The 2003 Annual Report of the Global Ocean Observing System Center at AOML

U.S. Department of Commerce
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Atlantic Oceanographic and Meteorological Laboratory
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The 2003 Annual Report of the Global Ocean Observing System at AOML

Annual Report

January through December 2003

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www.aoml.noaa.gov/goos

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Executive Summary - 2003

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The GOOS Center at AOML operates 1) NOAA's Global Drifter, Expendable Bathythermograph and SEAS Meteorological Programs; 2) migrates long term monitoring projects into operations when appropriate; 3) provides timely, high quality and cost effective oceanographic data and products for NOAA now cast, forecast, detection, attribution and research mission requirements; and, 4) represents NOAA on national and international coordinating bodies (e.g., the U.S. Argo Science Team, the WMO/IOC Data Buoy Cooperation Panel, Ship of Opportunity Implementation Panel and Ship Observations Team, and the International Argo Data Management Team).

During the calendar year 2003 the GOOS Center Global Drifter Program deployed 568 Drifting Buoys. 107 carried Sea Level Pressure (SLP) sensors and 31 carried wind speed and direction sensors. At the end of 2003 the global array totaled 903 Drifters reporting approximately 4500 sea surface temperature observations daily. The Center collected and processed more than 238,000 global sea surface meteorological and 11,000 Expendable Bathythermograph (XBT) observations from approximately 350 participating Voluntary Observing Ships (VOS). The GOOS Center XBT observations represented more than 52% of the total inserted by all groups onto the Global Telecommunications System. There were 293 successful deployments of ARGO Floats in the Atlantic Ocean by the United States of which AOML deployed 78 or about 26%. Most deployments were from Voluntary Observing Ships and NOAA research vessels. GOOS Center real-time data tracking activities of subsurface observations monitored more than 215,000 observations consisting of Bathy, Buoy, Float, TAO, Triton, XBT, ADCP and TESAC data.

The Data Assembly Center (DAC) of the Global Drifter Program on average assembled and quality controlled 850 Drifters each month as well as assuring the Drifter data were submitted to the Global Telecommunications System upon deployment. The DAC continued to successfully update the research quality database at two-month intervals and develop new and improved products for web distribution. The Atlantic XBT Data Assembly Center, a component of the Global Temperature and Salinity Profile Program, continued to import real time data into the AOML database at monthly intervals. The research quality database (i.e. consisting of both real time and delayed mode data), which began in 1990, is current to 1999 and consists of approximately 120,000 observations.

The GOOS Center with the assistance of NOAA's Office of Global Programs was able to continue both limited XBT support and the upgrade of 51 drifters with barometer capability for southern ocean deployments. Additionally our international colleagues upgraded 60 drifters with barometer sensors: (Meteo France-25, South African Weather Bureau-18, Meteorological Service of New Zealand-9 and the Australian Bureau of Meteorology-8). The GOOS Center continues to represent the Global Drifter Program on the Data Buoy Cooperation Panel and our SEAS XBT and Met Programs on the Ship of Opportunity Implementation Panel, Ship Observations Team, VOSClim and the Working Group on Automated Systems.

The development of SEAS 2000 continues with the deployment of Phase II throughout our VOS fleet and the testing of Phase III by integrating Automated Weather Systems and Thermosalinograph capabilities into its operations. Additionally, we are also working with the International Ocean Carbon Coordination Project (IOCCP) by partnering SEAS 2000 Phase III with the AOML Ocean Chemistry Division and their pCO2 project.

GOOS Center Mission

To provide high quality ocean data and products in a timely and cost-effective manner to satisfy NOAA now-cast, forecast, detection, attribution and research mission requirements.

Introduction

This report summarizes the data collection activities of the GOOS Center at AOML during 2003. The report is prepared to serve several purposes:

(1) providing NOAA management with a summary of the agencies activities in GOOS;
(2) providing the international community with the information needed to implement a global ocean observing system; and
(3) acknowledging the crucial contributions of the commercial and research vessels to GOOS.

This report is dedicated to the Voluntary Observing Ships, Research Vessels, and ship riders that provide the backbone of the GOOS Center Activities.

Major GOOS Center Operations

Voluntary Observing Ship (VOS) Program

www.aoml.noaa.gov/goos

The Global Ocean Observing System (GOOS) Center at NOAA's Atlantic Oceanographic and Meteorological Laboratory presently manages a global VOS fleet of about 350 domestic and foreign commercial vessels. The GOOS global fleet (that utilize SEAS shipboard software to transmit meteorological and AMVER messages) represents a subset of the larger National Weather Service Voluntary Observing Ship (VOS) fleet consisting of over 1000 vessels. Presently, not all NWS VOS use the SEAS shipboard software. These vessels voluntarily collect sea surface meteorological observations. A smaller portion of this GOOS fleet (approximately 35 vessels) also collect a mix of more sophisticated observations consisting of sub-surface expendable bathythermograph, and shipboard thermosalinograph observations, deploy drifting buoys and highly instrumented profiling floats and sometimes tow Continuous Plankton Recorders. The GOOS global VOS fleet is the mechanism used to collect observations and deploy instrumentation that transmit data, in real-time, to National Operational Centers such as the National Center for Envi-

ronmental Prediction (NCEP). During 2003, there were 11,760 XBT observations collected and 112,591 Meteorological Observations collected via AOML's VOS network.

Expendable Bathythermograph (XBT) Program

www.aoml.noaa.gov/goos/goos-products_xbt.html

The GOOS Center operates a global XBT Program that utilizes approximately 40 VOS to monitor on an approximately monthly basis, 20 transects in all three ocean basins. The XBT program is coordinated internationally by the IOC - WMO, Ship of Opportunity Program Implementation Panel (SOOPIP), and Ship Observations Team (SOT). Participating countries select transects of importance to national programs and manage the efforts along these lines. The United States has selected the transects shown in Figure 1 to operate in High Density (eddy resolving), Low Density (seasonal resolution) and Frequently Sampled (4 probes per day, 18 transects per year) mode. Both SIO and AOML operate HD lines as shown on Figure 1.

The GOOS Center utilizes Shipboard Environmental data Acquisition Systems (SEAS) hardware/software to collect, quality control and transmit in real-time subsurface oceanographic observations (about 10,000 - 15,000 per year) and sea surface meteorological observations (about 240,000 per year). The XBT is an expendable temperature probe that is launched from the bridge wings or sterns of commercial vessels approximately 4 - 12 times per day, along certain scientifically selected shipping lanes (Figure 1). The data are collected by ship personnel via a wire link from the XBT probe to the SEAS computer where it is processed and formatted for satellite transmission. The transmitted data are routed to the GOOS Center where it is automatically quality controlled before being inserted on to the GTS for global distribution. NCEP and other national and international operational groups use these data for weather and climate forecasting, and the international scientific community for seasonal, and interannual and decadal climate research.

High Density XBT

www.aoml.noaa.gov/phod/hdenxbt

AOML presently operates a research and development High Density XBT Program utilizing VOS. Five routes (Figure 1): 1) Mediterranean Sea to Miami, FL (A-7), 2) New York, NY to San Juan, Puerto Rico (A-10), 3) Cape Town, South Africa to New York City, New York (A-8,) 4) Cape Town, South Africa to Buenos Aires, Argentina (A-18) and Cape Town, 5) South Africa to Antarctica (A-25) are sampled two - four times per year by placing ship riders on board to collect XBT temperature data. Observations are collected at 30 - 50 km intervals with close spacing near boundaries and specific ocean features of interest. The mission is to measure the seasonal to interannual temperature variability in the upper ocean heat content and transport across the center of the subtropical gyres in the tropical Atlantic and across the Antarctic Circumpolar Current. This effort

has been undertaken to improve our ability to predict important climatic fluctuations. Plans are to integrate the Autolauncher System with (Shipboard Environmental data Acquisition System) SEAS 2000 shipboard software to improve positioning via GPS and facilitate the real-time transmission of these data to the GOOS Center.

Global Drifter Program (GDP)

www.aoml.noaa.gov/phod/dac

The GOOS Center presently operates in cooperation with the Scripps Institution of Oceanography a global Drifting Buoy Center that annually deploys, via VOS, research vessels and U.S. Navy aircraft, over 400 Drifters in all three ocean basins. These drifters are tracked daily via the ARGOS satellite system. Their positions and sea surface temperatures (and sometimes other parameters) are processed and inserted on to the Global Telecommunications System (GTS) for global distribution. Additionally, the GOOS Center operates the Data Assembly Center (DAC) for the Global Drifter Program (GDP). When the deployed drifters are verified as operational, data, including from other national and international agencies, are forwarded to the DAC where the observations are quality controlled. This effort insures that research quality drifter data are available from all programs. The DAC is a participating member of the Intergovernmental Oceanographic Commission (IOC) - World Meteorological Organization (WMO), Data Buoy Cooperation Panel (DBCP) and as such provides NOAA representation to this international forum. To date 1,600,000 Sea Surface Temperature Observations were collected from Drifting Buoys.

Argo Program

www.aoml.noaa.gov/phod/ARGO/Homepage

AOML has been funded by the National Oceanographic Partnership Program (NOPP) as part of a larger group to develop, implement, and manage the real time data management infrastructure for the United States' component of the international Argo experiment. The procedure developed takes the data from the sensor through a real-time quality control to submission onto the GTS for dissemination to the user community. In addition, data accessibility and network evaluation issues are addressed and procedures developed and implemented. The principle NOAA user for the float data is the climate forecast group of NCEP. To satisfy a diverse group of users data must be provided within 24 hours of collection, 24 hours a day, 7 days a week. Automatic quality control procedures have been implemented to meet these requirements. The real-time portion of the data management methodology is now operational. Figure 2 shows the position of ARGO floats in all oceans during 2003.

Future Plans

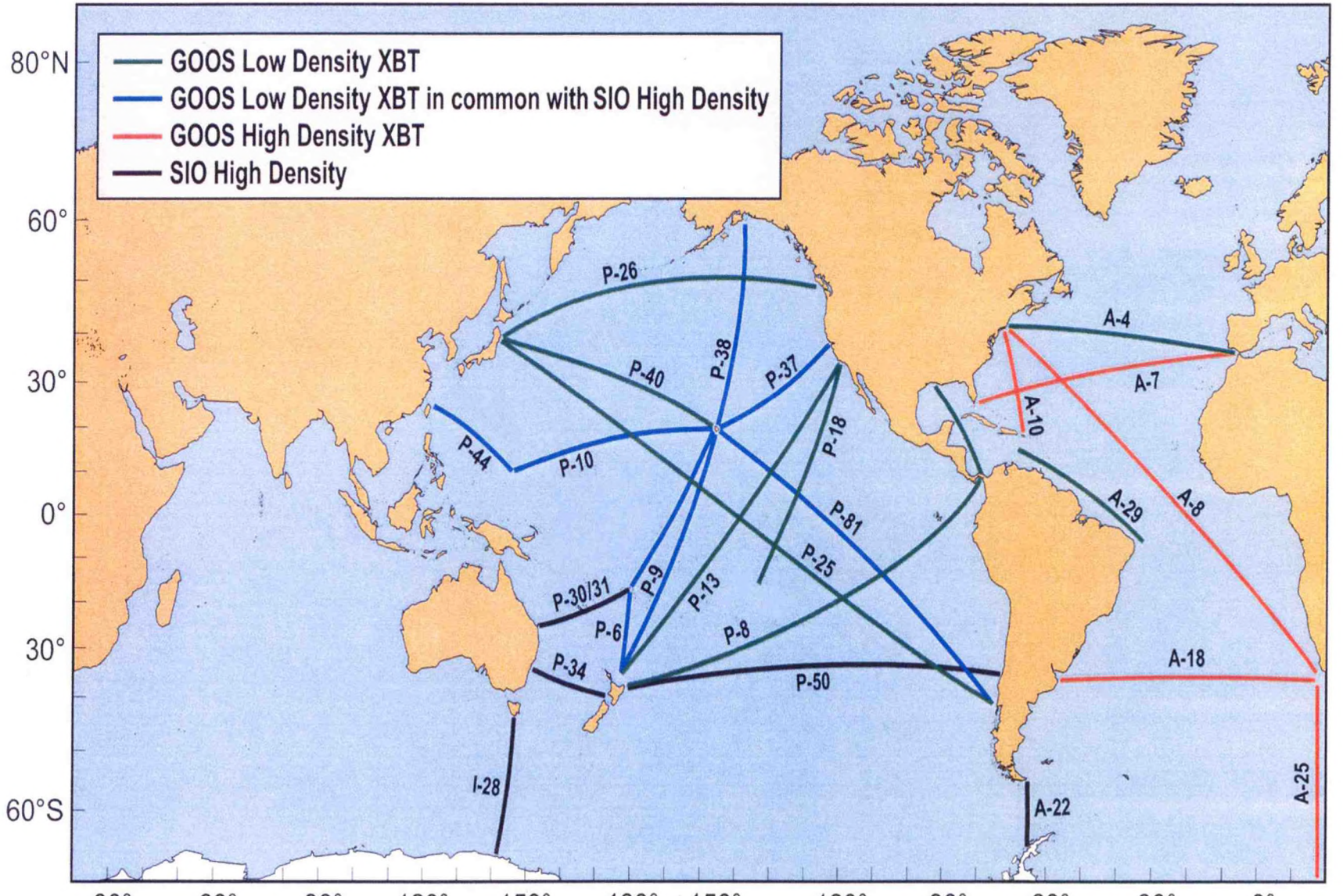
The AOML GOOS Center plans to:

- Improve XBT sampling both within the Low and High Density networks

by upgrading and integrating hardware using the new Sippican Mk-21 card and SEAS 2000 Phase II (Autolauncher) within the VOS fleet;

- Transmit full resolution XBT data from both the Low and High Density XBT networks to increase the quality of transmitted real-time data:
- Improve and implement Automatic Quality Control procedures for transmitted real-time Thermosalinograph (TSG) data to facilitate the early identification of any operational or systemic problems;
- Increase its cooperative work with the International Ocean Carbon Coordination Project (IOCCP) via the Ocean Chemistry Division at AOML by increasing the number of participating VOS;
- Implement SEAS 2000 Phase III (Automated Weather Systems and TSG) into the VOS fleet;
- Incorporate information from the long term Straits of Florida Cable and Abaco Hydrographic Section projects in next years Annual Report.

Figure 1. Principle GOOS XBT Routes during 2003



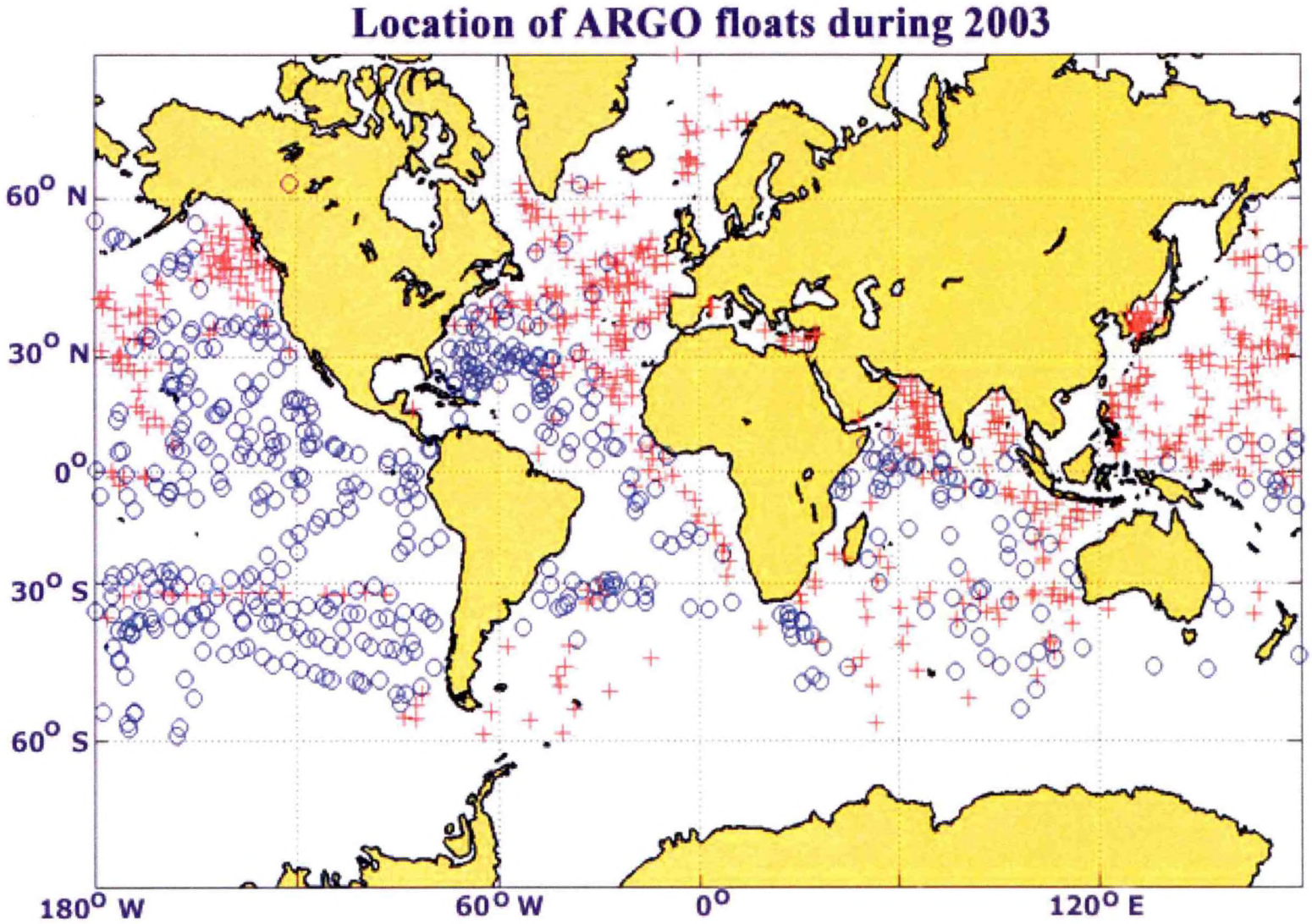


Figure 2: Location of ARGO floats during 2003.
o - International (555 floats)
o - U.S.A. (492 floats)

Data Availability and Web Products

Websites for obtaining GOOS data and information described in this report:

Real Time Products/GOOS database queries:
http://seas.amverseas.noaa.gov/seas/seas.html

AOML ARGO Floats:
http://www.aoml.noaa.gov/phod/ARGO/HomePage/

Global Drifter Center/Data Assembly Center:
http://www.aoml.noaa.gov/phod/dac/dacdata.html

AOML High Density XBT:
http://www.aoml.noaa.gov/phod/hdenxbt/

Interactive Plots:
http://www.aoml.noaa.gov/phod/trinanes/SEAS/SEAS3.html

Profile Plots:
http://goos142.amverseas.noaa.gov/db/XBTPLOTApp.html

ACKNOWLEDGEMENTS

The AOML GOOS Center would like to acknowledge the following people and thank them for their generous support of the GOOS Center monitoring efforts. We greatly appreciate the time and effort that these people have donated toward making these activities a success and look forward to their continued cooperation in the future.

The Captain and crewmembers of all of the participating VOS ships;
The many shipping companies who provide us with the use of their vessels;
The many agents who keep us informed of the continual changes in ships schedules and routes.

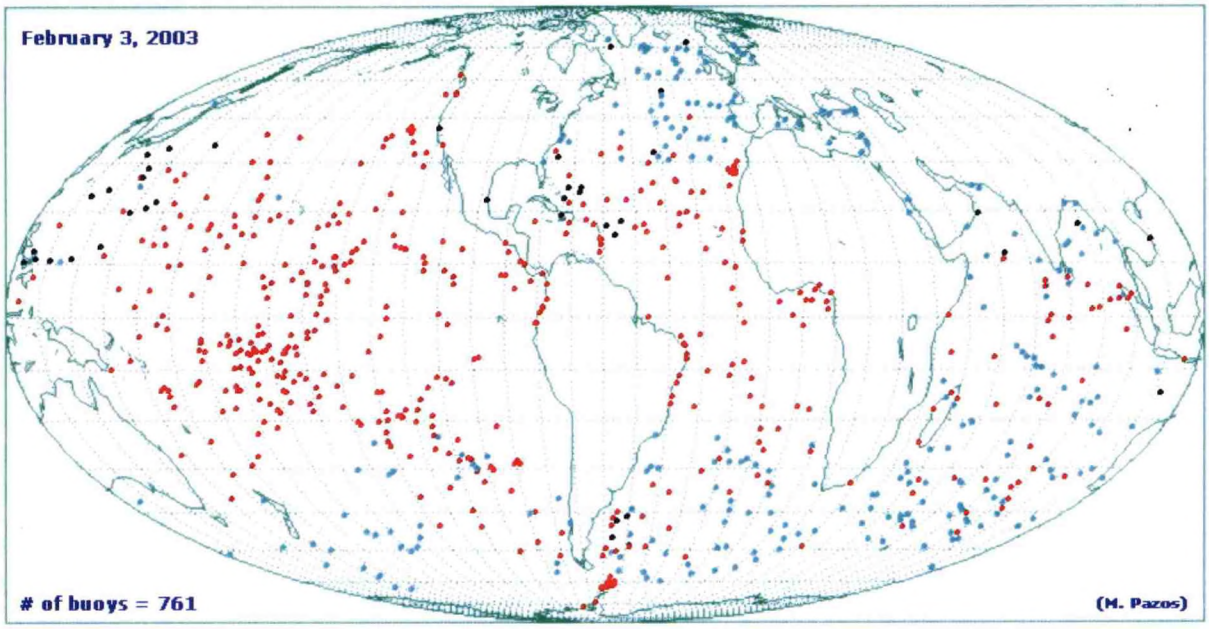
Support for this program was provided by the following:

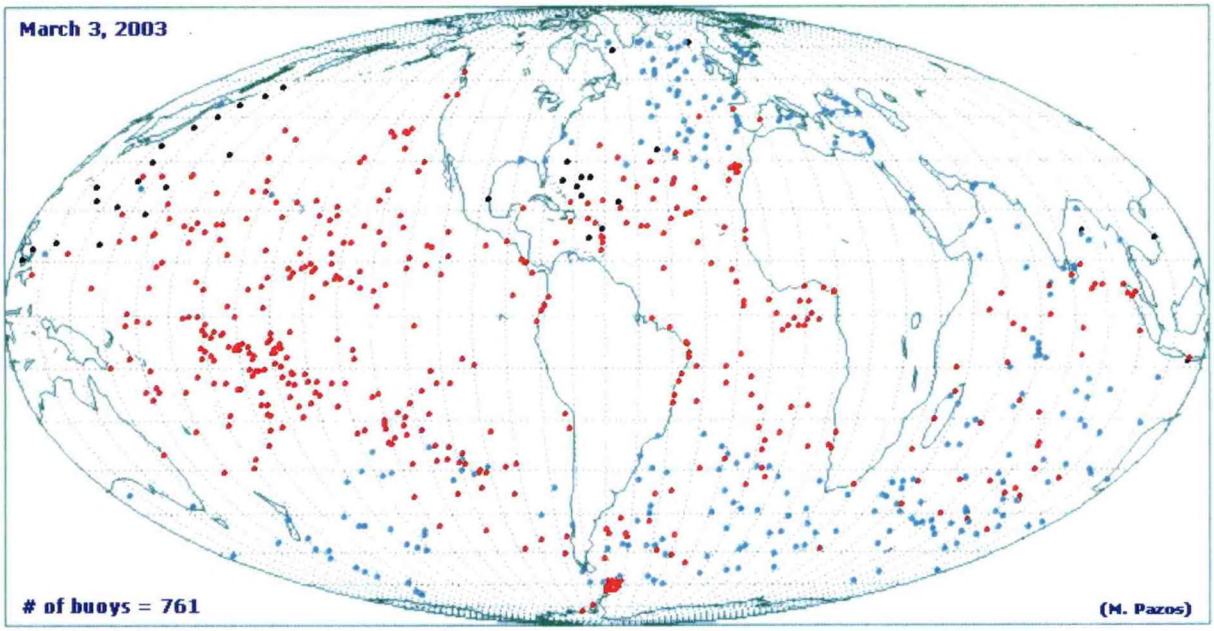
Office of Global Programs
NESDIS (National Environmental Satellite Data and Information Services)
U.S. Coast Guard and NWS
National Ocean Partnership Program
AOML/PHOD (Physical Oceanography Division)

GOOS Center Products

Status of Global Drifter Arrays during 2003

The number in the lower left corner of the plot indicates the number of drifters that were in the water as of the date listed in the upper left corner.

