	2.967	2.962	177.89	178.75	176.545	15.75

D-Theta = (ptemp + (4.85 * pden)) - 135.965
Additional Samples Collected:
Particulate Trace Elements
Dissolved Fe and Mn

*U.S. GOVERNMENT PRINTING OFFICE: 1992-673-025/69020