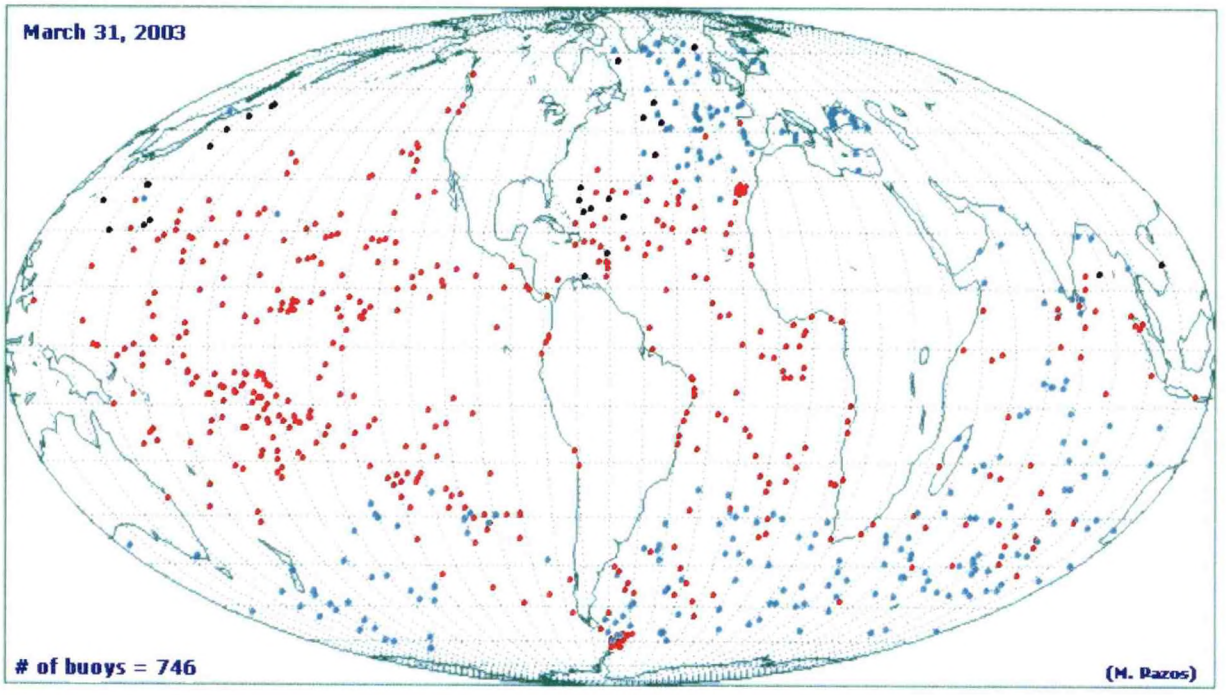


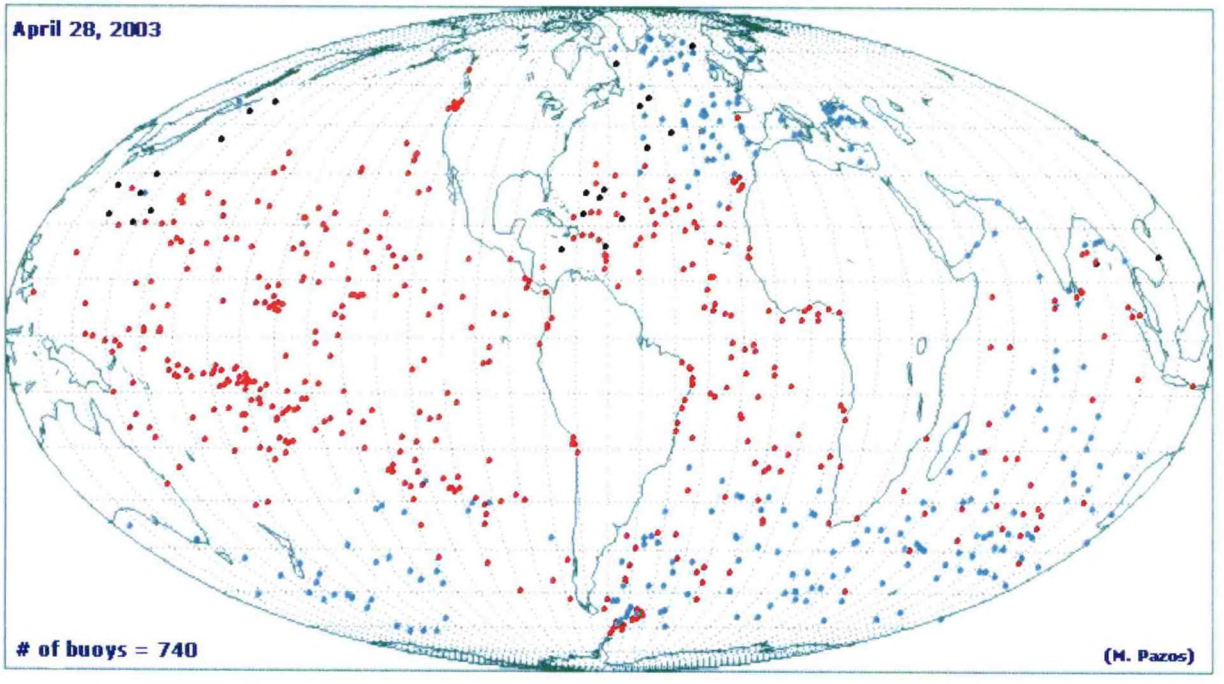


SST only
SST/SLP
SST/SLP/WIND

GLOBAL DRIFTER PROGRAM

Status of Global Drifter Arrays *(cont'd)*

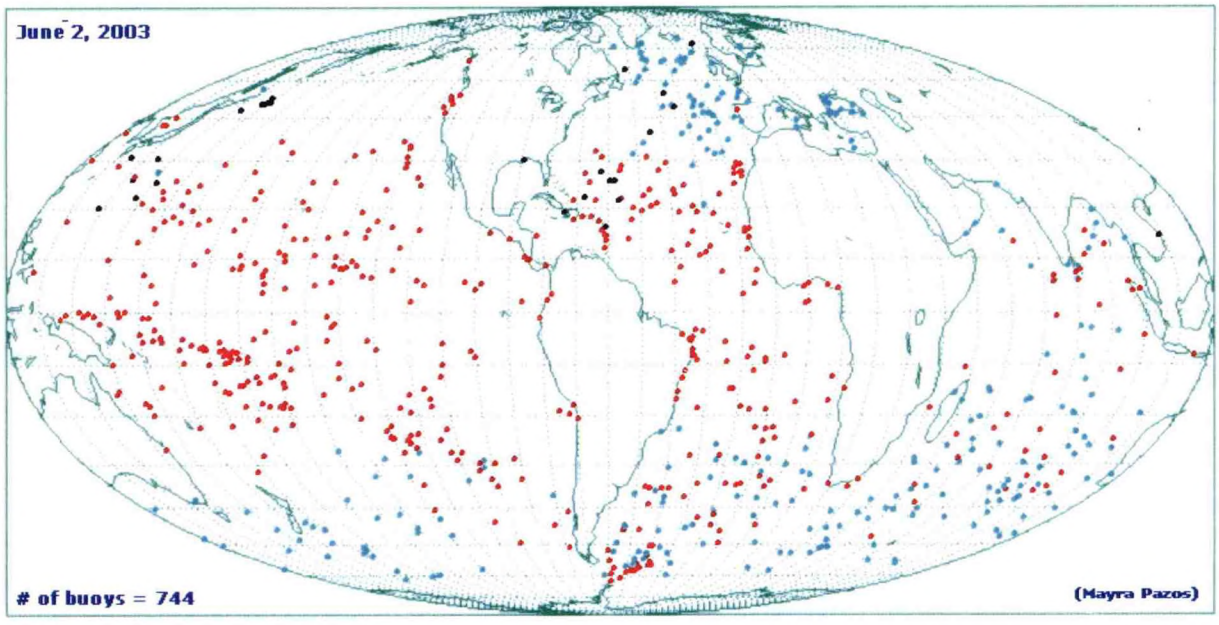


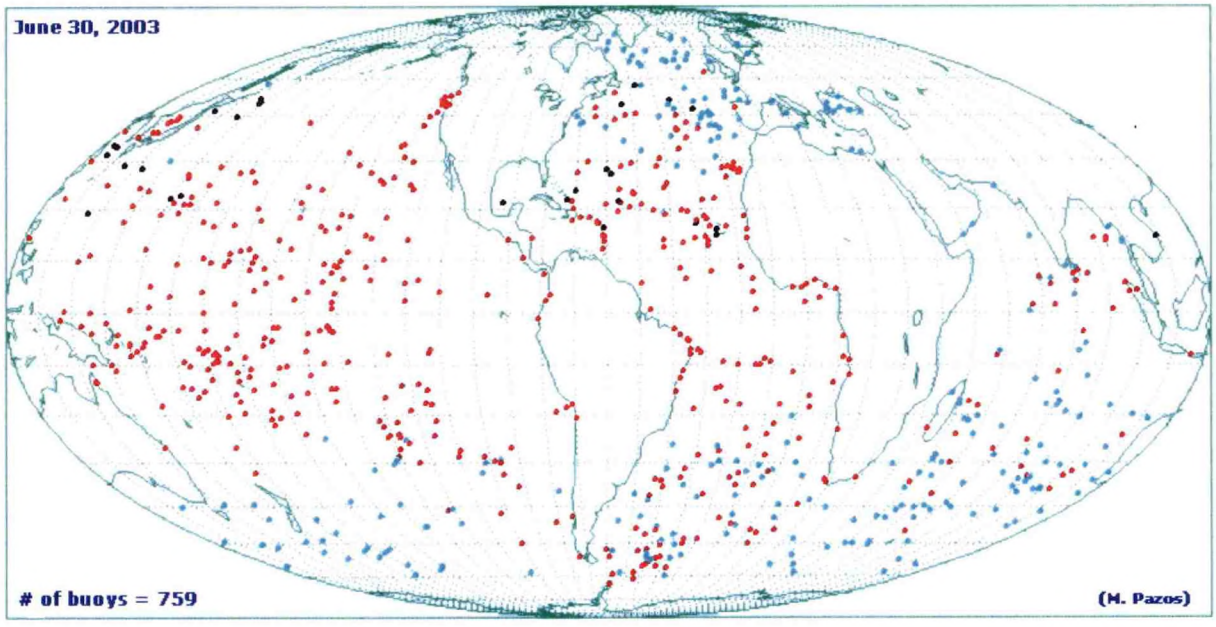


SST only
SST/SLP
SST/SLP/WIND

GLOBAL DRIFTER PROGRAM

Status of Global Drifter Arrays *(cont'd)*

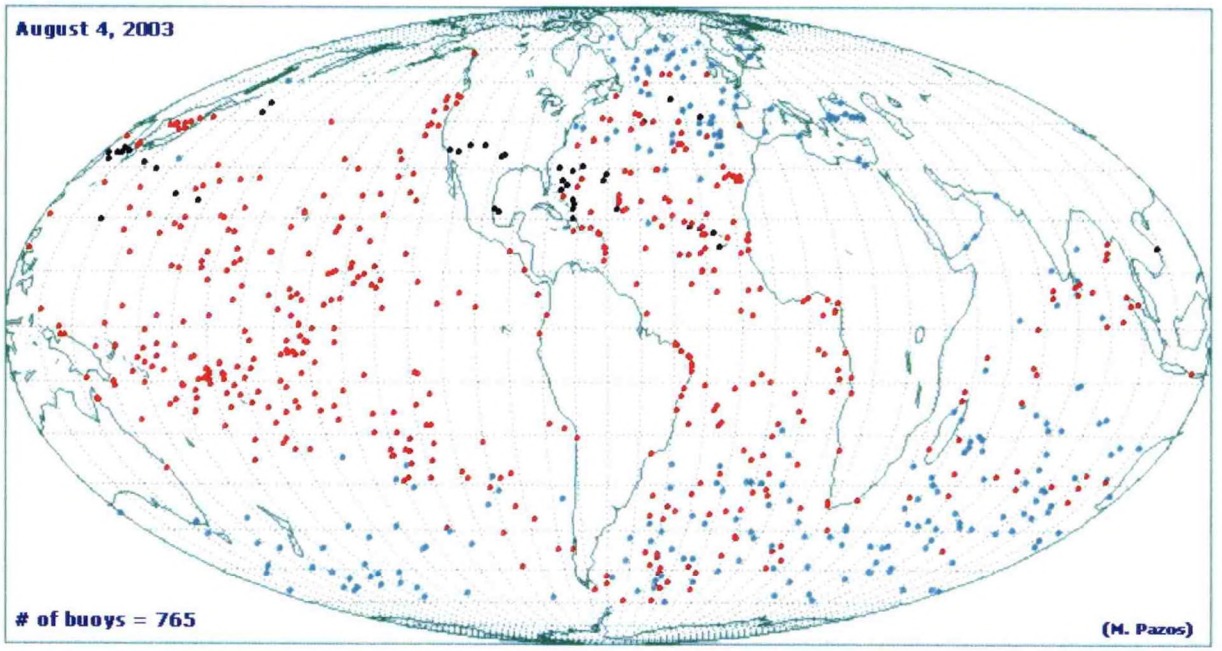


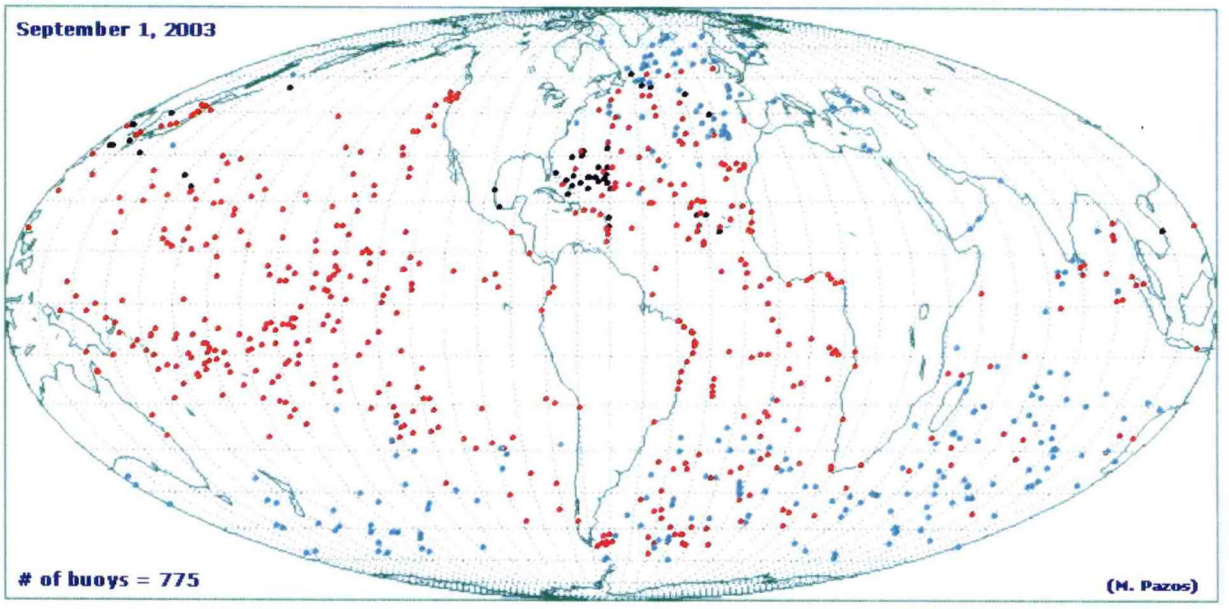


SST only
SST/SLP
SST/SLP/WIND

GLOBAL DRIFTER PROGRAM

Status of Global Drifter Arrays *(cont'd)*

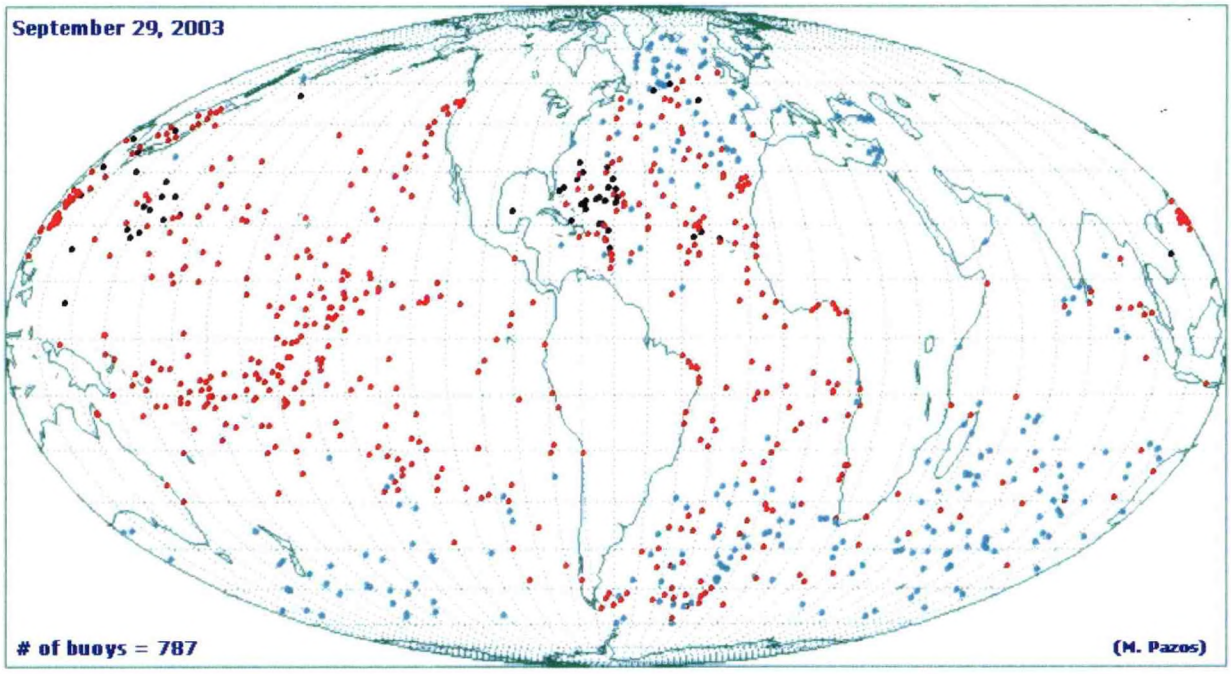


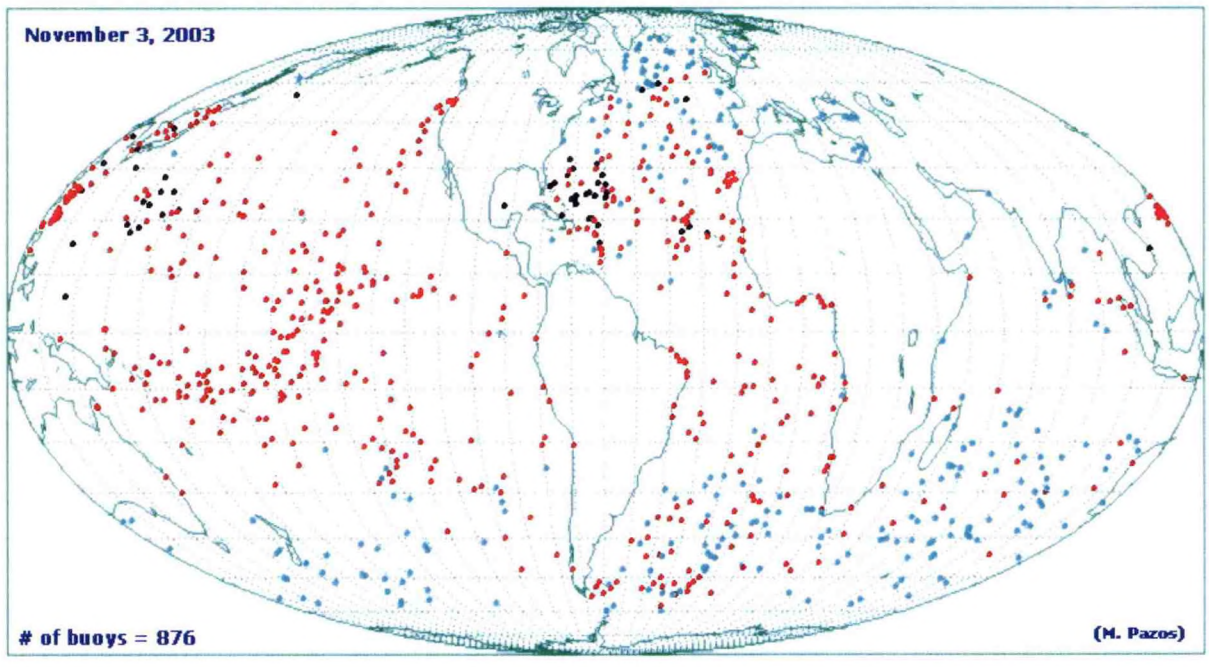


SST only
SST/SLP
SST/SLP/WIND

GLOBAL DRIFTER PROGRAM

Status of Global Drifter Arrays *(cont'd)*

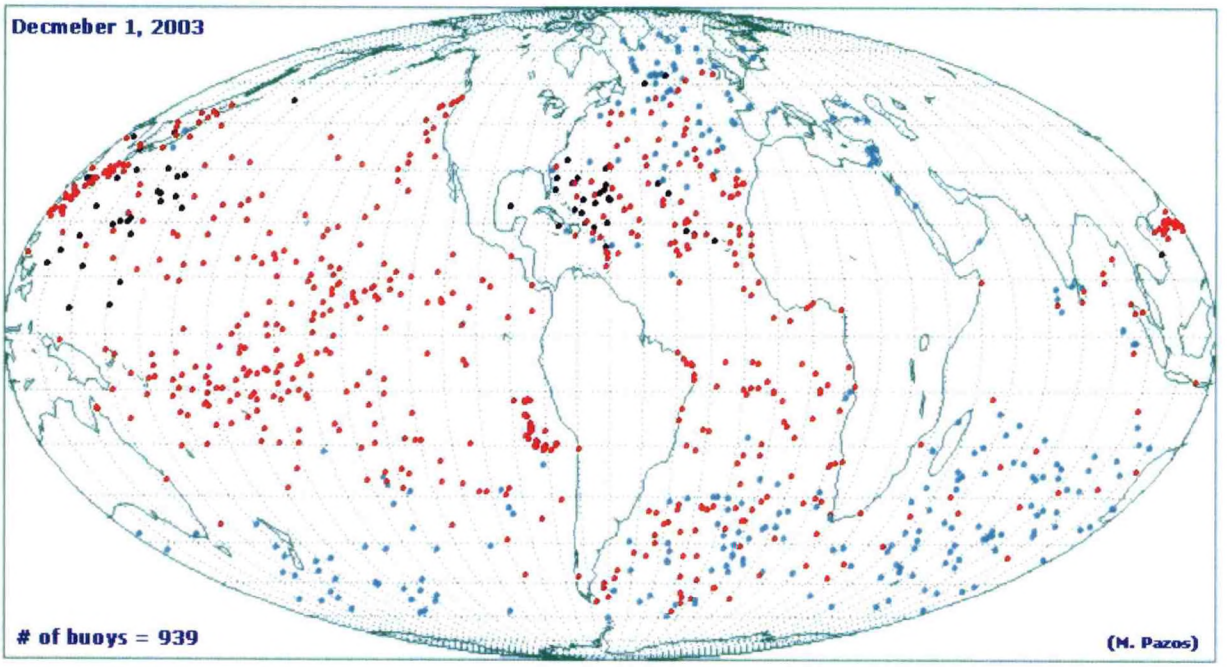


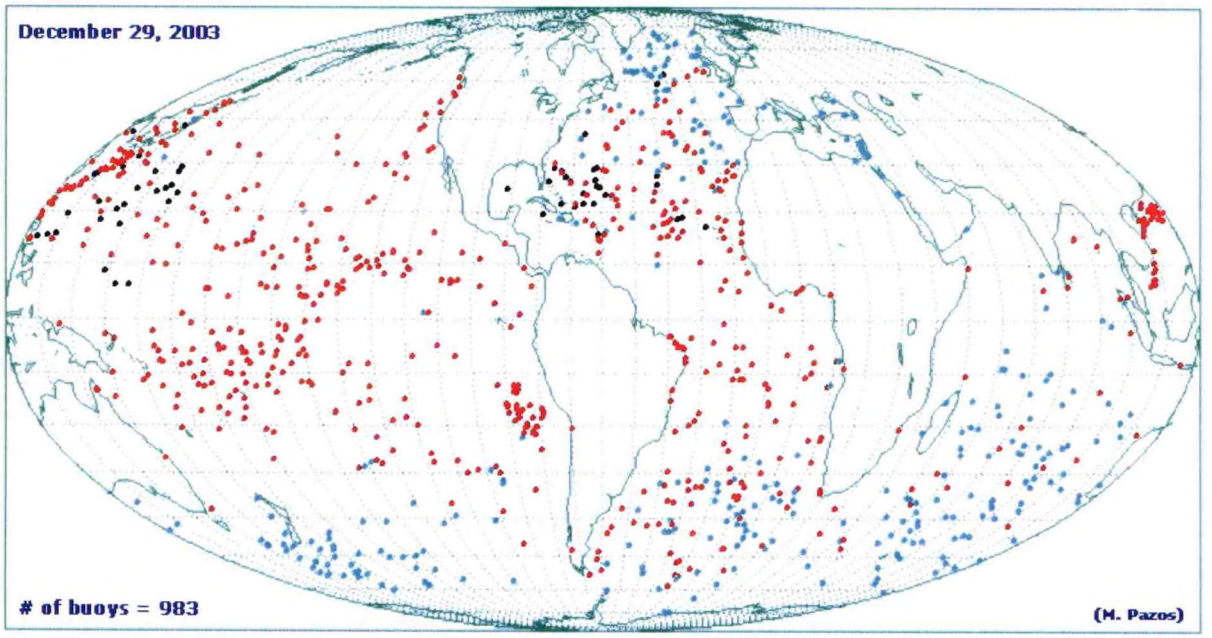


SST only
SST/SLP
SST/SLP/WIND

GLOBAL DRIFTER PROGRAM

Status of Global Drifter Arrays *(cont'd)*





SST only
SST/SLP
SST/SLP/WIND

GLOBAL DRIFTER PROGRAM

Drifter Deployment Plan from October 2003 through September 2004

Plans are for the deployment of 712 Drifters in the period between October 2003 and September 2004. 118 SVP buoys will be upgraded with barometer by NOAA/OGP.

An Acronyms list is given on page 63.

North Pacific (60N-20N) (40 SVP-B NOAA/NDBC)

Tropical Oceans (20N – 20S) # of Drifters
Tropical Pacific 176
Tropical Atlantic 100
Tropical Indian 60 (10 SVP-B Meteo-France)

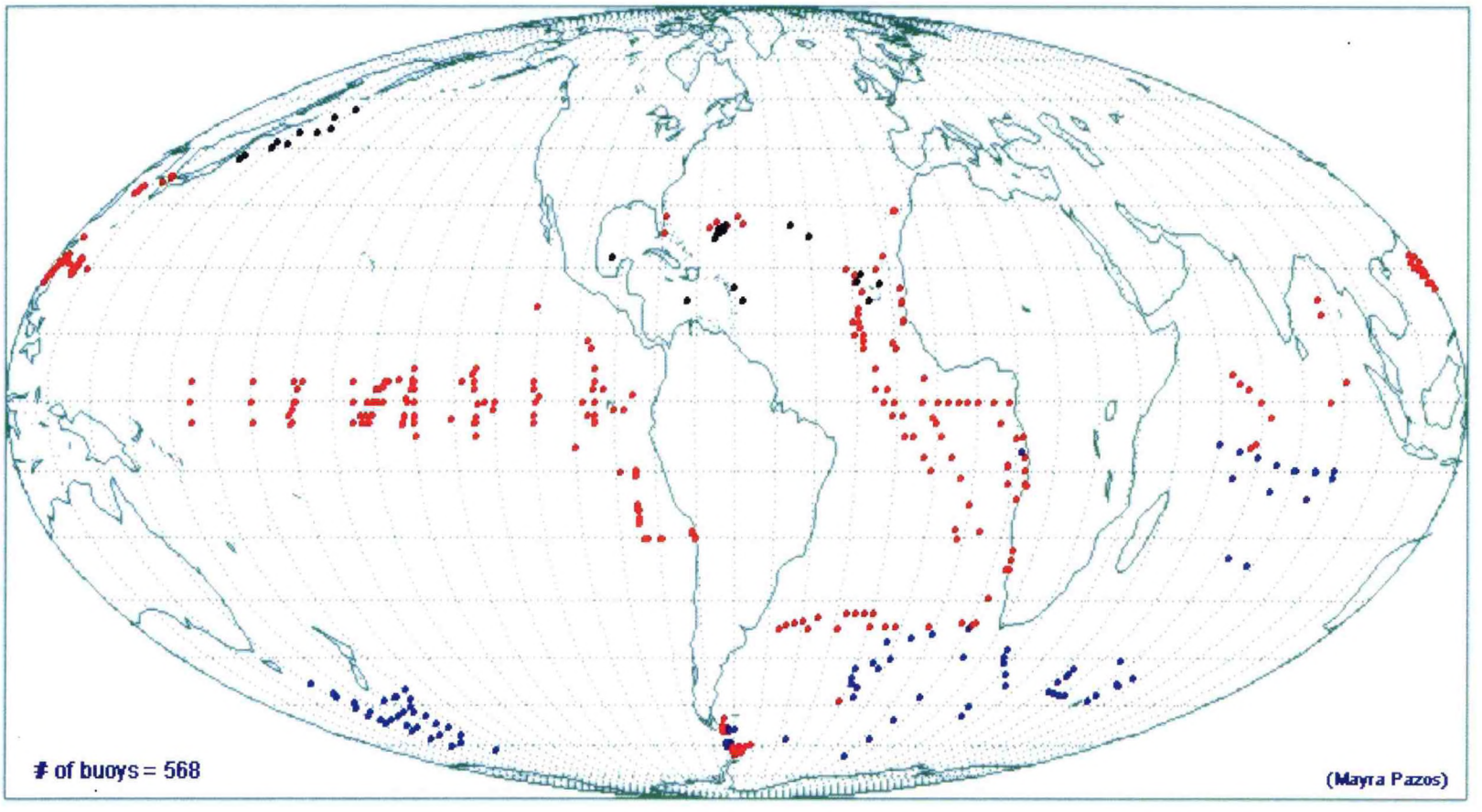
150 Consortium Ocean Research in Climate
- Drifters used for specific research projects. Although they are included in the GDC database, deployment is not controlled by AOML

36 SVP-B NOAA/SIO
- Reflects AOML's participation with the NDBC to upgrade drifters for deployment for deployment into the North Pacific this coming year.

Sub-tropical Southern Oceans (20S –40S) # of Drifters
Pacific 40
Atlantic 35
Indian 15

Southern Oceans (40S –60S) # of Drifters
Pacific 25 (20 SVP-B NOAA/SIO, 5 SVP-B MSNZ)
Atlantic 49 (15 SVP-B NOAA/SIO, 24 SVP-B SAWS) + 10 SVP GOODHOPE
Indian 25 (7 SVP-B NOAA/SIO, 10 SVP-B ABOM, 5 SVP-B Meteo-France)

Deployments by Global Drifter Center in 2003



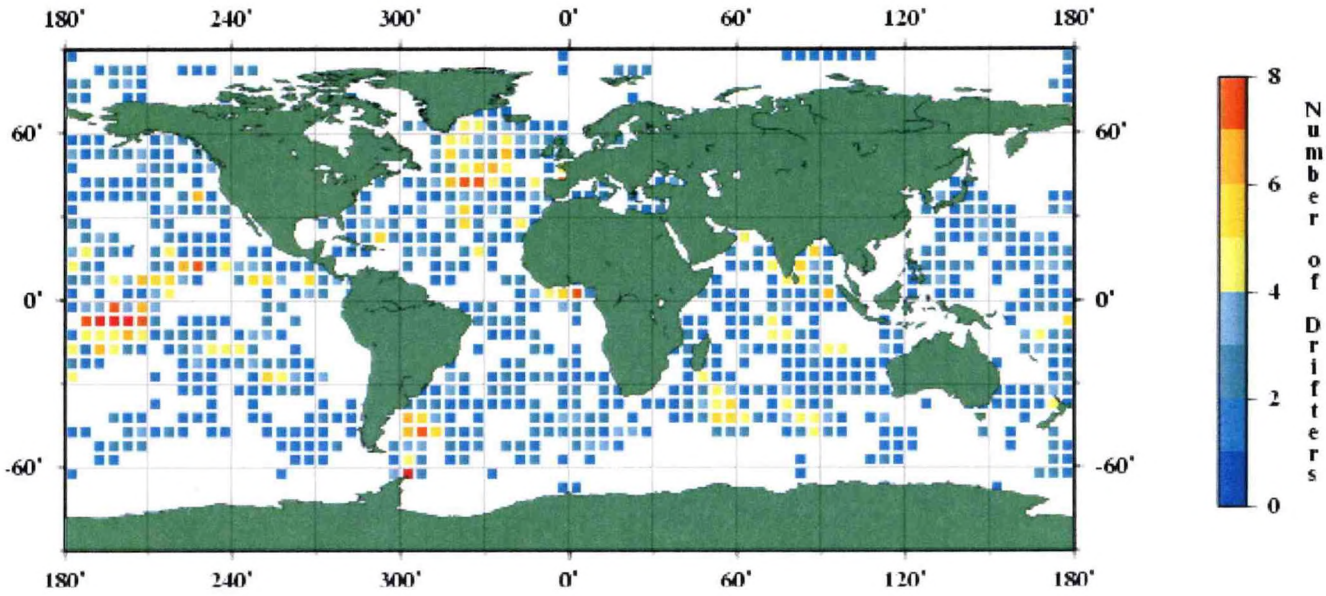
- SST = 430
- SST/SLP = 107
- SST/SLP/WIND = 31

DRIFTER DATA ASSEMBLY CENTER

The plots on the following pages show the number of drifters in 5x5 degree squares (resolution required for satellite validation) for each month during the year 2003. Availability (%) is the percentage of ocean surface covered by drifters. Number of drifters per cell is represented by the different color boxes. See color bar to determine the number of drifters for each cell.

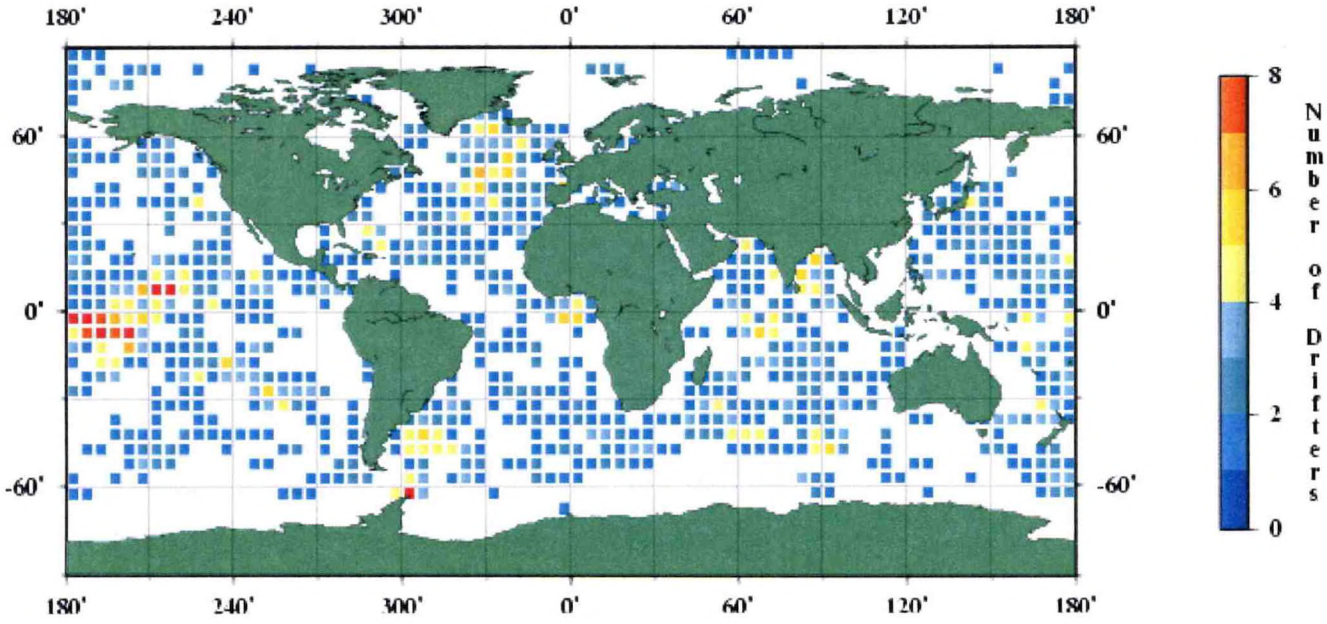
January 2003

Availability (%) of drifter data at 5^0x5^0 boxes between 60N-60S = 76%



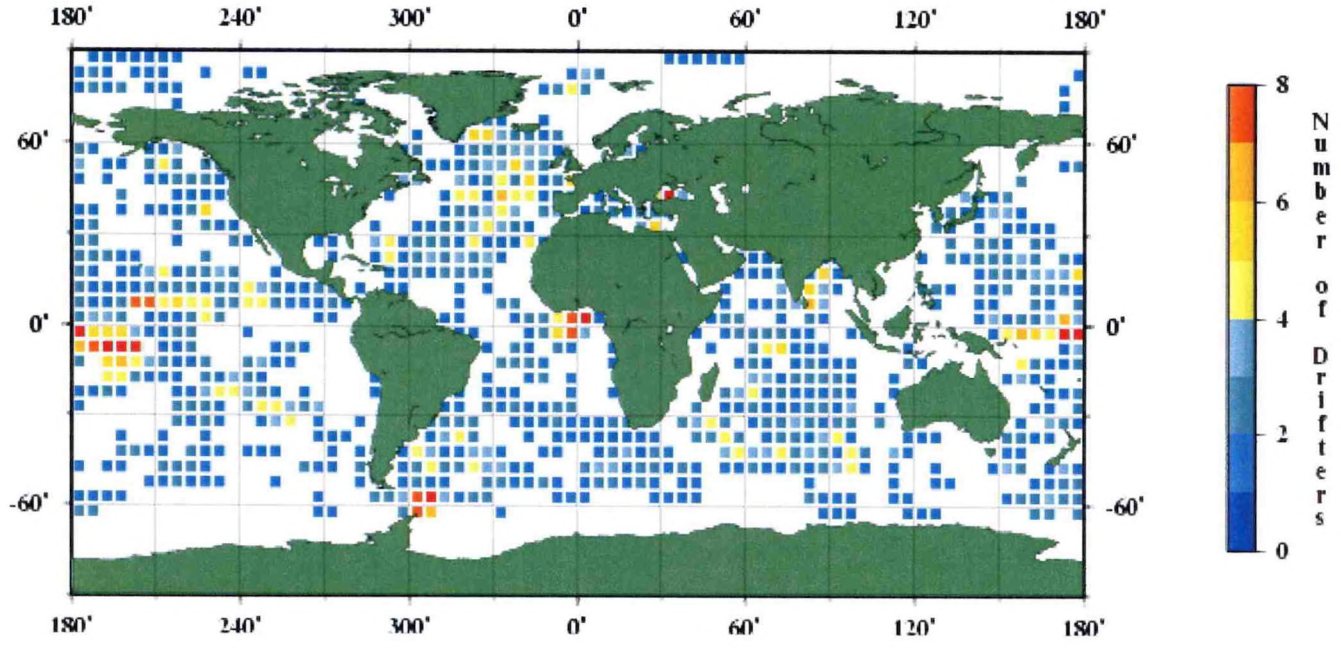
February 2003

Availability (%) of drifter data at 5^0x5^0 boxes between 60N-60S = 73%



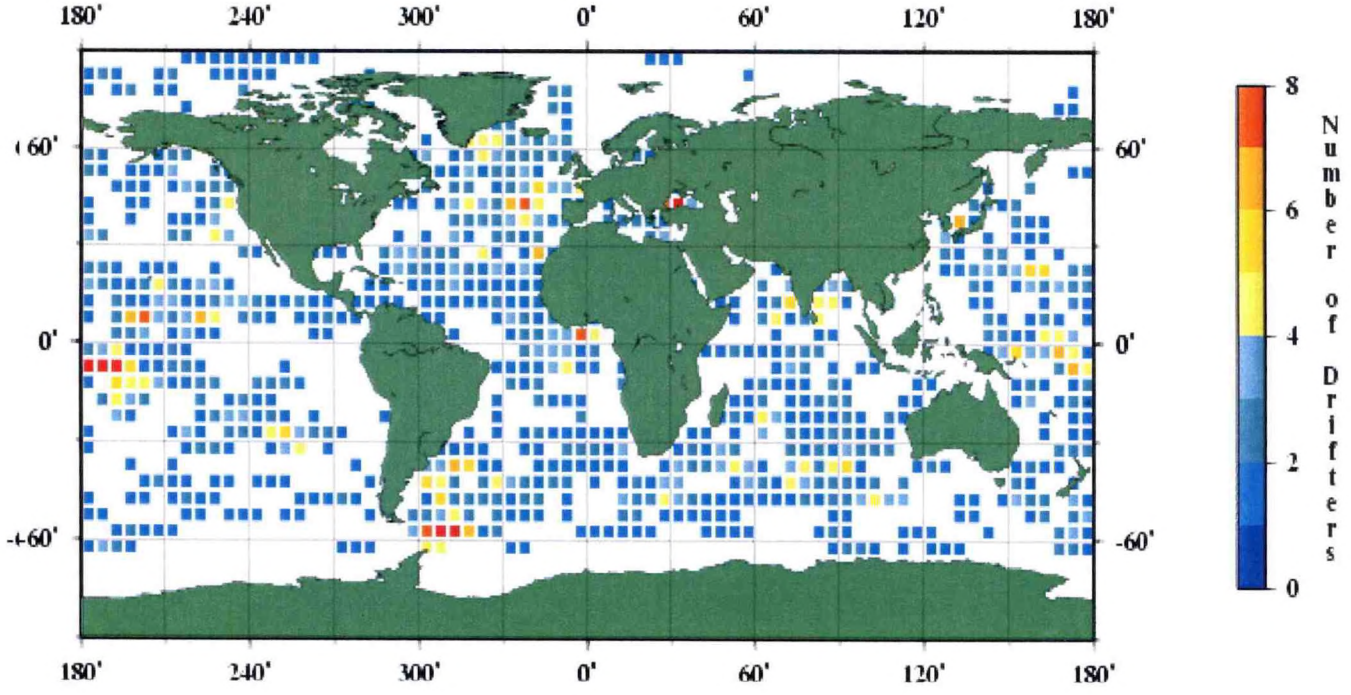
March 2003

Availability (%) of drifter data at 5^0x5^0 boxes between 60N-60S =74%



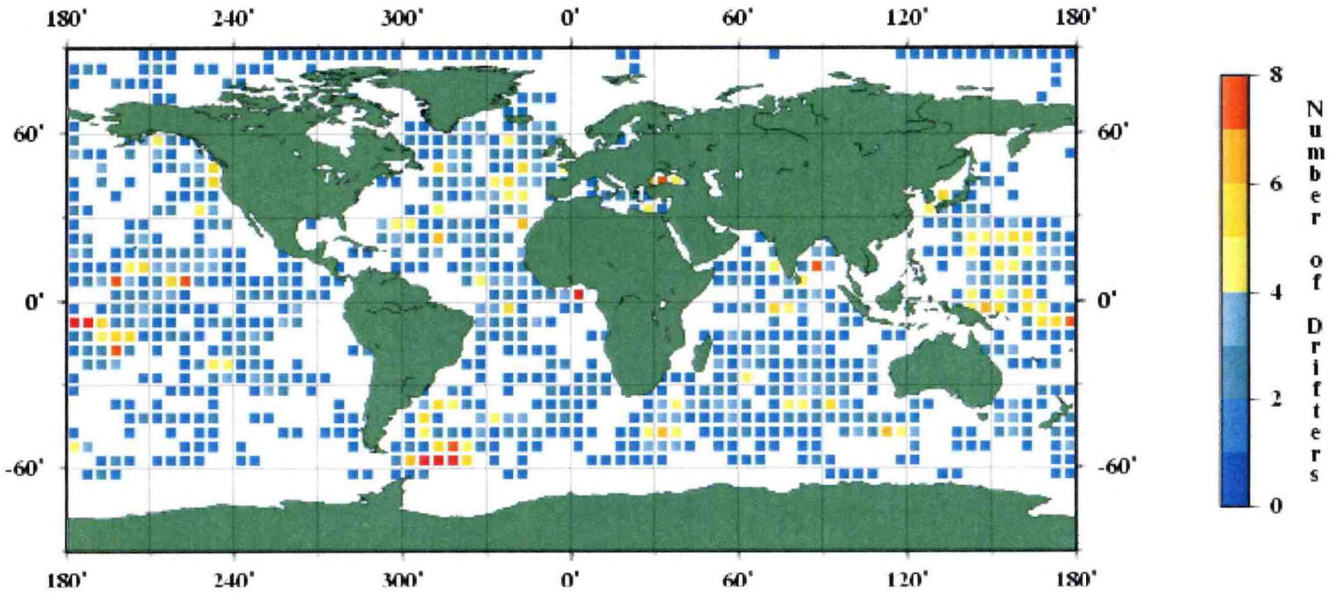
April 2003

Availability (%) of drifter data at 5^0x5^0 boxes between 60N-60S =74%



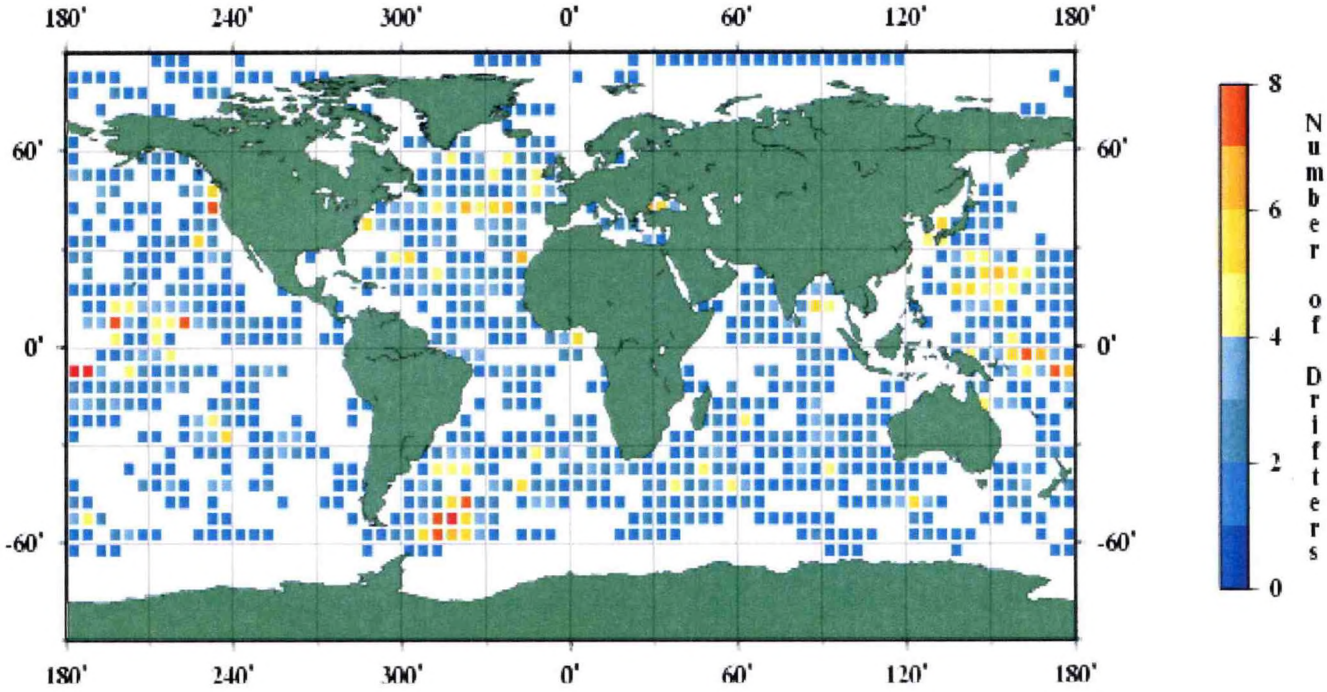
May 2003

Availability (%) of drifter data at 5^0x5^0 boxes between 60N-60S =71%



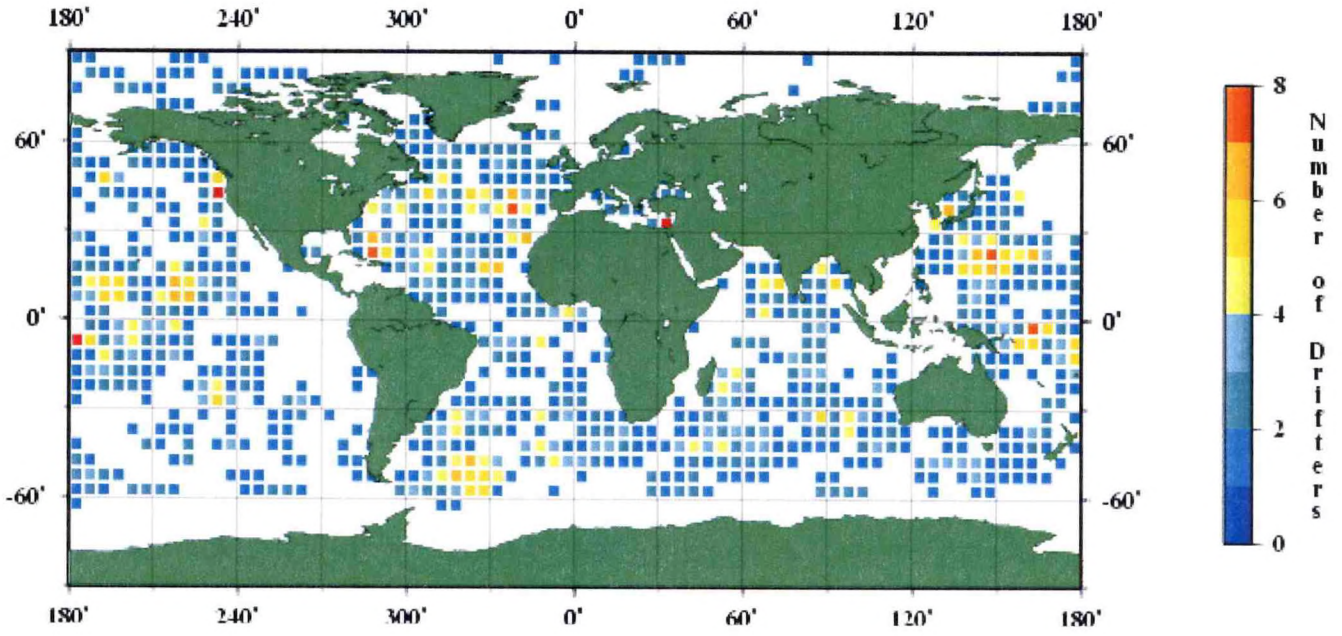
June 2003

Availability (%) of drifter data at 5^0x5^0 boxes between 60N-60S =71%



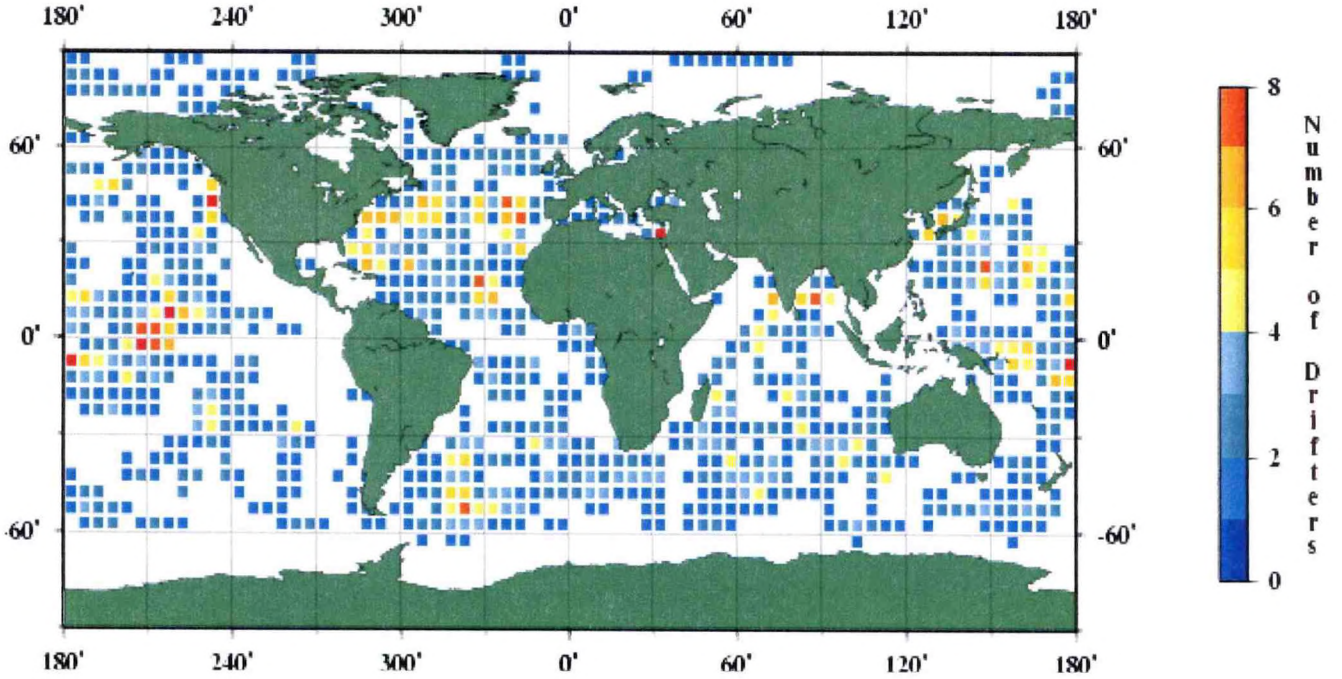
July 2003

Availability (%) of drifter data at 5^0x5^0 boxes between 60N-60S = 65%



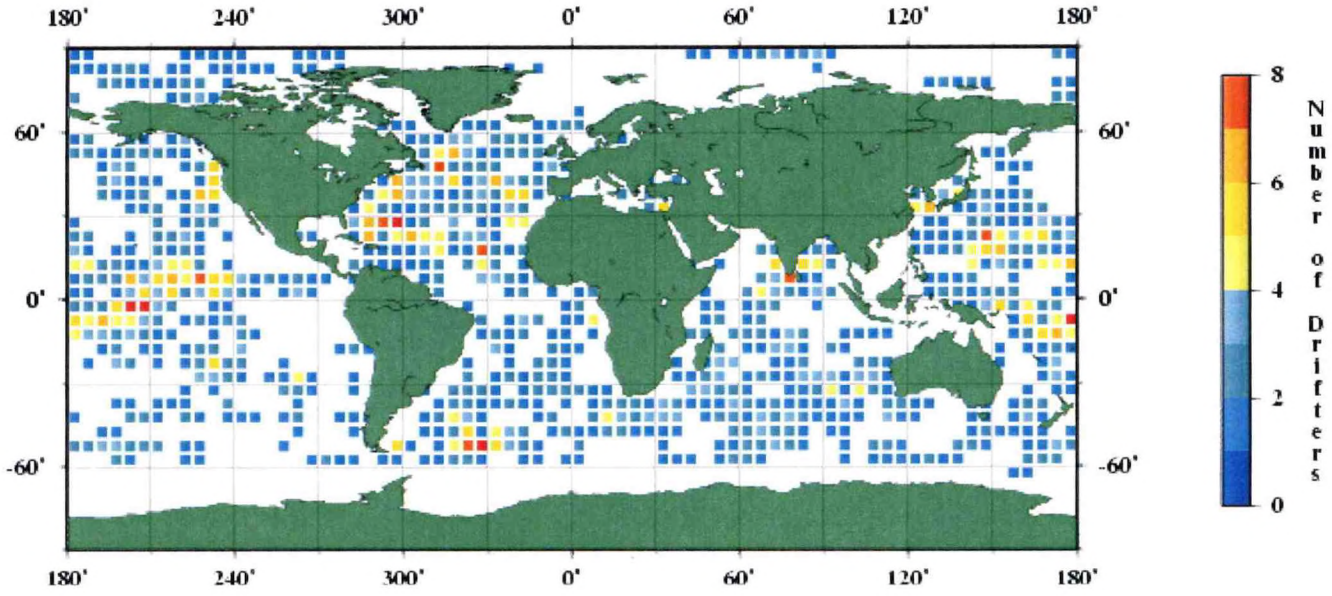
August 2003

Availability (%) of drifter data at 5^0x5^0 boxes between 60N-60S = 69%



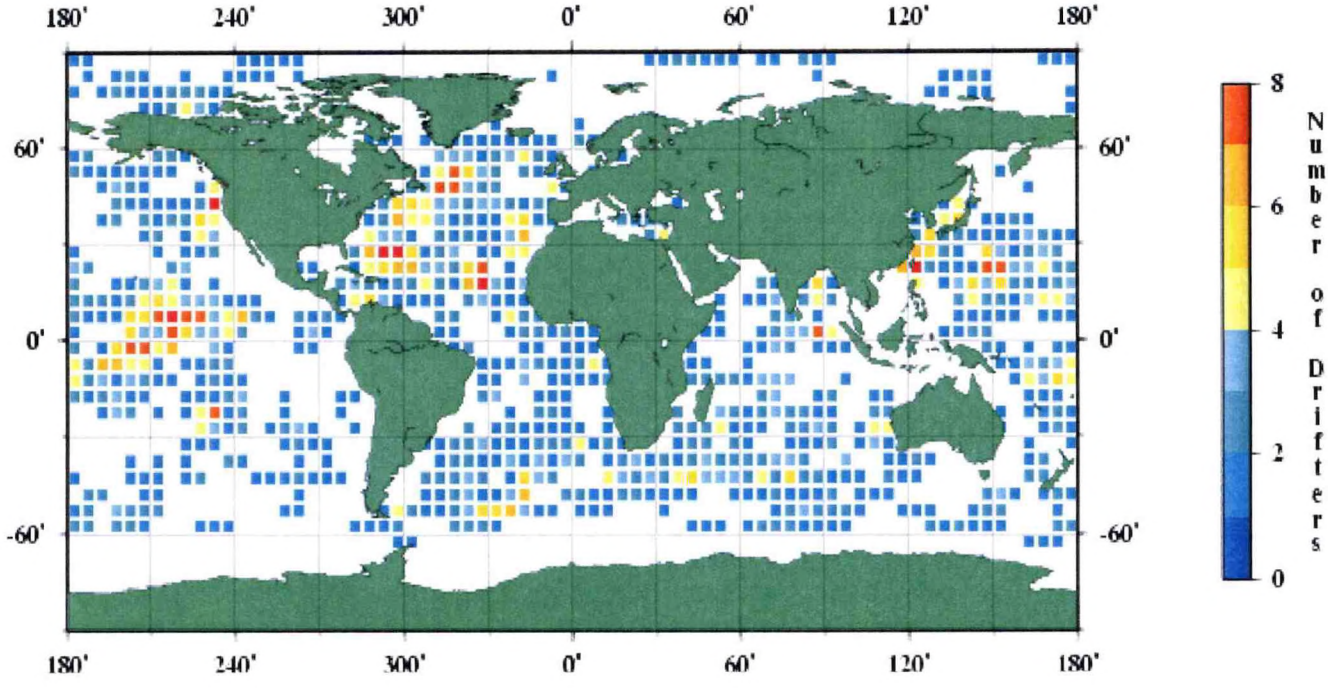
September 2003

Availability (%) of drifter data at 5^0x5^0 boxes between 60N-60S = 70%



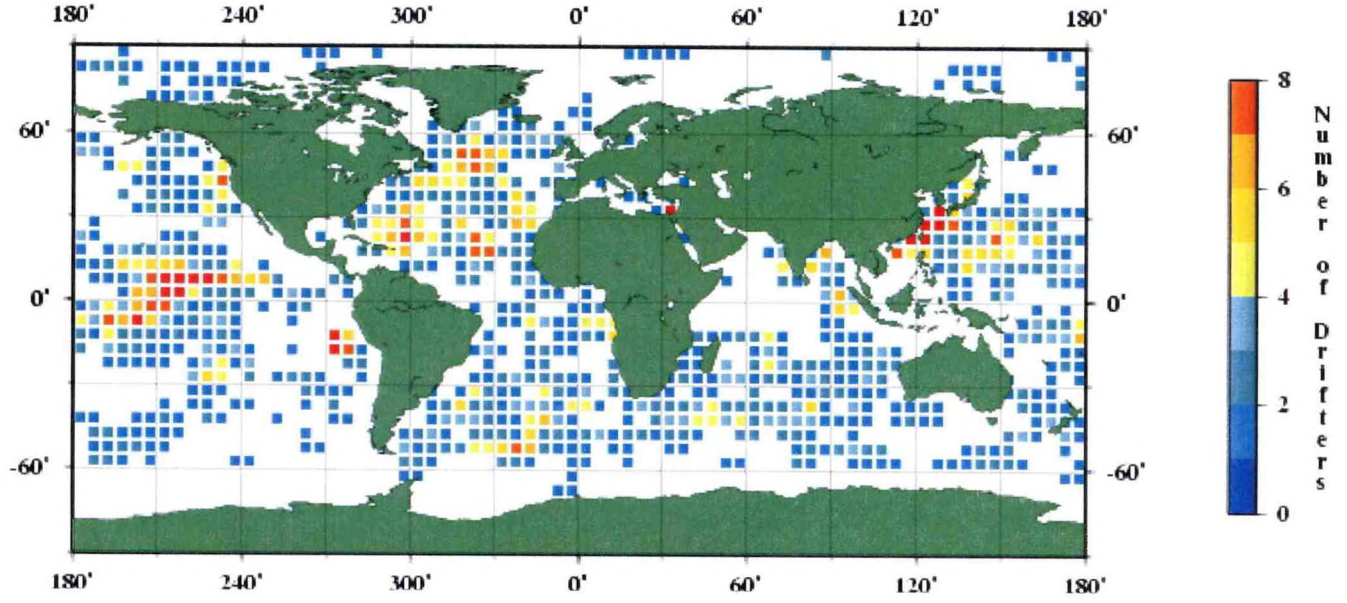
October 2003

Availability (%) of drifter data at 5^0x5^0 boxes between 60N-60S = 72%



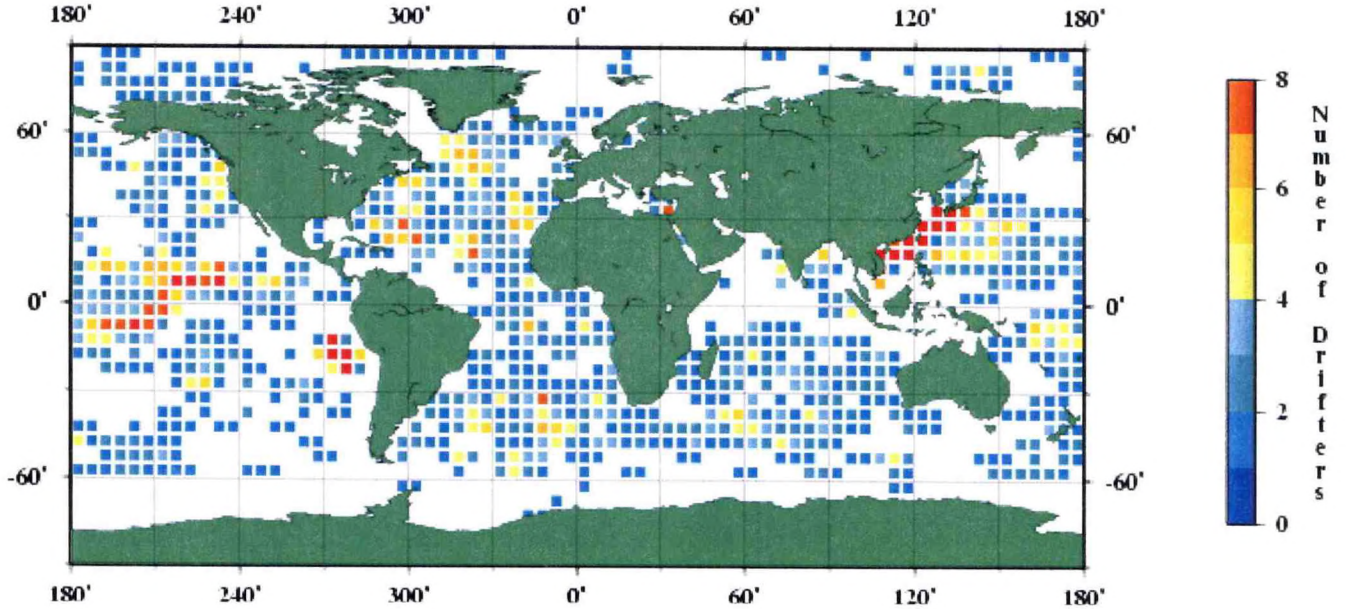
November 2003

Availability (%) of drifter data at 5^0x5^0 boxes between 60N-60S = 71%



December 2003

Availability (%) of drifter data at 5^0x5^0 boxes between 60N-60S = 72%



High Density XBT Lines

www.aoml.noaa.gov/phod/hdenxbt/

During 2003 NOAA/AOML maintained four (4)* high-density XBT lines:

*(The 5th line, AX25, began in 2004)

1) AX7 - extending from the Straits of Gibraltar to Miami;
2) AX10 - running between New York and Puerto Rico;
3) AX8 - running across the Tropical Atlantic between 30°N and 30°S;
4) AX18 - running between South Africa and Argentina along 35°S.

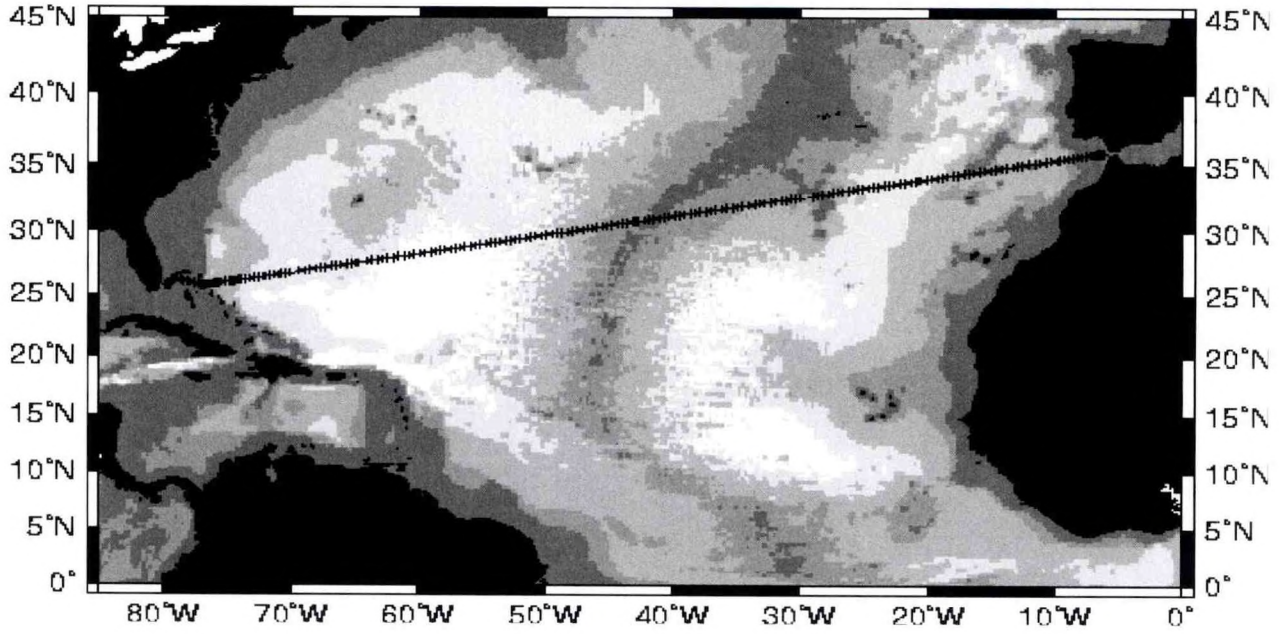
These XBT lines have been chosen to capture and monitor thermal properties within the Atlantic. The AX7 and AX18 lines have been selected to monitor the portion of the meridional flow in the upper ocean. AX10 and AX08 are meridional lines that were selected because they cross important highly variable ocean currents, namely the Gulf Stream, the numerous Equatorial Atlantic Currents and the Agulhas Currents respectively. All XBT lines are valuable in providing estimates of the mean and time dependent temperature fields with sufficiently close spacing to resolve the mesoscale field (XBTs spaced between 30-50km). They all sample various aspects of the overturning circulation and hence provide useful data on heat transport and interbasin/cross equatorial exchanges. To date, more than 13,000 XBTs have been deployed in its high density mode in the Atlantic Ocean.

These XBT lines require the aid of Volunteer Observing Ships (VOS) willing to have a scientist aboard to deploy XBTs. These 4 lines meet WOCE criteria for high resolution deployment providing temperature profiles every 50 km in the open ocean and between 10-30 km near boundary currents down to a depth of about 800 meters. Such fine horizontal sampling requires a scientist on board the ship and the use of an auto-launcher designed at AOML that can load and launch up to 6-8 XBTs fired remotely via computer-controlled software.

Typically an AX7 line takes 12 days of ship time and about 240 XBTs. The AX8 line takes approximately 20 days and about 215 XBTs. A typical AX10 line takes only 4 days and about 100 XBTs and the AX18 line takes approximately 11 days and about 190 XBTs.

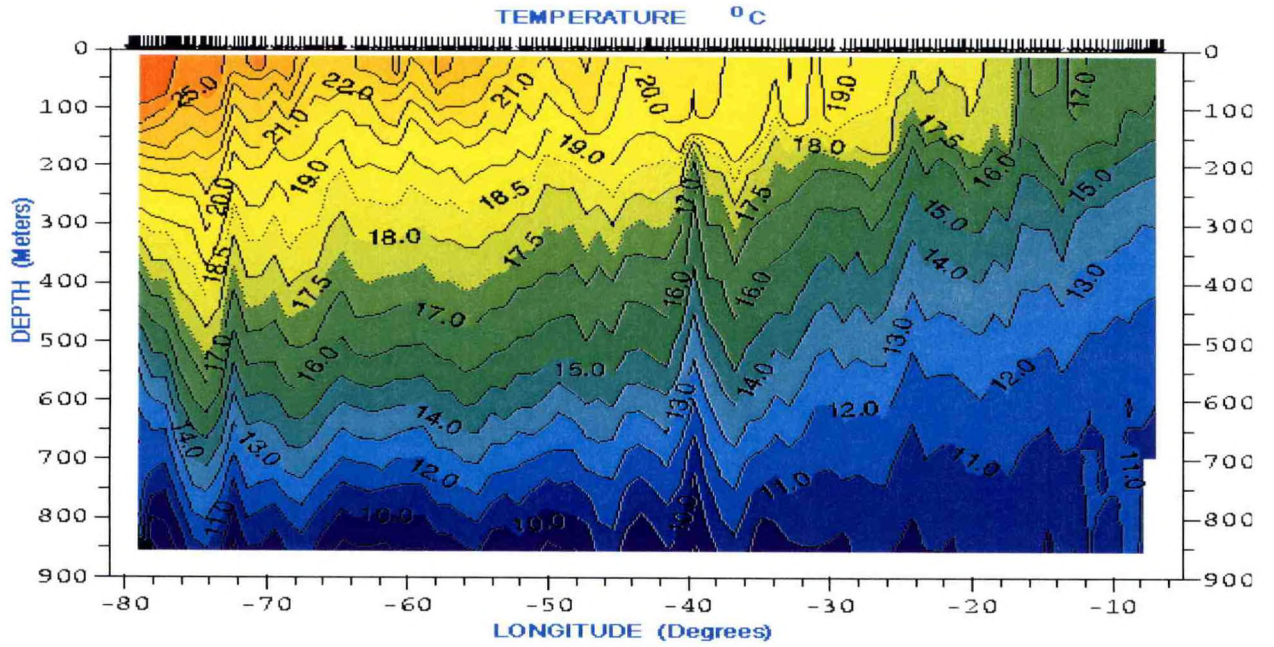
Displayed in the following pages are the cruise dates, number of XBT observations collected, route map and a temperature section from the cruise for each of the high density lines listed above. For more information on these lines consult the website listed at the top this page.

AX7 line



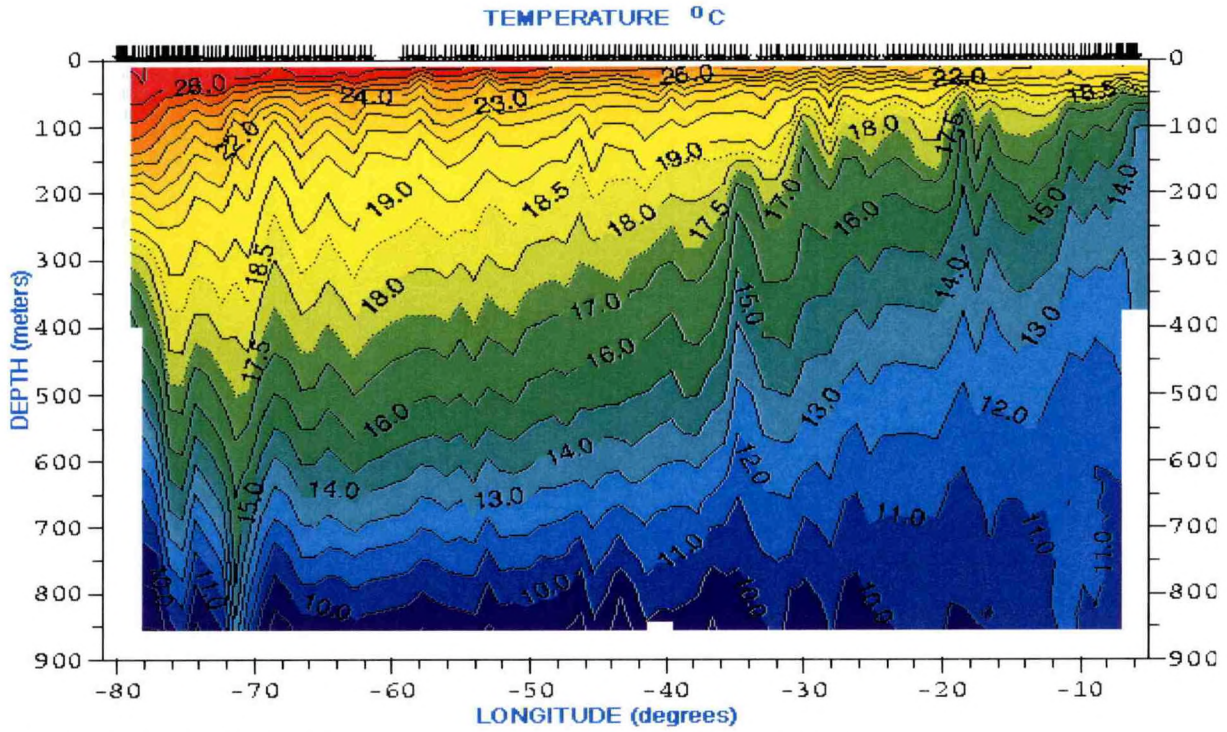
AX7 is occupied four times per year. This station map shows the position of XBTs dropped during one high density cruise.

Cruise Dates:	March 20-29, 2003
Ship:	LYKES COMMANDER
# of XBTs collected:	230



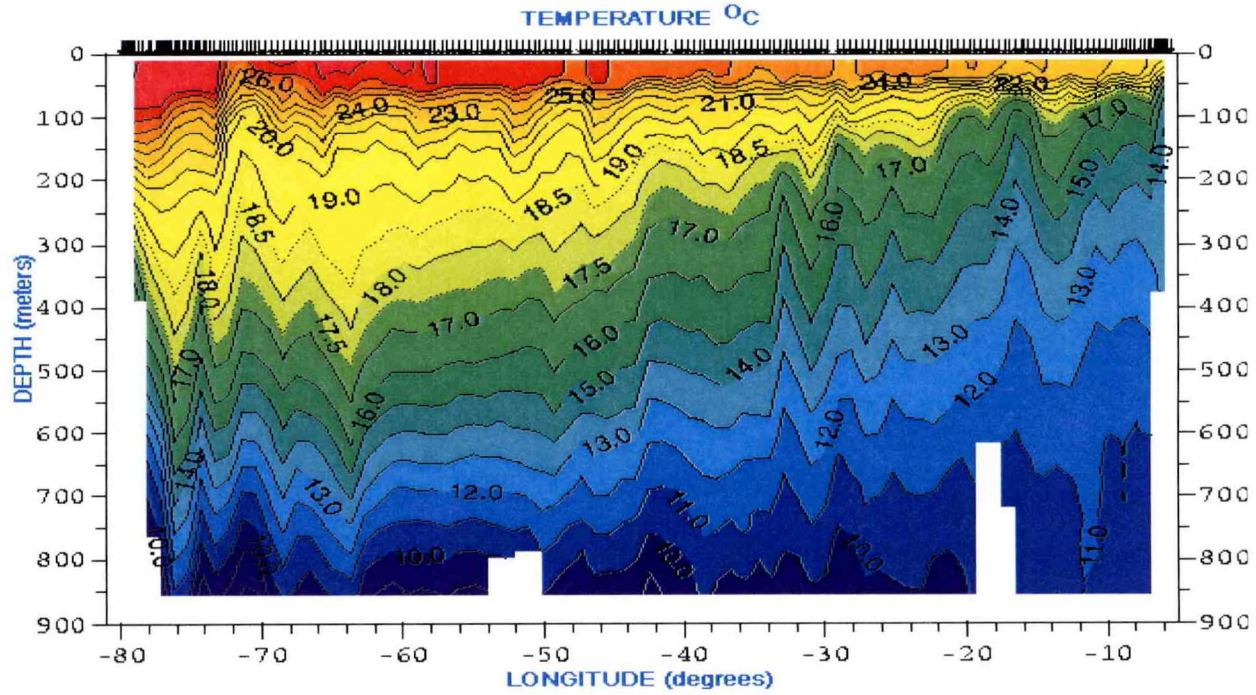
Section plot from AX7 showing temperature as a function of latitude and depth.

Cruise Dates: July 4 - 14, 2003
Ship: TMM SONORA
# of XBTs collected: 234



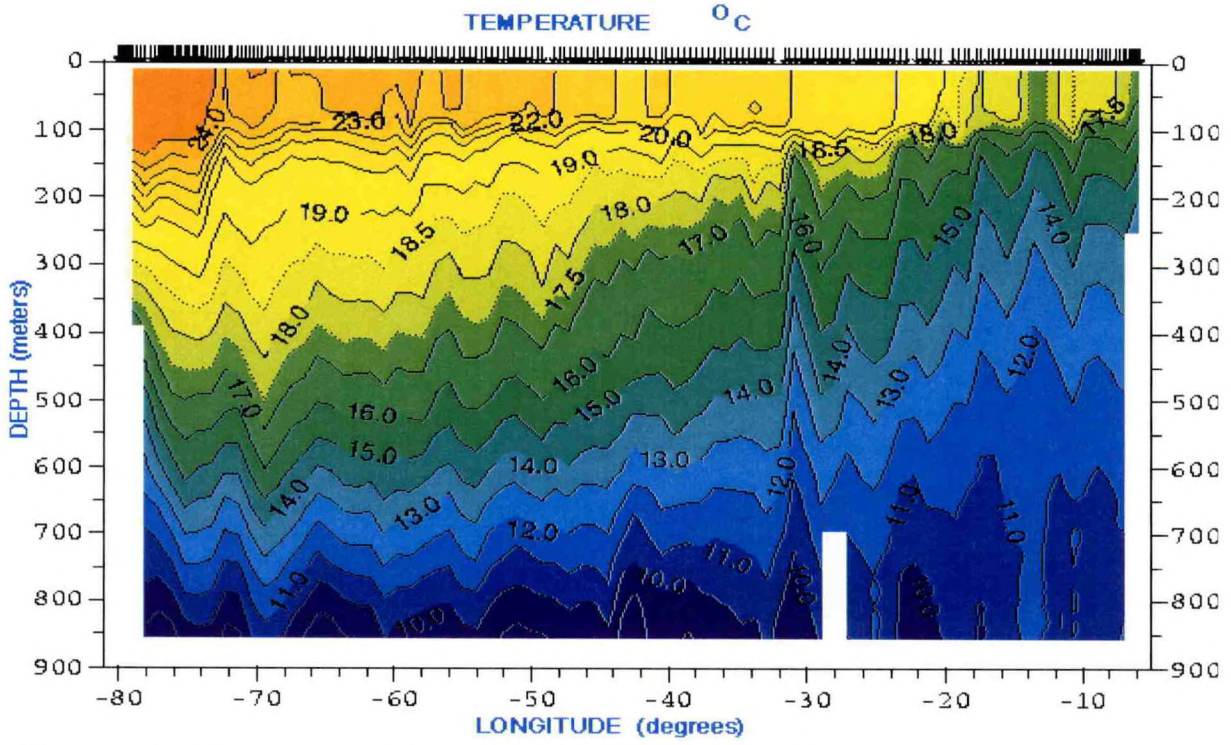
Section plot from AX7 showing temperature as a function of latitude and depth.

Cruise Dates: September 29—October 8, 2003
Ship: TMM HERMOSILLO
# of XBTs collected: 243



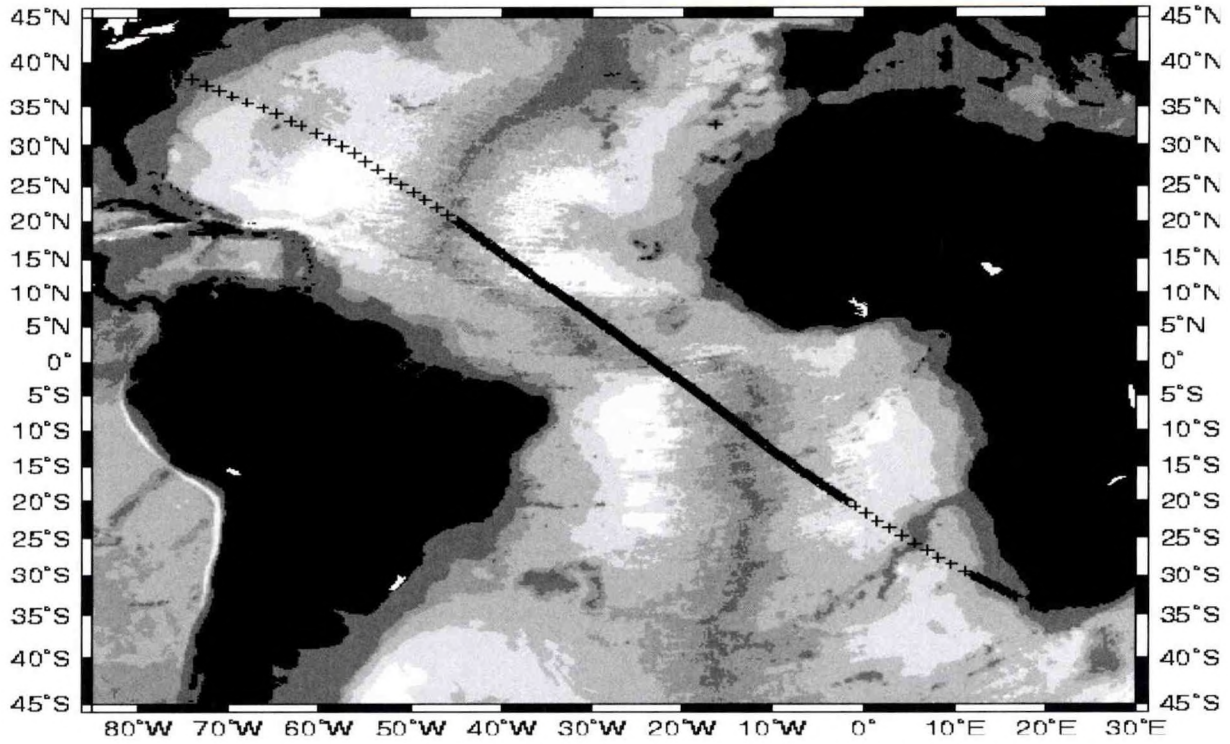
Section plot from AX7 showing temperature as a function of latitude and depth.

Cruise Dates:	December 12-19, 2003
Ship:	LYKES AMBASSADOR
# of XBTs collected:	233



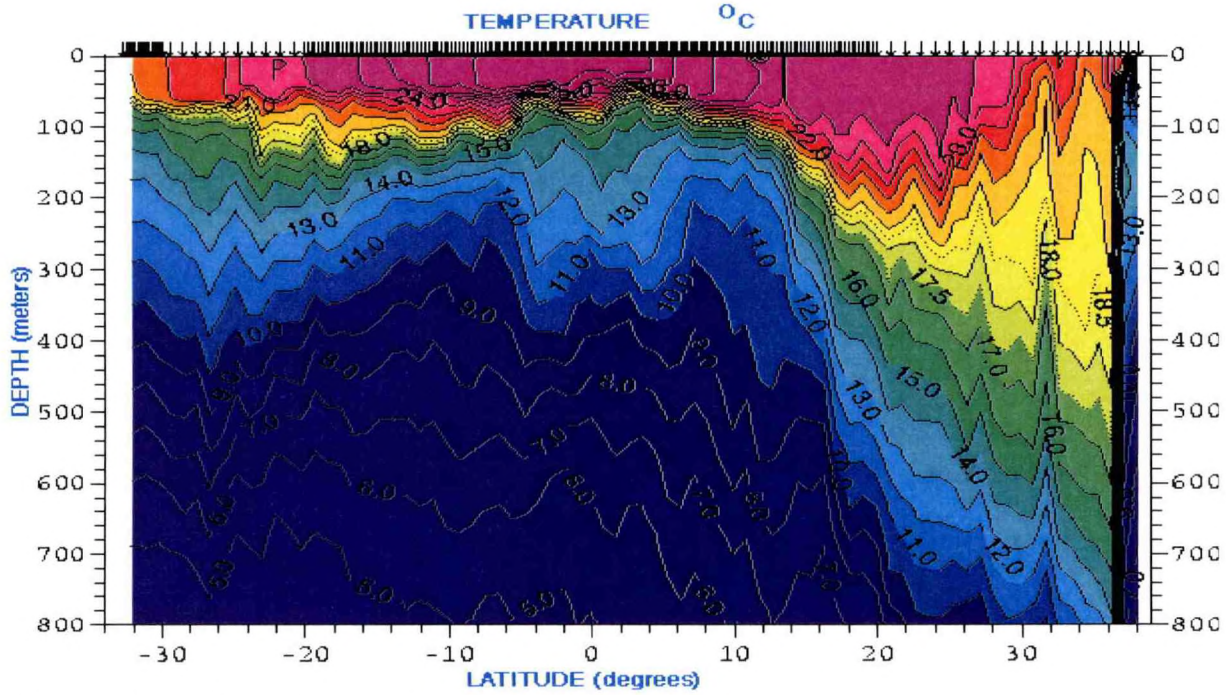
Section plot from AX7 showing temperature as a function of latitude and depth.

AX8 Line



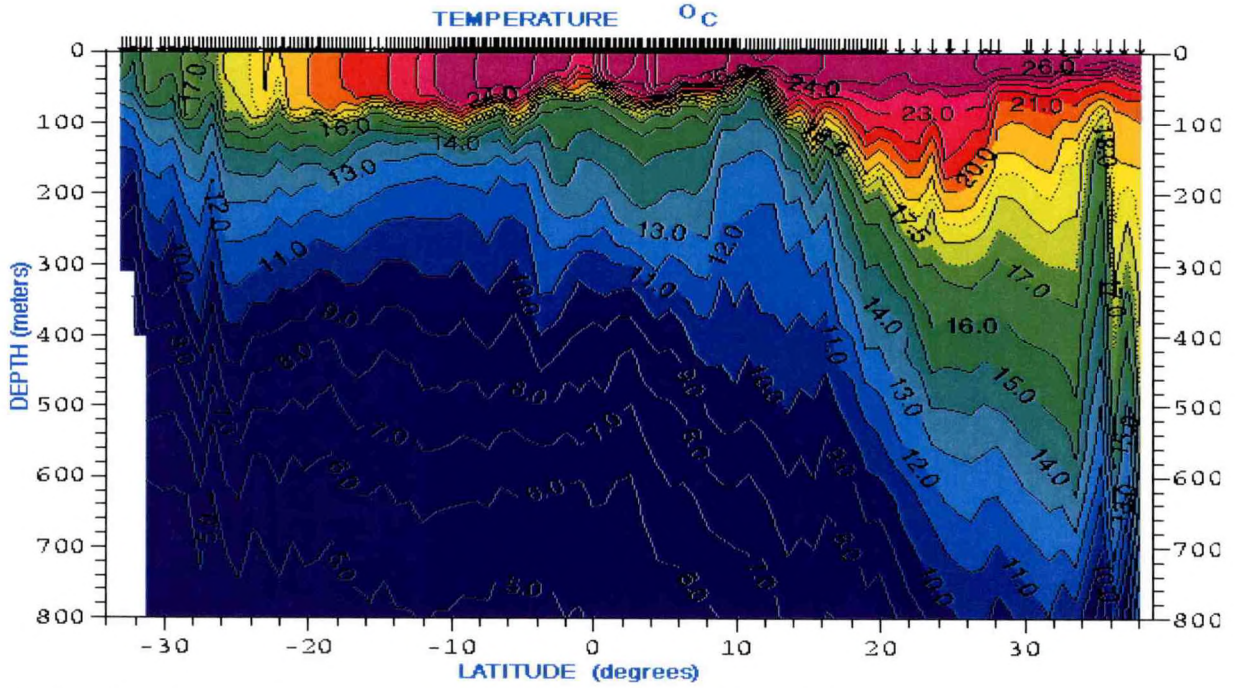
AX8 is occupied four times per year. This station map shows the position of XBTs dropped during one high density cruise.

Cruise Dates:	April 6– 24, 2003
Ship:	M/V LYKES RUNNER
# of XBTs collected:	249



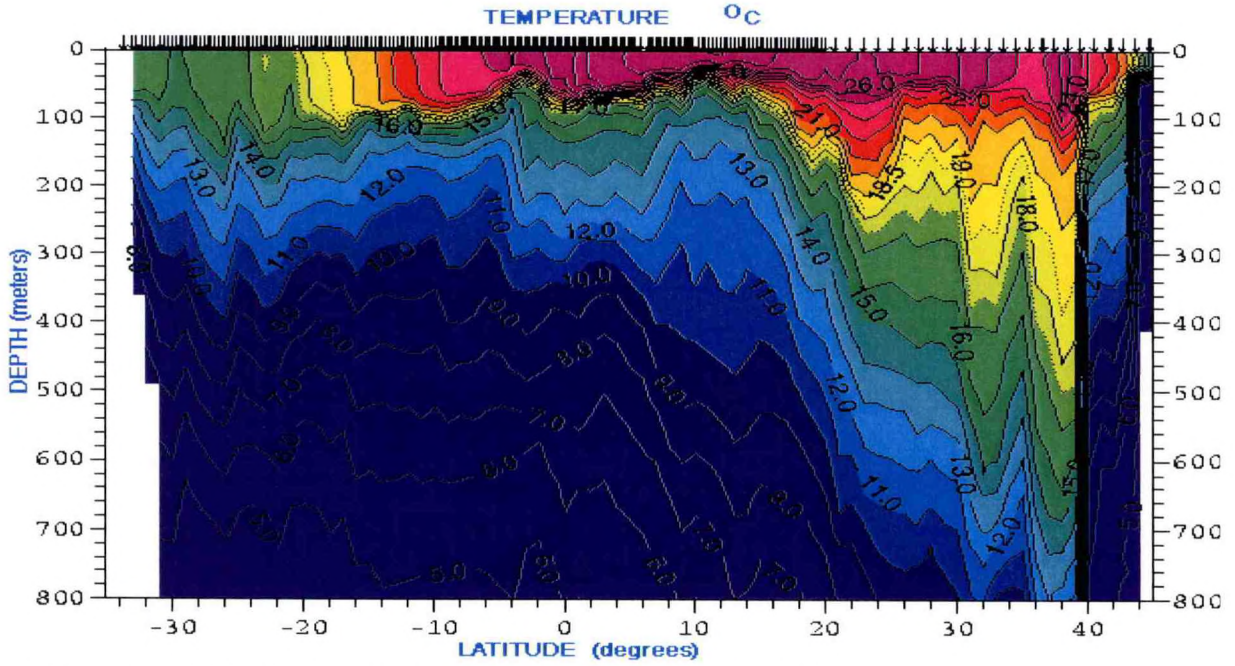
Section plot from AX8 showing temperature as a function of latitude and depth.

Cruise Dates: July 7—24, 2003
Ship: M/V LYKES RAIDER
# of XBTs collected: 255



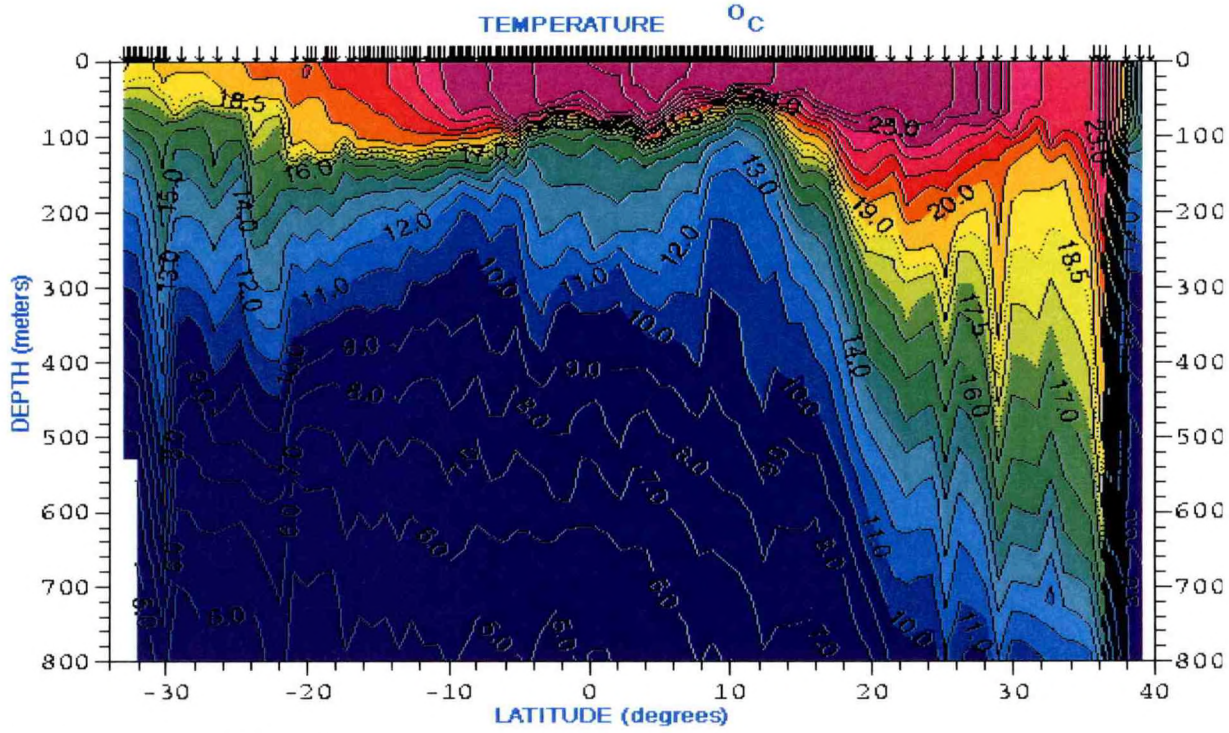
Section plot from AX8 showing temperature as a function of latitude and depth.

Cruise Dates: September 22– October 10, 2003
Ship: M/V LYKES RAIDER
# of XBTs collected: 270



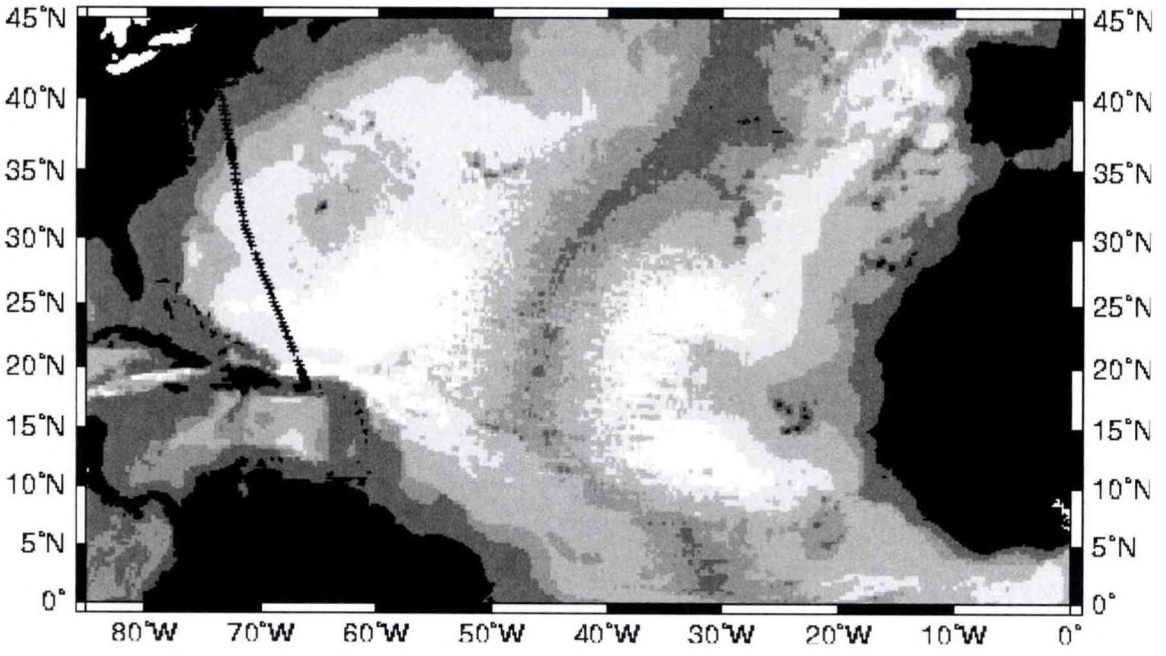
Section plot from AX8 showing temperature as a function of latitude and depth.

Cruise Dates:	November 25—December 9, 2003
Ship:	S.L. PATRIOT
# of XBTs collected:	259



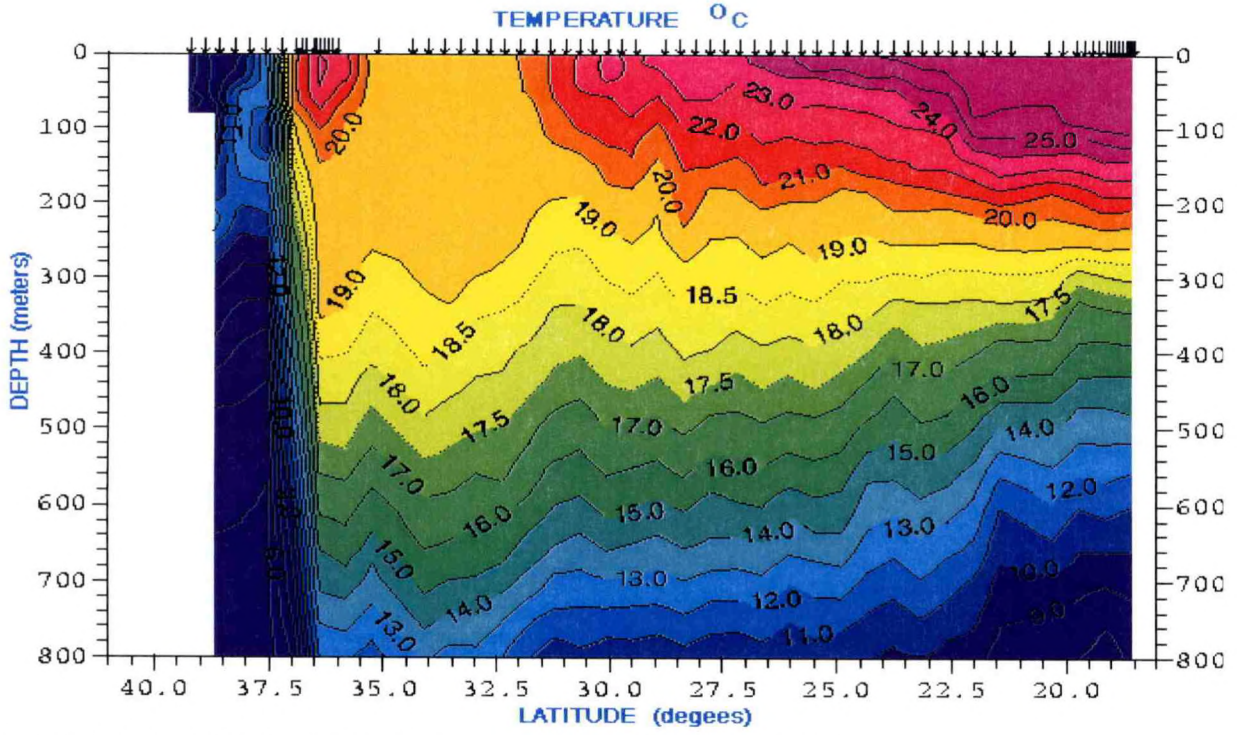
Section plot from AX8 showing temperature as a function of latitude and depth.

AX10 Line



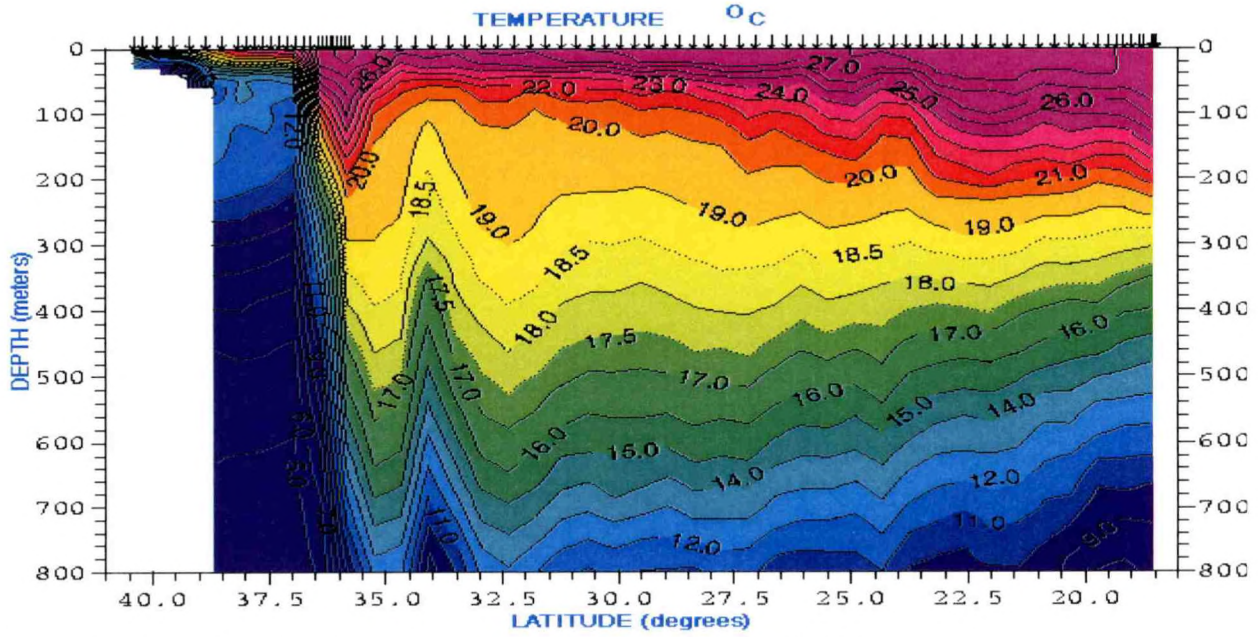
AX10 is occupied four times per year. This station map shows the position of XBTs dropped during one high density cruise.

Cruise Dates:	March 8 – 11, 2003
Ship:	HORIZON HAWAII
# of XBTs collected:	94



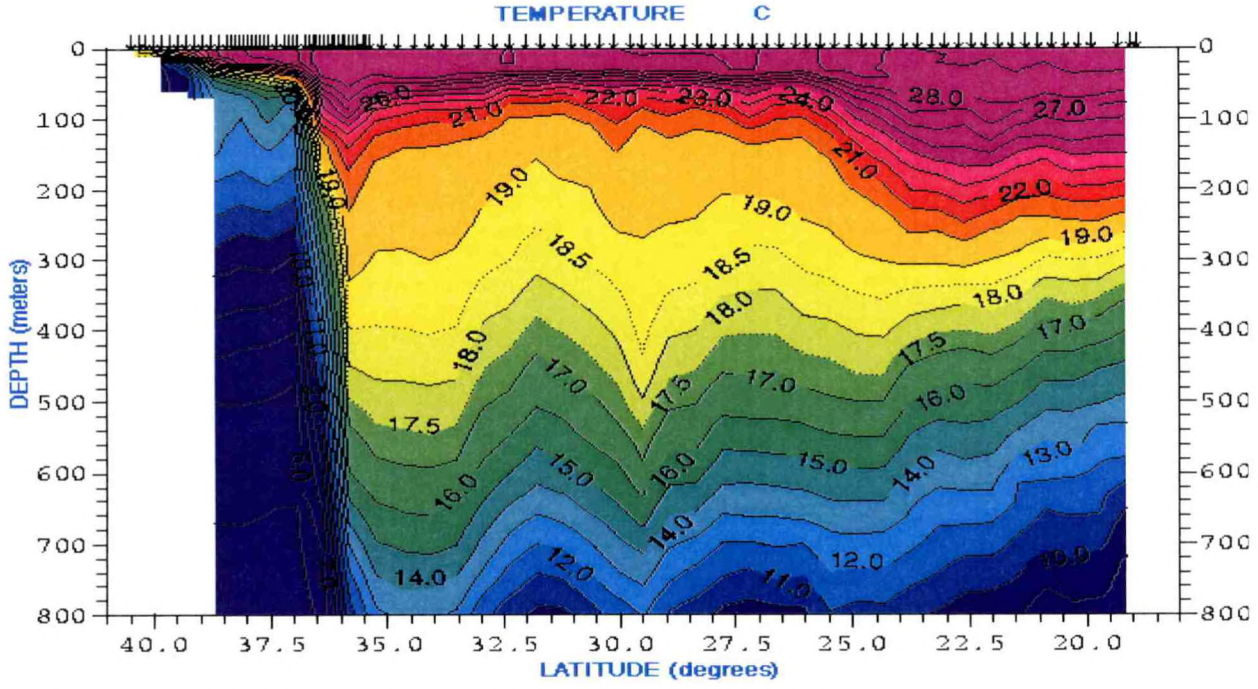
Section plot from AX10 showing temperature as a function of latitude and depth.

Cruise Dates: June 27- July 1, 2003
Ship: HORIZON HAWAII
# of XBTs collected: 95



Section plot from AX10 showing temperature as a function of latitude and depth.

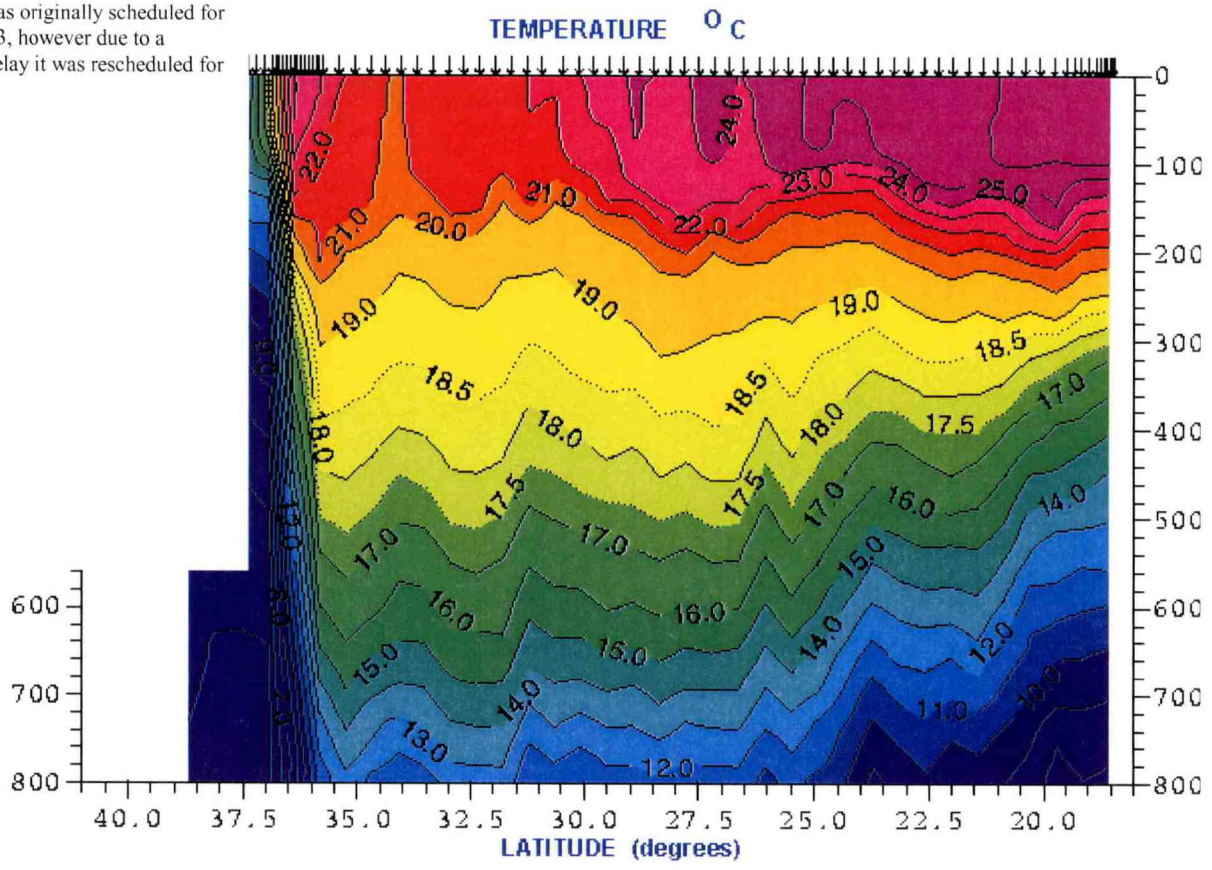
Cruise Dates: September 6 - 9, 2003
Ship: HORIZON HAWAII
# of XBTs collected: 111



Section plot from AX10 showing temperature as a function of latitude and depth.

Cruise Dates:	*January 4 – 7, 2004
Ship:	HORIZON HAWAII
# of XBT's	115

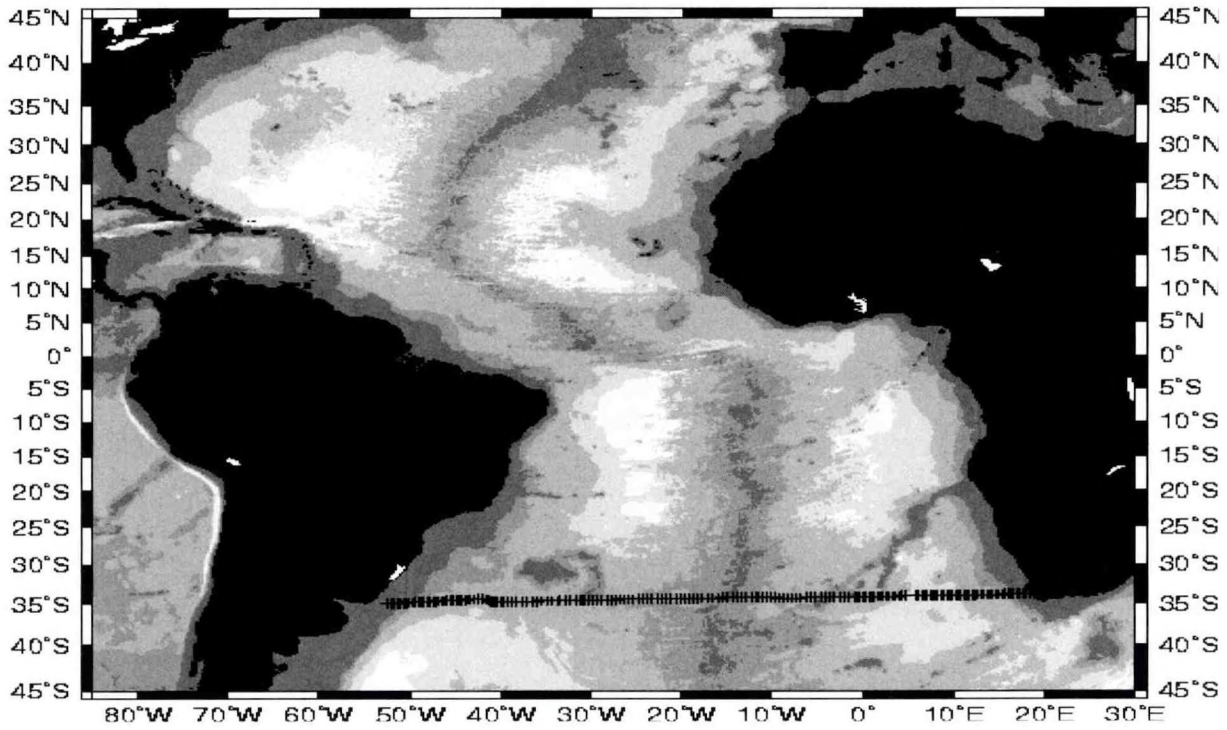
*This cruise was originally scheduled for December 2003, however due to a delay it was rescheduled for January 2004.



Section plot from AX10 showing temperature as a function of latitude and depth.

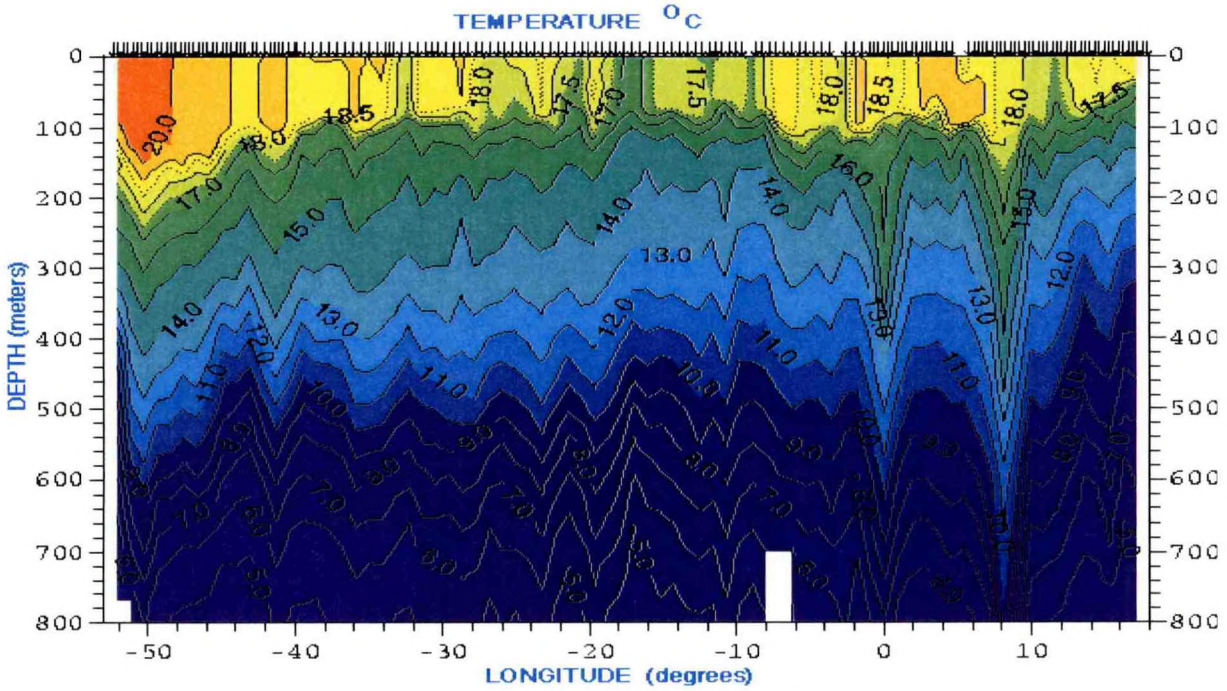
*This cruise was originally scheduled for December 2003, however due to a delay it was rescheduled for January 2004.

AX18 Line



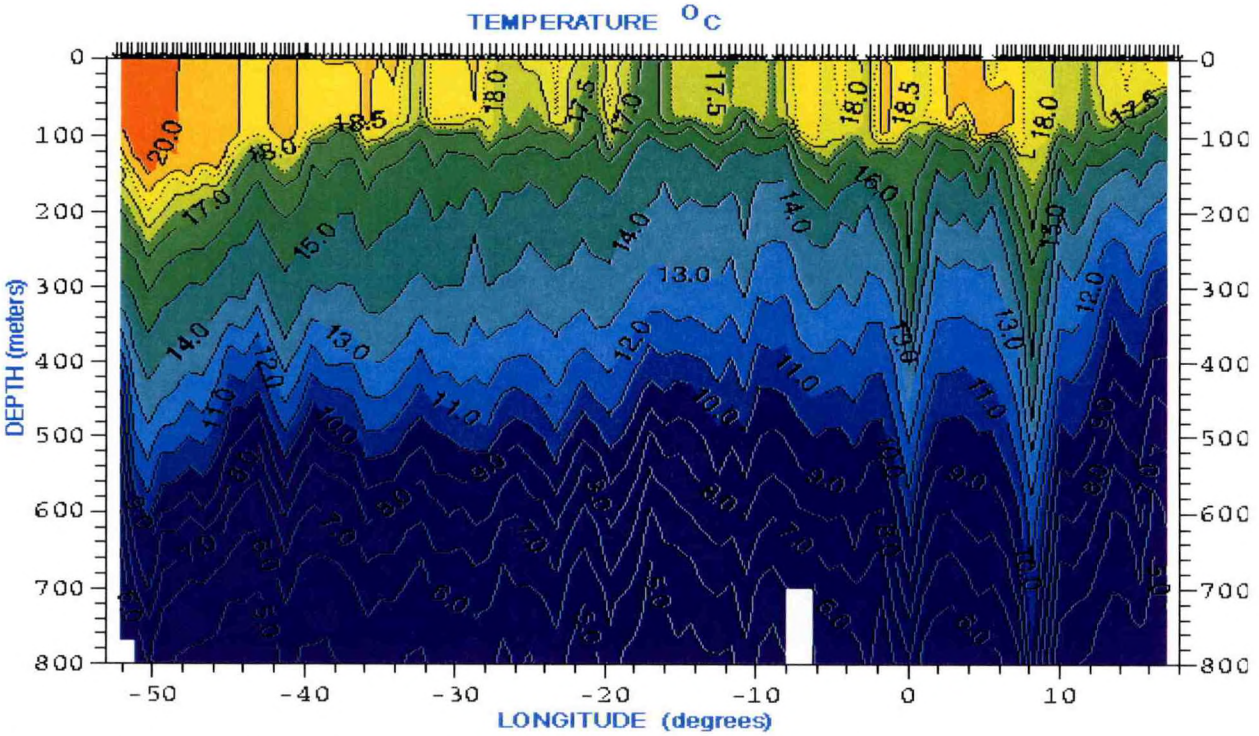
AX18 is occupied four times per year. This station map shows the position of XBTs dropped during one high density cruise.

Cruise Dates:	May 20 - 30, 2003
Ship:	M/V EVER GARDEN
# of XBTs collected:	187



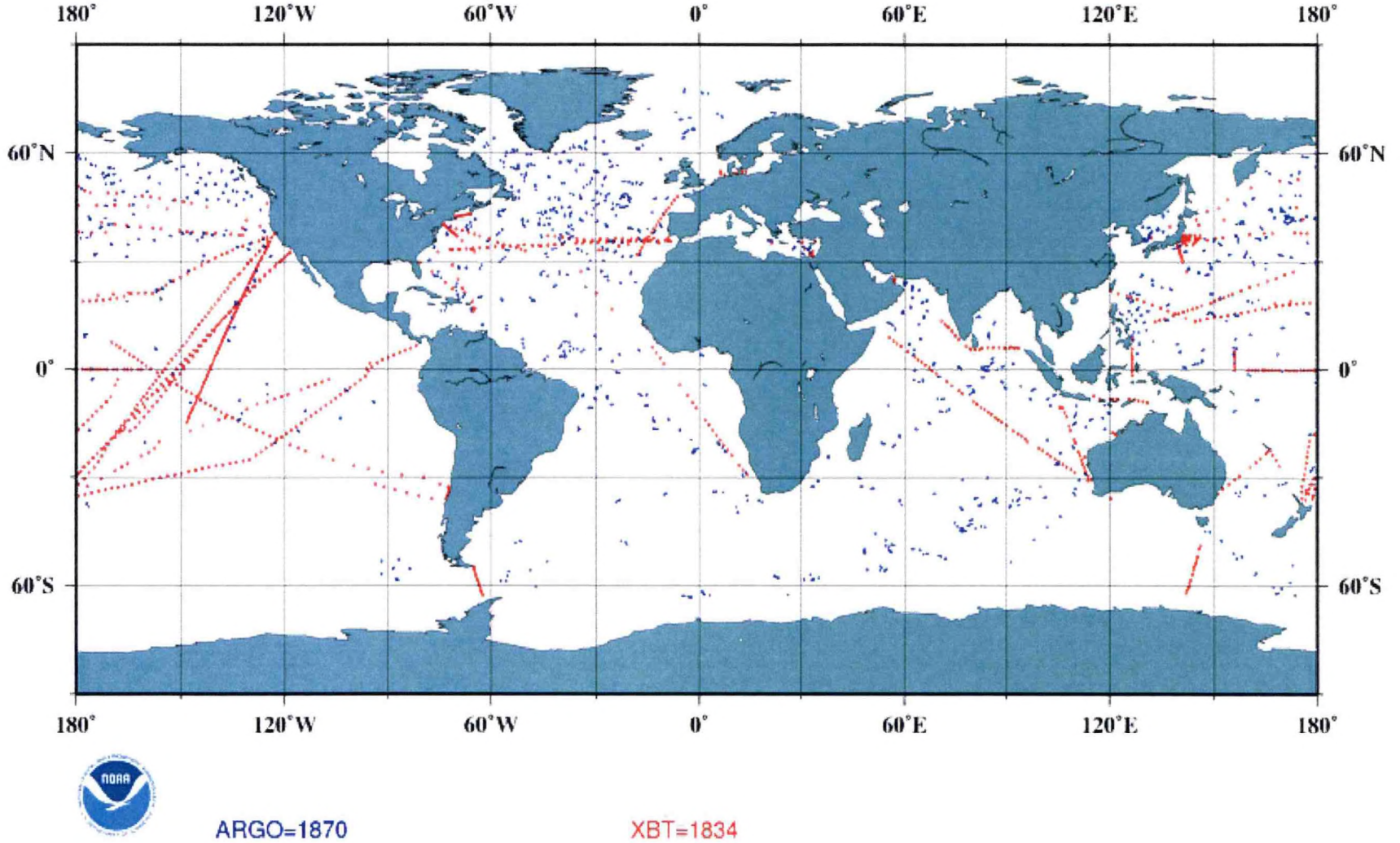
Section plot from AX18 showing temperature as a function of latitude and depth.

Cruise Dates:	November 11– 20, 2003
Ship:	M/V EVER GENIUS
# of XBTs collected:	190

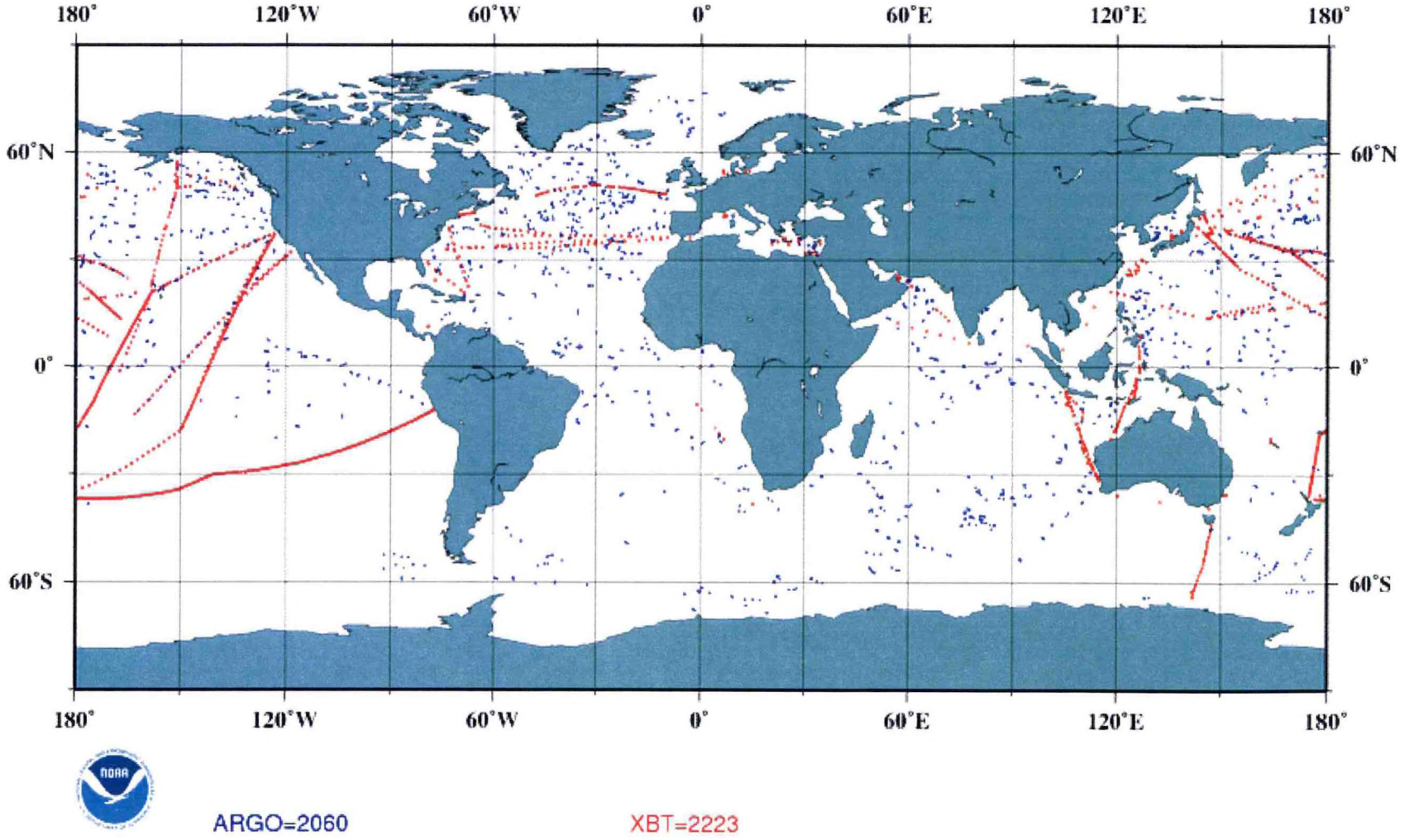


Section plot from AX18 showing temperature as a function of latitude and depth.

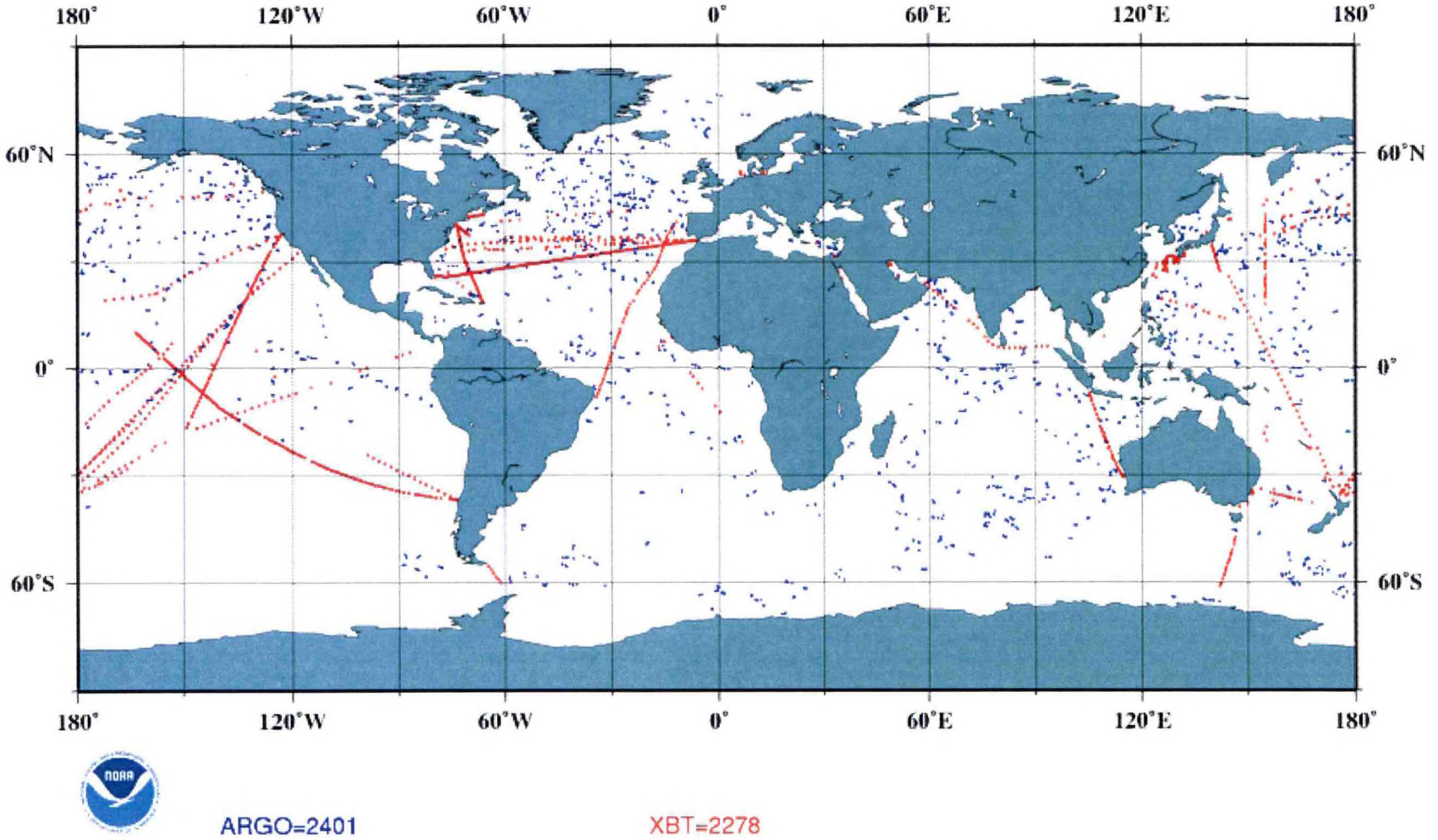
Plot showing location of ARGO and XBT profiles taken during January 2003



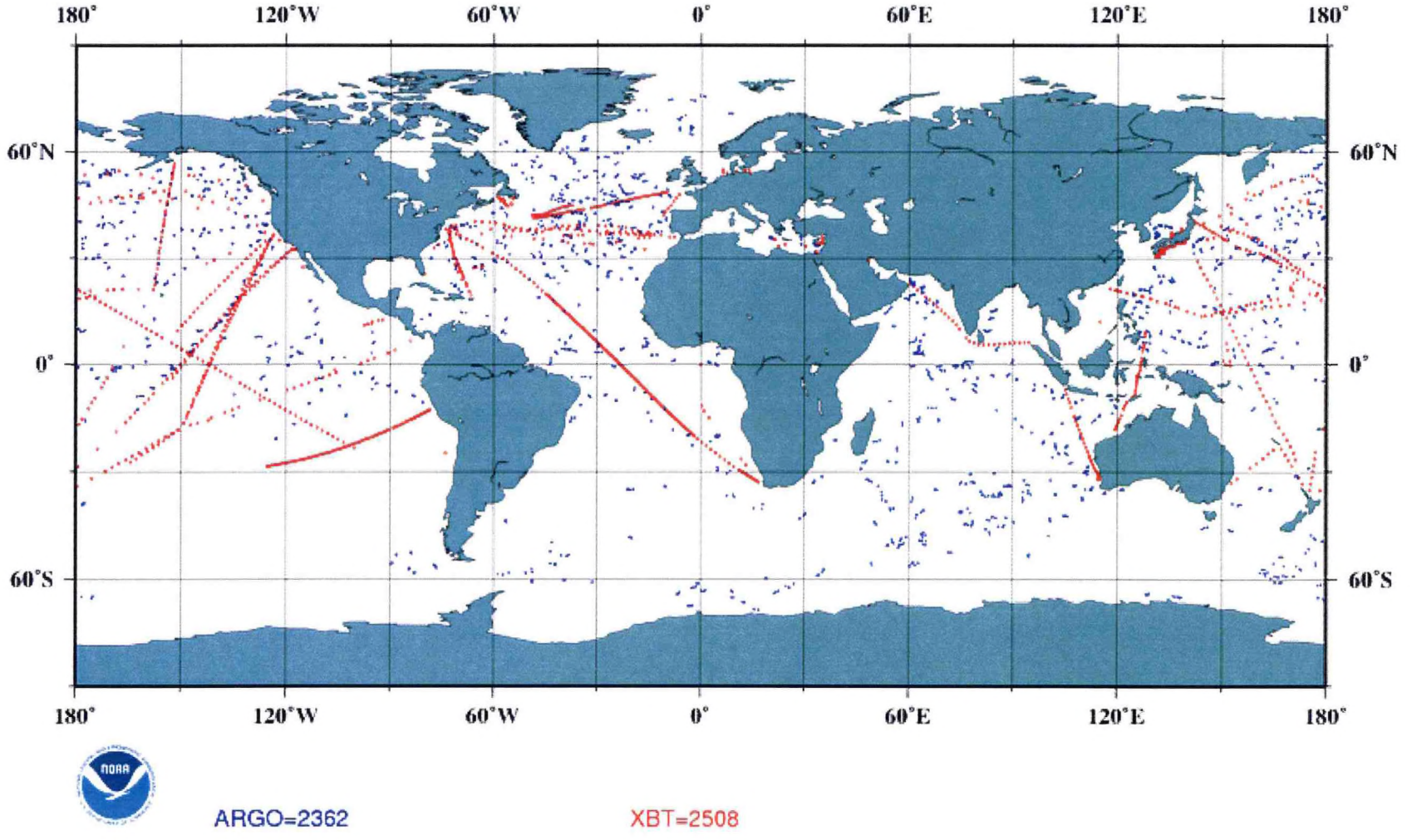
Plot showing location of ARGO and XBT profiles taken during February 2003



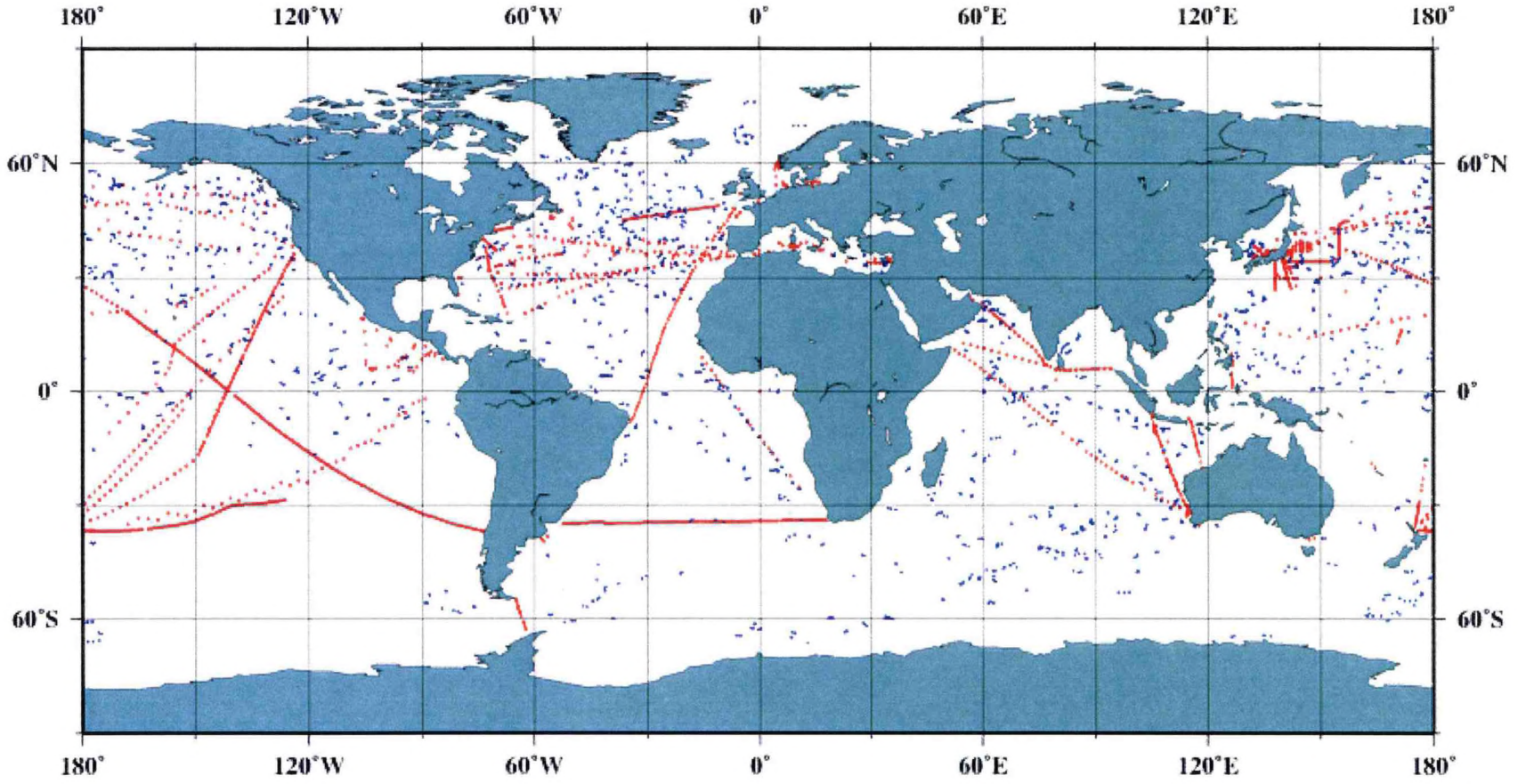
Plot showing location of ARGO and XBT profiles taken during March 2003



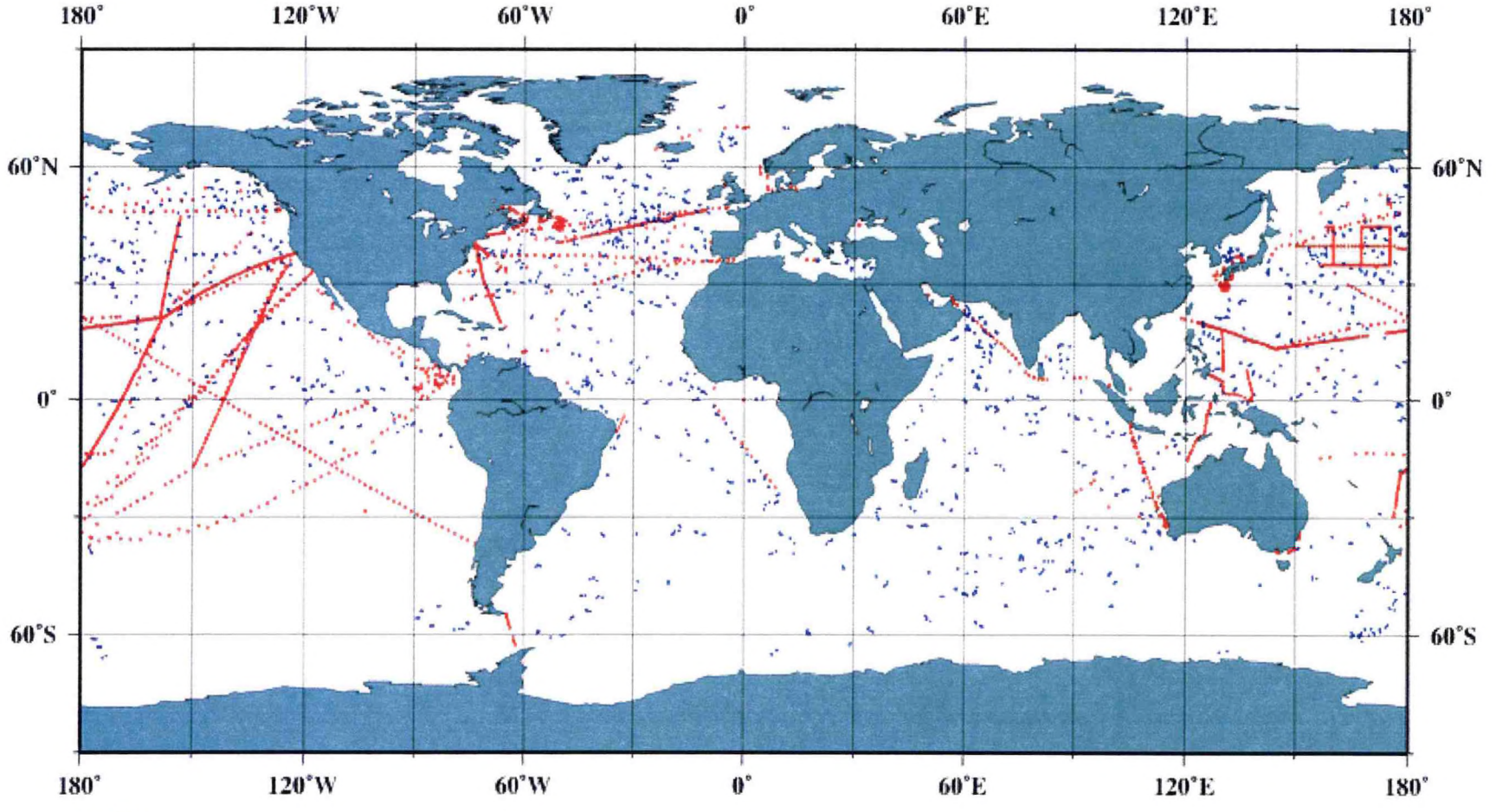
Plot showing location of ARGO and XBT profiles taken during April 2003



Plot showing location of ARGO and XBT profiles taken during May 2003



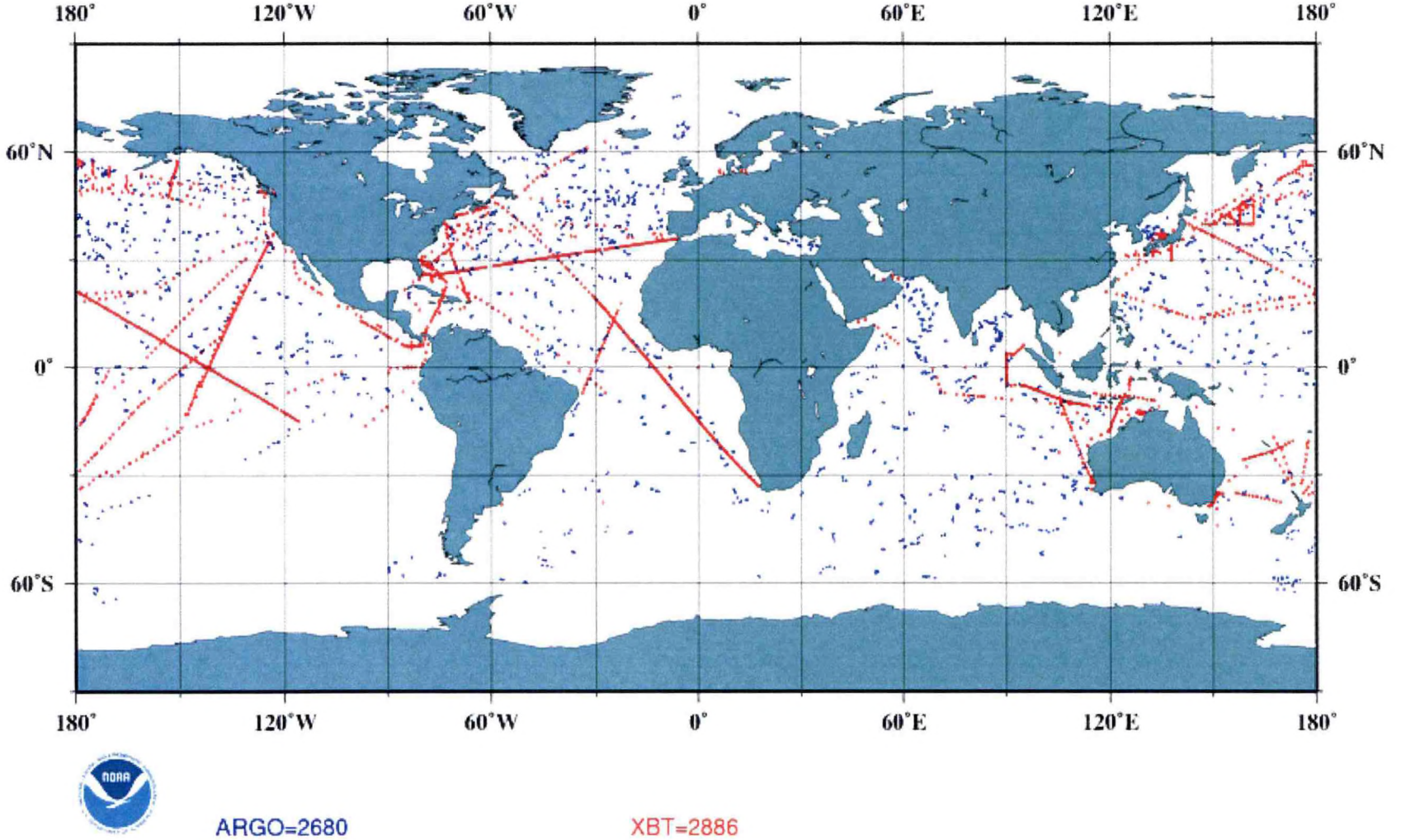
Plot showing location of ARGO and XBT profiles taken during June 2003



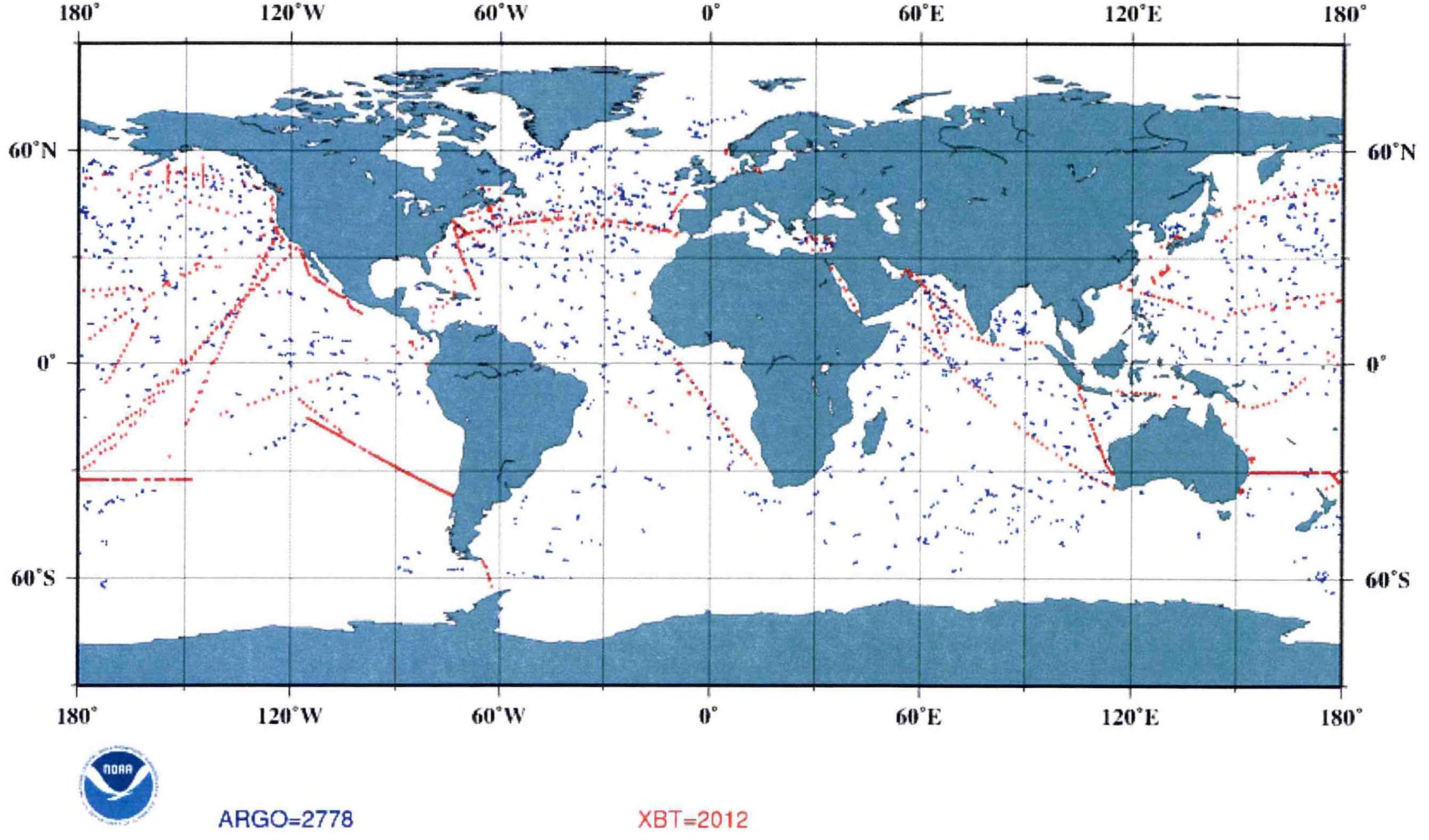
ARGO=2495

XBT=2999

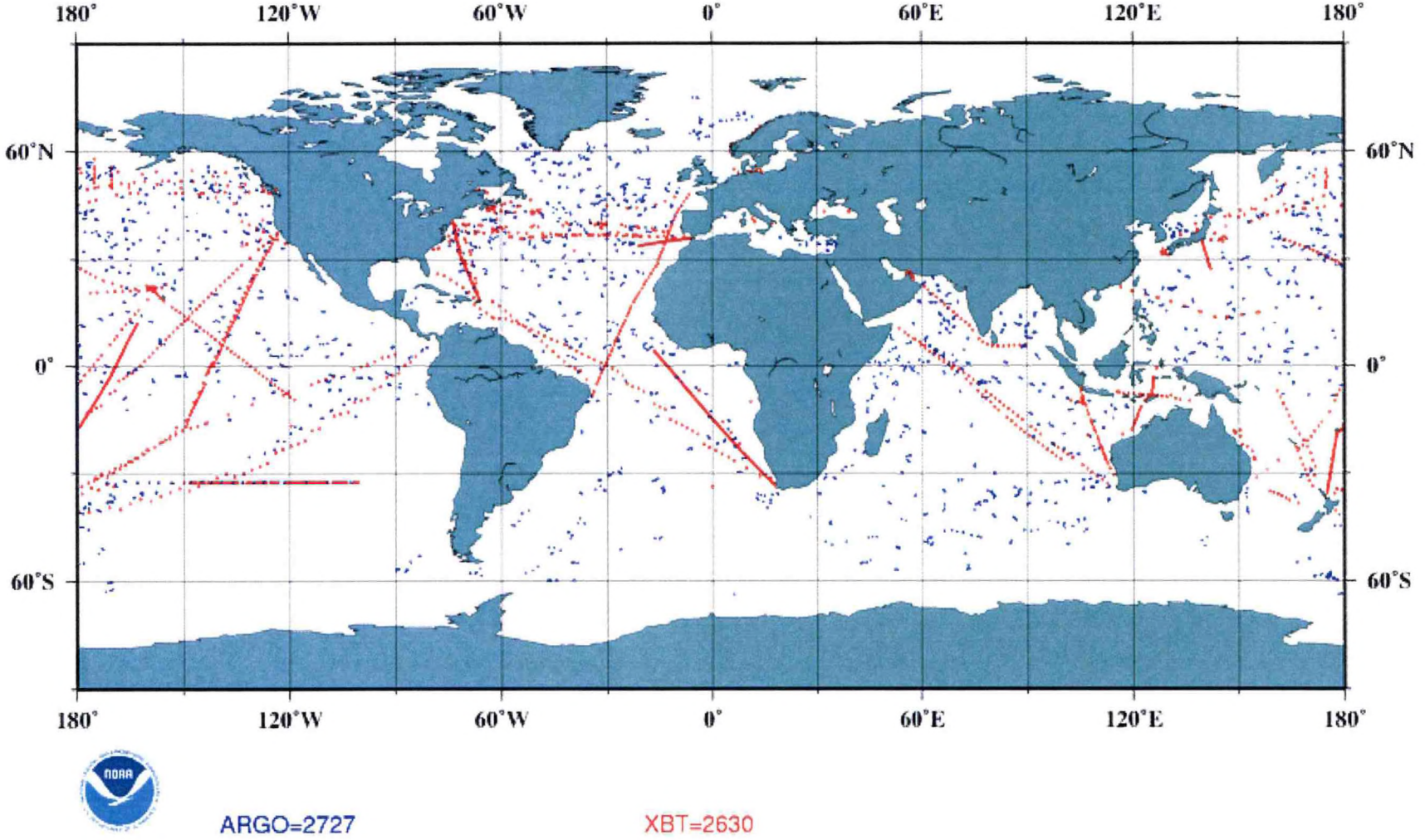
Plot showing location of ARGO and XBT profiles taken during July 2003



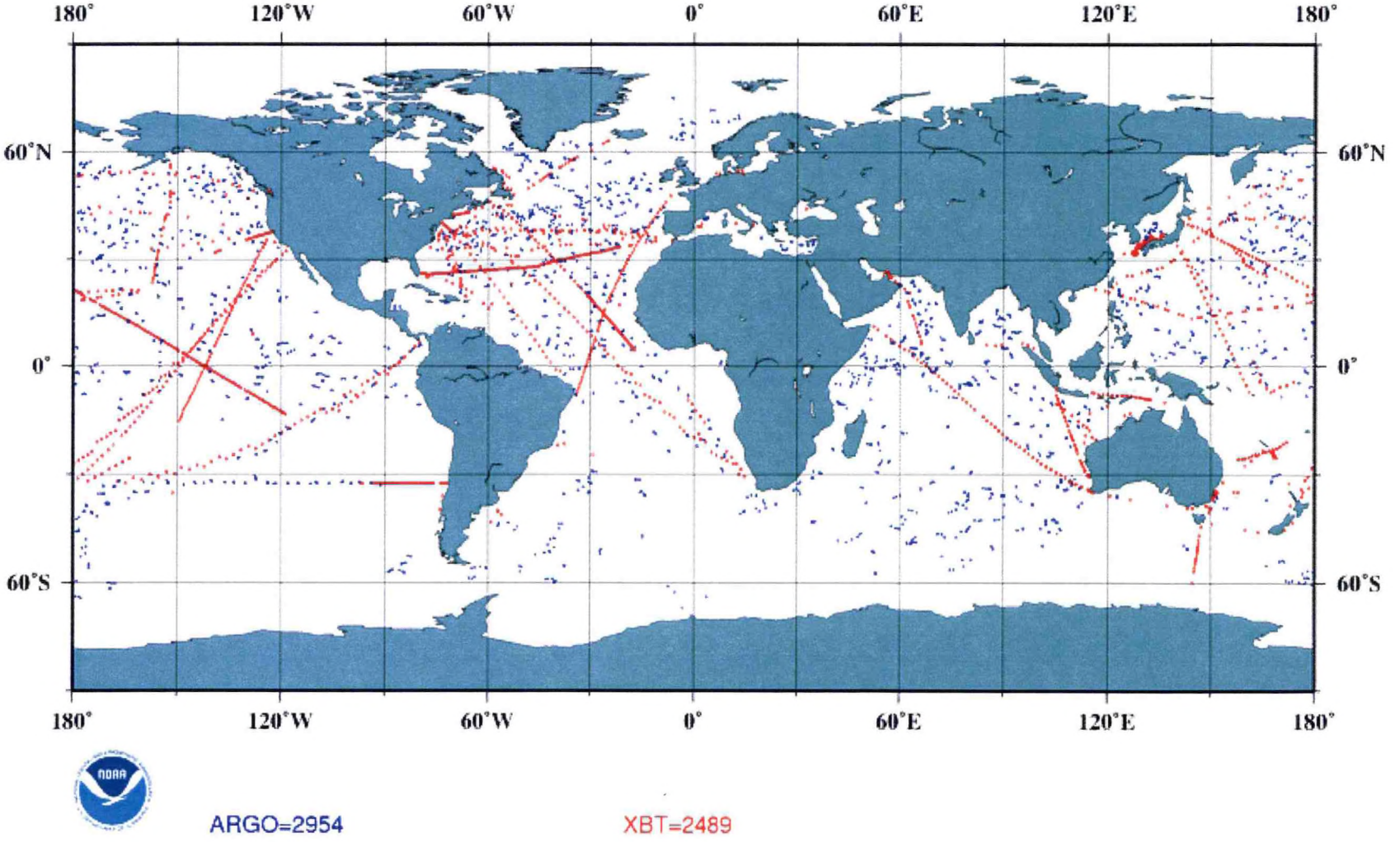
Plot showing location of ARGO and XBT profiles taken during August 2003



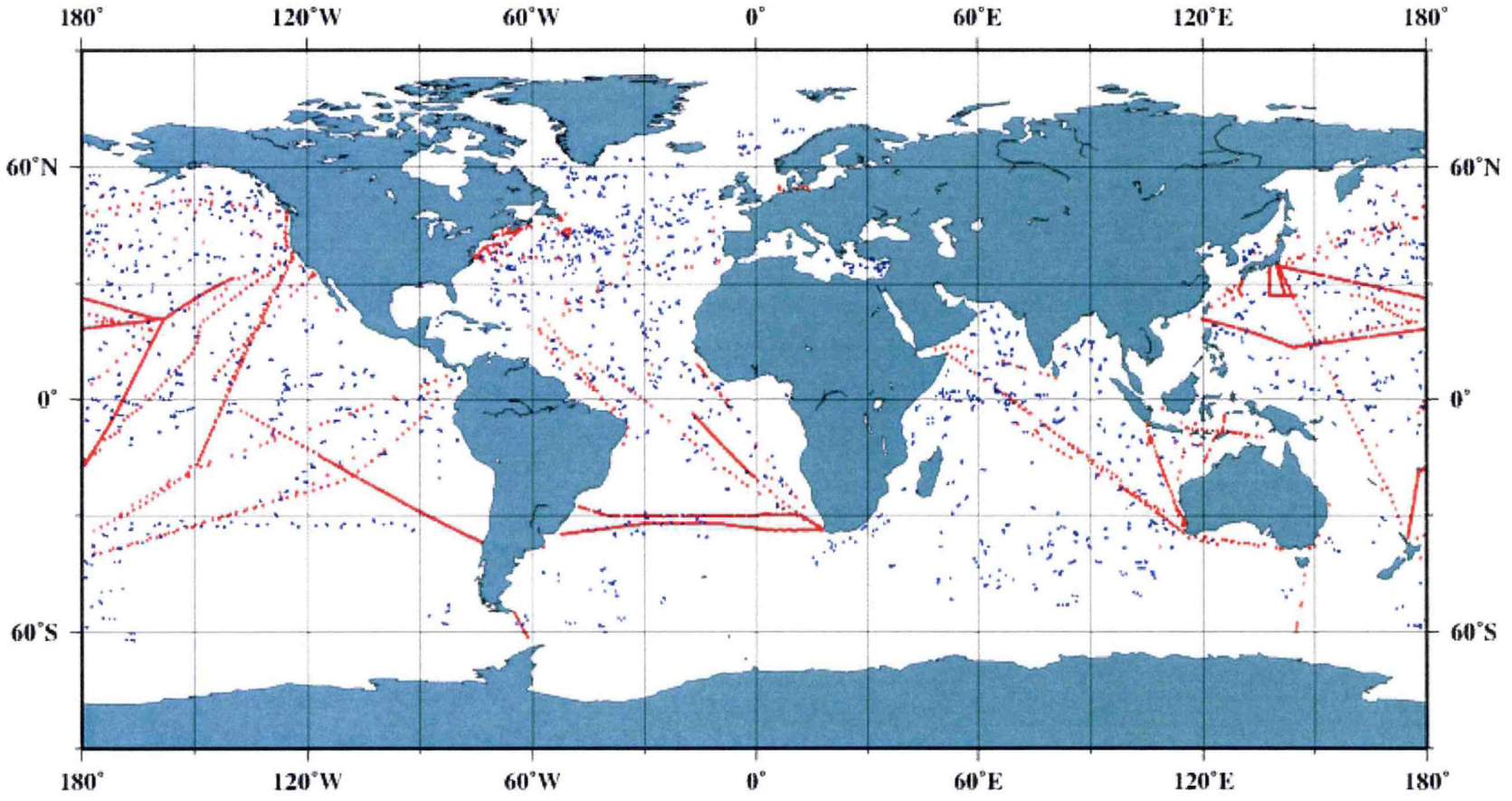
Plot showing location of ARGO and XBT profiles taken during September 2003



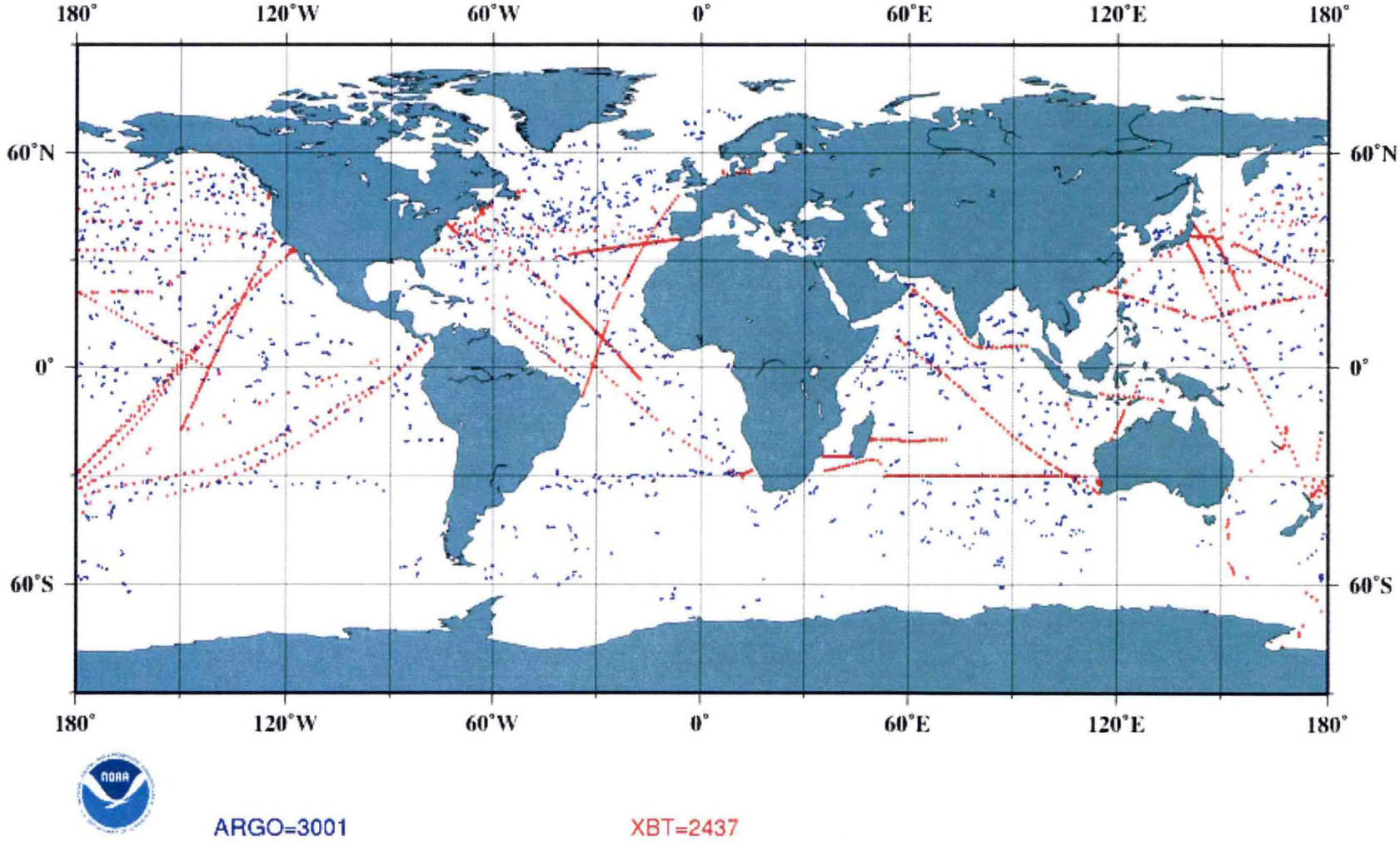
Plot showing location of ARGO and XBT profiles taken during October 2003



Plot showing location of ARGO and XBT profiles taken during November 2003

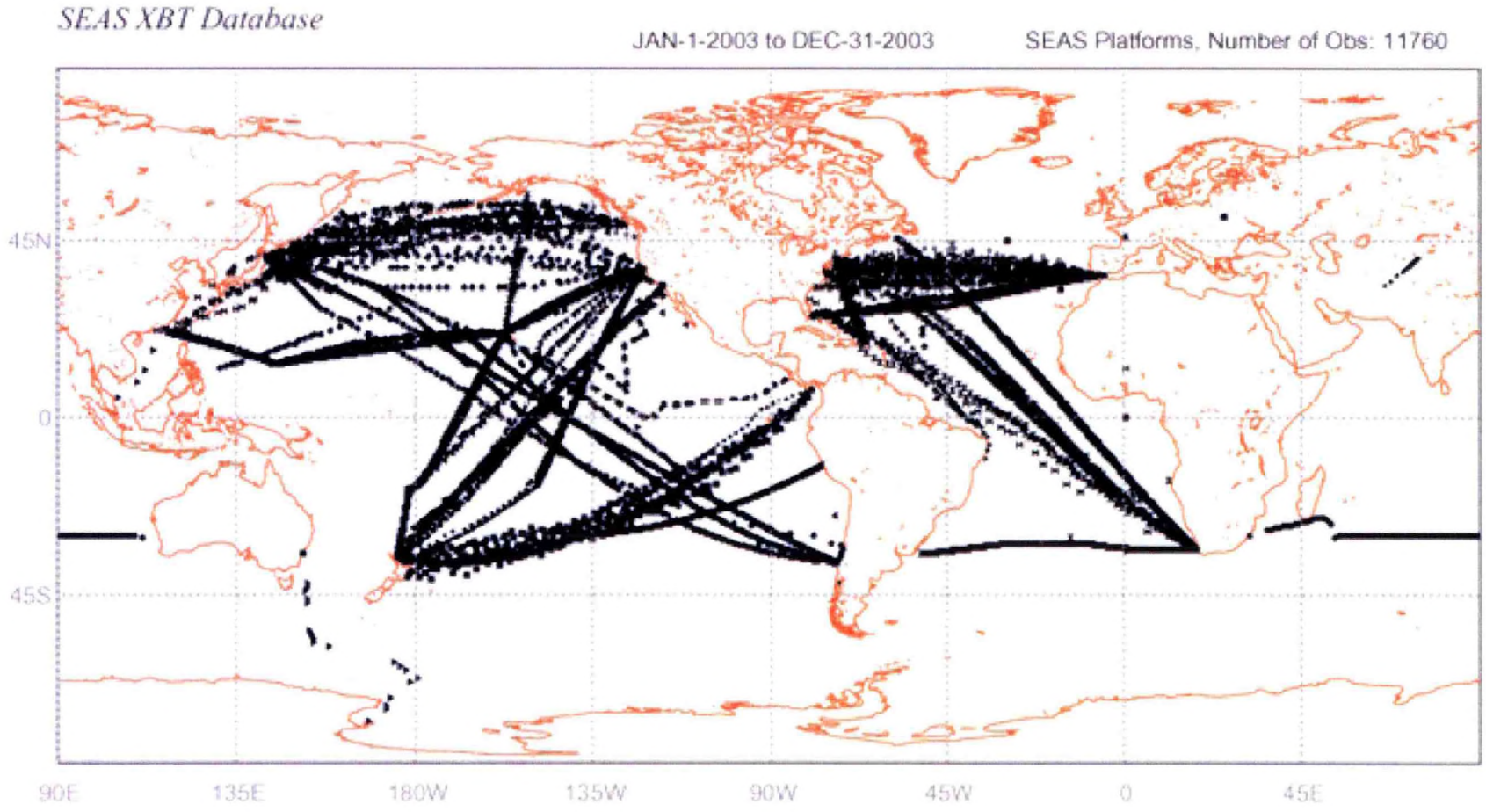


Plot showing location of ARGO and XBT profiles taken during December 2003

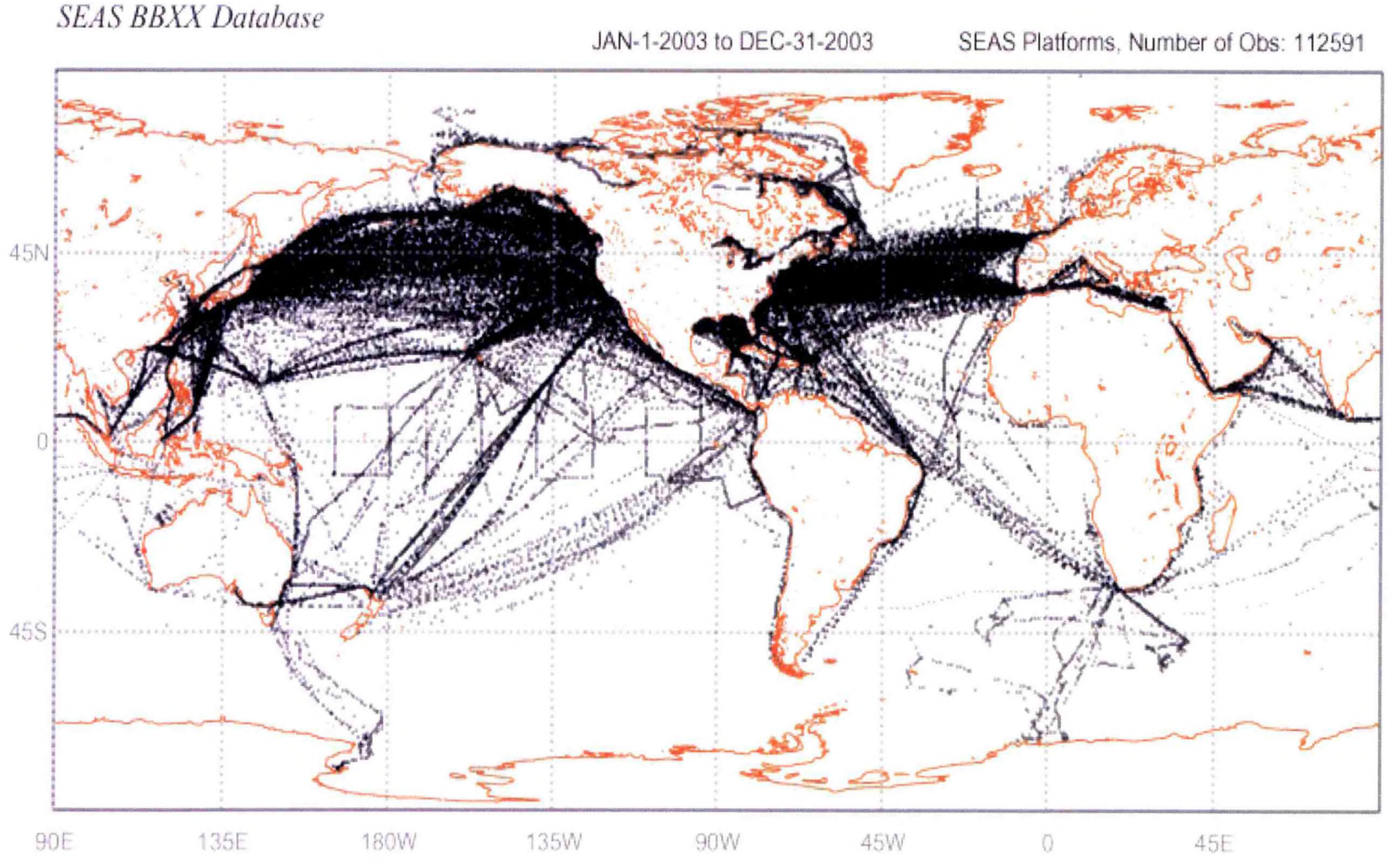


Data Collection

Plot of all XBT observations collected via SEAS during the year 2003. Total number of XBT observations = 11,760



Plot of all binary meteorological observations collected via SEAS during the year 2003. Total number of SEAS Meteorological observations = 112,591



Key to Call Signs for the ships listed in the 2003 XBT Counts by Route tables:

CALL SIGN	SHIP NAME
3EZI6	NACRE
3FRY9	LYKES COMMANDER
9HZJ5	LYKES RAIDER
9VND	RUBY INDAH
9VRA	DIRECT EAGLE
A8BT5	CAP REINGA
BKHC	EVER GENIUS
BOAB	TAI HE
C4LV	MSC FEDERICA
DDQI	CONTI ASIA
ELRR4	SAFMARINE TUGELA
ELYT5	DIRECT FALCON
ELTZ3	COLUMBUS FLORIDA
ELZU6	CAP SAN ANTONIO
GZKA	AMERICA STAR
KGJB	SEA-LAND DEFENDER
KGJD	SEA-LAND EXPRESS
KHRF	SEA-LAND PATRIOT
KIRF	CSX HAWAII
KRGB	CSX ENTERPRISE
LADB2	SKAUGRAN
LAJV4	SKAUBRYN
NRUO	POLAR SEA
OWKF2	JOSEPHINE MAERSK
OYYK2	JENS MAERSK
PJJU	OLEANDER
S6ID	EMERALD INDAH
V2CA2	POLYNESIA
V2FA2	TAUSALA SAMOA
VSRF9	TMM HERMOSILLO
VSRL9	LYKES AMBASSADOR
V2XM	SKOGAFOSS
WAUW	ENDEAVOR
WAUY	ENTERPRISE
WDA7827	KILO MOANA
WMLG	DELAWARE BAY
WSRL	CSX PACIFIC
WTEJ	MCARTHUR

VOS Ships reporting and the number of XBT Obs. reported by each ship during 2003

(= LD only)*

Nacre	3EZI6	1399	
C. Florida	ELZT3	1132	
H. Enterprise	KRGB	1100	
L. Raider	9HZJ5	771	
H. Hawaii	KIRF	566	
T. Samoa	V2FA2	565	*
C. Asia	DDQI	473	
S/L Patriot	KHRF	445	
H. Pacific	WSRL	443	
D. Eagle	9VRA	366	
Enterprise	WAUY	361	*
C. Regina	A8BT5	358	
D. Bay	WMLG	330	*
S/L Defender	KGJB	317	*
J. Maersk	OWKF2	312	*
Polynesia	V2CA2	285	*
Endeavor	WAUW	273	*
TMM Hermosillo	VSRF9	236	*
L. Commander	3FRY9	229	
Oleander	PJJU	205	*
Ever Genius	BKHC	188	
C. San Antonio	ELZU6	123	
Skaubryn	LAJV4	111	*
L. Ambassador	VSRL9	101	
J. Maersk	OYYK2	100	*
Skaugran	LADB2	86	*
MSC Federica	C4LV	75	
A. Star	GZKA	64	*
Kilo Moana	WDA7827	54	
D. Falcon	ELYT5	49	
E. Indah	S6ID	42	*
Tai He	BOAB	40	*
S/L Express	KGJD	34	
Polar Sea	NRUO	19	*
S. Tugela	ELRR4	13	
Total		11265	

SEAS XBT Counts by Route

The Chart below is a list showing the XBT routes and the number of XBTs collected and transmitted by each VOS ship for each month during the year 2003. The number per year indicates the required number of XBTs that should be collected in low density mode per year as mandated by the SOOPIP. The number per month indicates the required number of XBTs that should be collected per month per ship, for 4 samples collected per day and monthly resolution. The monthly totals indicate the actual number of XBTs collected per

Ship	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
AX04, New York to Spain						**#/Year =440**			**#Mon = 37**				
WAUW	12	0	36	20	32	19	31	17	23	46	14	23	273
WAUY	38	46	24	25	48	3	2	66	68	31	6	4	361
WMLG	46	40	37	46	0	27	0	40	32	22	15	25	330
TOTAL	96	86	97	91	80	49	33	123	123	99	35	52	**964**
AX07, Gulf of Mexico to Gibraltar						**#/Year = 520**			**#/Mon = 43**				
VSRFP	0	0	0	0	0	0	0	0	56	180	0	0	236
VSRL9	0	0	0	0	0	0	0	0	0	0	0	101	101
3FRY9	0	0	229	0	0	0	0	0	0	0	0	0	229
TOTAL	0	0	229	0	0	0	0	0	56	180	0	101	**566**
AX08, New York to Cape of Good Hope						**#/Year = 960**			**#/Mon = 80**				
9HZJ5	0	0	0	248	0	0	255	0	162	0	106	0	771
ELRR4	13	0	0	0	0	0	0	0	0	0	0	0	13
KHRF	0	0	0	0	0	0	0	0	23	64	108	8	203
TOTAL	13	0	0	248	0	0	255	0	185	64	214	8	**987**
AX10, New York to Trinidad/Caracas						**#/Year = 200**			**#/Mon = 17**				
KIRF	11	25	117	41	22	102	49	27	150	22	0	0	566
TOTAL	11	25	117	41	22	102	49	27	150	22	0	0	**566**
AX18, Cape Town to Buenos Aires						**#/Year = 480**					**#/Mon = 40**		
BKHC	0	0	0	0	0	0	0	0	0	0	188	0	188
TOTAL	0	0	0	0	0	0	0	0	0	0	188	0	**188**

Ship	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total

AX32, New York to Bermuda **#/Year = 120** **#/Mon = 10**

PJJU	29	0	18	9	16	22	18	35	27	22	0	24	220
TOTAL	29	0	18	9	16	22	18	35	27	22	0	24	**220**

AX29, New York to Brazil **#/Year = 360** **#/Mon = 30**

KGJD	0	0	0	0	0	0	27	7	0	0	0	0	34
KHRF	0	0	0	0	0	0	0	0	35	0	43	124	202
ELZU6	0	0	0	0	0	0	0	0	23	33	48	19	123
TOTAL	0	0	0	0	0	0	27	7	58	33	91	143	**359**

PX01, Seattle/Vancouver to Indonesia **#/Year = 860** **#/Mon = 72**

S6ID	34	0	0	0	0	0	0	0	0	0	0	0	34
TOTAL	34	0	0	0	0	0	0	0	0	0	0	0	**34**

PX06, Suva (Fiji) to Auckland **#/Year = 160** **#/Mon = 13**

A8BT5	0	0	0	0	0	0	0	0	8	0	0	0	8
ELYT5	49	0	0	0	0	0	0	0	0	0	0	0	49
ELZT3	0	75	0	10	14	44	15	0	72	0	57	0	287
TOTAL	49	75	0	10	14	44	15	0	80	0	57	0	**344**

PX08, Auckland to Panama **#/Year = 700** **#/Mon = 58**

OWKF2	0	0	0	0	45	56	2	0	55	61	41	52	312
GZKA	64	0	0	0	0	0	0	0	0	0	0	0	64
OYYK2	0	0	0	0	0	0	0	0	0	0	50	50	100
TOTAL	64	0	0	0	45	56	2	0	55	61	91	102	**476**

PX09, Hawaii to Fiji/Auckland **#/Year = 440** **#/Mon = 37**

A8BT5	0	0	0	0	0	45	0	0	0	0	10	13	68
ELZT3	0	141	0	11	0	132	42	15	94	0	136	0	571
TOTAL	0	141	0	11	0	177	42	15	94	0	146	13	**629**

PX10, Hawaii to Guam/Saipan **#/Year = 440** **#/Mon = 37**

KRGB	32	20	7	15	0	126	23	18	13	16	121	30	421
WSRL	5	14	0	24	20	24	24	22	9	11	10	16	179
TOTAL	37	34	7	39	20	150	47	40	22	27	131	46	**600**

Ship	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total

PX13, New Zealand to California **#/Year = 770** **#/Mon = 64**

9VRA	50	64	54	73	51	72	46	58	54	55	53	48	678
A8BT5	0	0	0	0	0	0	35	49	48	51	54	13	250
ELZT3	58	0	58	0	43	54	18	26	76	11	58	49	451
TOTAL	108	64	112	73	94	126	99	133	178	117	165	110	**1379**

PX18, Tahiti to California **#/Year = 440** **#/Mon = 37**

A8BT5	0	0	0	0	0	0	0	0	0	0	17	0	17
ELZT3	0	0	0	0	0	25	0	0	0	0	0	0	25
V2CA2	49	54	53	47	50	3	0	0	0	0	0	9	265
V2FA2	59	55	44	8	51	52	50	0	54	53	51	53	530
TOTAL	108	109	97	55	101	80	50	0	54	53	68	62	**837**

PX25, Valparaiso to Japan/Korea **#/Year = 1,320** **#/Mon = 110**

3EZ16	6	59	156	86	223	81	172	108	0	149	126	59	1225
TOTAL	6	59	156	86	223	81	172	108	0	149	126	59	**1225**

PX26, Transpac to Transpac **#/Year = 5,500** **#/Mon = 458**

BOAB	32	8	0	0	0	0	0	0	0	0	0	0	40
KGJB	10	6	11	31	52	14	42	27	24	29	17	54	317
KRGB	0	21	25	0	11	22	25	32	28	61	30	34	289
LADB2	6	8	6	10	9	0	4	0	9	7	9	18	86
LAJV4	19	6	5	11	12	8	10	3	7	8	11	11	111
WSRL	0	0	0	14	17	21	15	4	22	0	15	24	132
TOTAL	67	49	47	66	101	65	96	66	90	105	82	141	**975**

PX37, Hawaii to California **#/Year = 250** **#/Mon = 21**

ELZT3	0	19	0	0	0	19	0	4	0	0	0	0	42
KRGB	20	0	18	0	0	70	1	8	0	11	42	3	173
WTEJ	0	0	0	0	0	0	5	86	0	91	0	0	182
WSRL	0	0	0	3	6	0	13	1	3	0	21	1	48
TOTAL	20	19	18	3	6	89	19	99	3	102	63	4	**445**

Ship	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
PX38, Hawaii to Valdez						**#/Year = 100**				**#/Mon = 8**			
WDA7827	0	0	0	29	0	0	0	0	0	25	0	0	54
TOTAL	0	0	0	29	0	0	0	0	0	25	0	0	**54**
PX40, Hawaii to Japan						**#/Year = 450**				**#/Mon = 38**			
3EZI6	10	46	0	0	0	0	0	0	39	0	0	0	95
TOTAL	10	46	0	0	0	0	0	0	39	0	0	0	**95**
PX44, Taiwan to Guam						**#/Year = 160**				**#/Mon = 13**			
KRGB	8	0	9	15	0	51	5	11	8	25	65	18	215
WSRL	0	12	0	5	6	10	14	8	0	0	15	13	83
TOTAL	8	12	9	20	6	61	19	19	8	25	80	31	**298**
PX50,						**#/Year = 230**				**#/Mon = 19**			
DDQI	0	235	0	102	136	0	0	0	0	0	0	0	473
TOTAL	0	235	0	102	136	0	0	0	0	0	0	0	**473**
PX81, Honolulu to Coronel (Chile)						**#/Year = 800**				**#/Mon = 67**			
3EZI6	39	0	18	0	0	0	0	0	32	0	0	0	89
TOTAL	39	0	18	0	0	0	0	0	32	0	0	0	**89**
GOOS un-specified Routes,													
C4LV	0	0	0	0	0	0	0	0	0	0	0	75	75
S6ID	1	0	1	0	0	6	1	0	0	0	0	0	9
NRUO	0	0	0	0	0	0	0	0	0	0	0	19	19
WSRL	0	0	1	0	0	0	0	0	0	0	0	0	1
9VID	1	0	0	0	0	0	0	0	0	0	0	0	1
TOTAL	1	0	2	0	0	6	1	0	0	0	0	94	**104**

Delayed Mode XBT Data Received at AOML from January through December 2003 and forwarded to the National Oceanographic Data Center (NODC) for archival

Ship Name/Call Sign	# of Drops	Dates
AMERICA STAR (GZKA)	64	5/29/02 – 6/14/02
AMERICA STAR (GZKA)	128	8/9/02 – 11/26/02
AMERICA STAR (GZKA)	64	1/2/03 – 1/17/03
CAP SAN ANTONIO (ELZU6)	52	9/12/03 - 10/18/03
COLUMBUS COROMANDEL (DDGY)	87	12/28/02 – 2/10/03
COLUMBUS COROMANDEL (DDGY)	104	2/20/30 – 4/6/03
COLUMBUS COROMANDEL (DDGY)	80	4/17/03 – 6/1/03
COLUMBUS COROMANDEL (DDGY)	81	6/11/03 – 7/27/03
COLUMBUS COROMANDEL (DDGY)	106	8/7/03 – 9/21/03
COLUMBUS COROMANDEL (DDGY)	112	10/1/03 – 11/16/03
COLUMBUS FLORIDA (ELZT3)	184	9/21/02 – 12/27/02
COLUMBUS FLORIDA (ELZT3)	64	1/8/03 – 1/22/03
COLUMBUS FLORIDA (ELZT3)	23	2/15/03 – 2/24/03
COLUMBUS FLORIDA (ELZT3)	79	3/6/03 – 4/12/03
COLUMBUS FLORIDA (ELZT3)	57	4/30/03 – 6/16/03
DELAWARE BAY (WMLG)	53	10/4/02 – 11/11/02
DELAWARE BAY (WMLG)	57	11/17/02 – 12/24/02
DELAWARE BAY (WMLG)	60	12/31/02 – 2/4/03
DELAWARE BAY (WMLG)	49	2/1/203 – 3/19/03
DELAWARE BAY (WMLG)	63	3/27/03 – 4/30/03
DELAWARE BAY (WMLG)	75	6/14/03 – 6/24/03; 8/2/03 – 9/11/03
DELAWARE BAY (WMLG)	42	9/22/03 – 10/21/03
DIRECT EAGLE (9VRA)	98	11/13/02 – 12/23/02
DIRECT EAGLE (9VRA)	105	1/5/03 – 2/15/03
DIRECT EAGLE (9VRA)	109	2/27/03 – 4/12/03
DIRECT EAGLE (9VRA)	103	4/24/03 – 6/6/03
DIRECT EAGLE (9VRA)	104	6/18/03 – 8/3/03
DIRECT EAGLE (9VRA)	103	8/13/03 – 9/27/03
DIRECT EAGLE (9VRA)	107	106/03 –11/22/03
DIRECT FALCON (ELYT5)	118	12/02/02 – 1/15/03
ENDEAVOR (WAUW)	49	11/10/02 – 12/17/02
ENDEAVOR (WAUW)	39	12/21/02 – 1/31/03
EMDEAVOR (WAUW)	87	3/22/03 – 6/3/03
ENDEAVOR (WAUW)	32	6/7/03 – 7/18/03
ENDEAVOR (WAUW)	49	9/3 - 11/03; 10/1-8/03
ENTERPRISE (WAUY)	80	10/11/02 – 1/4/03
ENTERPRISE (WAUY)	47	1/9/03 – 2/7/03
ENTERPRISE (WAUY)	48	2/15/03 – 3/26/03
ENTERPRISE (WAUY)	51	3/31/03 – 5/7/03
ENTERPRISE (WAUY)	27	5/11/03 – 6/17/03
ENTERPRISE (WAUY)	26	9/14/03 – 10/17/03
HORIZON HAWAII (KIRF)	71	6/12/02 – 11/18/02
HORIZON HAWAII (KIRF)	12	1/24/03 – 2/2/03
HORIZON HAWAII (KIRF)	94	3/8/03 – 3/11/03
HORIZON HAWAII (KIRF)	121	1/24/03 –5/23/03

Ship Name /Call Sign	# of Drops	Dates
HORIZON HAWAII (KIRF)	121	1/24/03 –5/23/03
HORIZON HAWAII (KIRF)	28	5/25/03 – 6/26/03
HORIZON HAWAII (KIRF)	95	6/27/03 – 7/1/03
HORIZON HAWAII (KIRF)	42	7/26/03 – 9/4/03
HORIZON HAWAII (KIRF)	112	9/6/03 – 9/9/03
HORIZON HAWAII (KIRF)	38	9/6/03 – 10/02/03
HORIZON HAWAII (KIRF)	17	10/5/03 – 10/8/03; 10/15/03
HORIZON PACIFIC (WSRL)	27	12/22/02 – 12/31/02
HORIZON PACIFIC (WSRL)	32	1/29/03 – 3/8/03
HORIZON PACIFIC (WSRL)	46	4/2/03 – 4/23/03
HORIZON PACIFIC (WSRL)	52	4/27/03 – 5/30/03
HORIZON PACIFIC (WSRL)	59	6/6/03 – 6/23/03
HORIZON PACIFIC (WSRL)	68	7/8/03 – 8/4/03
HORIZON PACIFIC (WSRL)	55	8/13/03 – 9/7/03
HORIZON PACIFIC (WSRL)	12	9/18/03 - 9/25/03
HORIZON PACIFIC (WSRL)	61	10/29/03 – 11/21/03
HORIZON PACIFIC (WSRL)	66	11/26/03 –12/26/03
JOSEPHINE MAERSK (OWKF2)	101	5/16/03 – 6/30/03
JOSEPHINE MAERSK (OWKF2)	3	7/17/03 – 25/03&9/3
JOSEPHINE MAERSK (OWKF2)	101	9/4/03 –9/21/03
LYKES COMMANDER (3FRY9)	230	3/20/03 – 3/29/03
LYKES RAIDER (9HZJ5)	249	4/6/03 – 4/24/03
LYKES RAIDER (9HZJ5)	255	7/7/03 – 7/24/03
LYKES RAIDER (9HZJ5)	269	9/22/03 – 10/10/03
LYKES RUNNER (9HBP6)	271	11/30/02 – 12/20/02
MELBOURNE STAR (GOVL)	64	5/6/02 – 5/22/02
MELBOURNE STAR (GOVL)	64	7/22/02 – 8/6/02
MELBOURNE STAR (GOVL)	55	10/4/02 – 10/20/02
M/V EVER GARDEN	187	5/20/03 – 5/30/03
M/V EVER GENIUS	190	11/11/03 – 11/20/03
OLEANDER (PJJU)	29	1/6/03 – 1/12/03
OLEANDER (PJJU)	18	3/15/03 – 3/15/03
OLEANDER (PJJU)	22	6/6/03 – 6/10/03
OLEANDER (PJJU)	19	7/11/03 – 7/15/03
OLEANDER (PJJU)	19	8/2/03 – 8/6/03
OLEANDER (PJJU)	26	9/5/03 – 9/7/03
OLEANDER (PJJU)	23	12/13/03 –12/17/03
POLYNESIA (V2CA2)	55	12/4/02 – 12/12/02
POLYNESIA (V2CA2)	49	1/6/03 – 1/14/03
POLYNESIA (V2CA2)	54	2/6/03 – 2/14/03
POLYNESIA (V2CA2)	53	3/8/03 – 3/17/03
POLYNESIA (V2CA2)	47	4/9/03 – 4/17/03
POLYNESIA (V2CA2)	50	5/8/03 – 5/16/03
QUEENSLAND STAR (MZBM7)	105	2/24/02 – 4/10/02
QUEENSLAND STAR (MZBM7)	116	10/12/02 – 12/7/02
SAFMARINE TUGELA (ELRR4)	80	9/11/02 – 1/4/03
SEA-LAND DEFENDER (KGJB)	19	12/28/02 – 1/28/03
SEA-LAND DEFENDER (KGJB)	15	2/5/03 – 3/8/03
SEA-LAND DEFENDER (KGJB)	12	3/21/03 – 4/17/03

Ship Name /Call Sign	# of Drops	Dates
SEA-LAND DEFENDER (KGJB)	53	4/21/03 – 5/21/03
SEA-LAND DEFENDER (KGJB)	34	5/25/03 – 6/15/03
SEA-LAND DEFENDER (KGJB)	43	6/30/03 – 7/28/03
SEA-LAND DEFENDER (KGJB)	34	8/9/03 – 9/2/03
SEA-LAND DEFENDER (KGJB)	47	7/9/03 – 10/18/03
SEA-LAND DEFENDER (KGJB)	46	11/16/03 – 12/16/03
SEALAND ENTERPRISE (KRGB)	20	2/2/03 – 2/9/03
SEALAND ENTERPRISE (KRGB)	58	2/21/03 – 3/16/03
SEALAND ENTERPRISE (KRGB)	34	5/29/03 – 6/6/03
SEALAND ENTERPRISE (KRGB)	26	7/4/03 – 7/11/03
SEALAND ENTERPRISE (KRGB)	75	7/17/03 – 8/15/03
SEALAND ENTERPRISE (KRGB)	86	9/30/03 – 10/25/03
SEALAND ENTERPRISE (KRGB)	30	11/18/30 – 11/27/03
SEALAND PATRIOT (KHRF)	115	9/13/03 – 10/21/03
SKAUBRYN (LAJV4)	24	12/7/02 – 1/22/03
SKAUBRYN (LAJV4)	15	2/9/03 – 3/17/03
SKAUBRYN (LAJV4)	23	4/2/03 – 5/18/03
SKAUBRYN (LAJV4)	18	6/2/03 – 7/20/03
SKAUBRYN (LAJV4)	20	9/29/03 – 11/14/03
SKAUGRAN (LADB2)	20	12/25/02 – 2/7/03
SKAUGRAN (LADB2)	17	3/1/03 – 4/10/03
SKAUGRAN (LADB2)	9	5/1/03 - 5/8/03
SKAUGRAN (LADB2)	4	7/5/03 – 7/9/03
SKAUGRAN (LADB2)	16	9/6/03 – 10/14/03
SKAUGRAN (LADB2)	21	10/31/03 –12/10/03
SKOGAFOSS (V2XM)	10	1/12/02 – 1/12/02
SKOGAFOSS (V2XM)	9	2/10/03 – 2/11/03
SKOGAFOSS (V2XM)	9	3/26/03 – 3/27/03
SKOGAFOSS (V2XM)	9	5/3/03 – 5/4/03
SKOGAFOSS (V2XM)	10	6/28/03 – 6/29/03
SKOGAFOSS (V2XM)	23	7/19/03 – 7/26/03
SKOGAFOSS (V2XM)	10	8/26/03 – 9/21/03
SKOGAFOSS (V2XM)	28	10/11/03 – 10/19/03
SKOGAFOSS (V2XM)	9	11/16/03
SKOGAFOSS (V2XM)	10	12/14/03 – 12/15/03
TAI HE (BOAB)	59	12/12/02 – 1/12/03
TAUSALA SAMOA (V2FA2)	43	12/22/02 – 12/30/02
TAUSALA SAMOA (V2FA2)	59	1/21/03 – 1/30/03
TAUSALA SAMOA (V2FA2)	58	2/20/03 – 2/28/03
TAUSALA SAMOA (V2FA2)	44	3/20/03 – 3/27/03
TAUSALA SAMOA (V2FA2)	8	4/20/03 – 4/21/03
TAUSALA SAMOA (V2FA2)	51	5/17/03 - 5/28/03
TAUSALA SAMOA (V2FA2)	52	6/19/03 – 6/27/03
TAUSALA SAMOA (V2FA2)	50	7/19/03 – 7/27/03
TAUSALA SAMOA (V2FA2)	35	8/18/03 – 8/26/03
TAUSALA SAMOA (V2FA2)	55	9/15/03 – 9/24/03
TAUSALA SAMOA (V2FA2)	53	10/14/03 – 10/23/03
TAUSALA SAMOA (V2FA2)	51	11/12/03 – 11/22/03
TMM HERMOSILLO (VSRF9)	236	9/29/03 – 10/7/03
TMM NUEVO LEON (3FPA9)	5	11/12/02 – 11/14/02
TMM SONORA (3FQT9)	60	4/18/03 – 6/2/03
TMM SONORA (3FQT9)	16	6/7/03 – 6/23/03
USGC POLAR SEA (NRUO)	8	12/18/02 –12/20/02
USGC POLAR SEA (NRU0)	1	12/17/02

Delayed Mode Meteorological Data Received at AOML and submitted to the National Climatic Data Center (NCDC) from January through December 2003

CALL SIGN	SHIP NAME
January 2003	
BOAB	TAI-HE
ELYT5	DIRECT FALCON
GZKA	AMERICA STAR
KGJB	SEA-LAND DEFENDER
KRGB	HORIZON ENTERPRISE
LAJV4	SKAUBRYN
V2CA2	POLYNESIA
February 2003	
KGJB	SEA-LAND DEFENDER
LADB2	SKAUGRAN
WMLG	DELAWARE BAY
March 2003	
ELRR4	SAFMARINE TUGELA
GOVL	MELBOURNE STAR
GZKA	AMERICA STAR
H9IM	WESTWOOD BELINDA
KGJB	SEA-LAND DEFENDER
KIRF	HORIZON HAWAII
KRGB	HORIZON ENTERPRISE
LAJV4	SKAUBRYN
MZBM7	QUEENSLAND STAR
WAUY	ENTERPRISE
WMLG	DELAWARE BAY

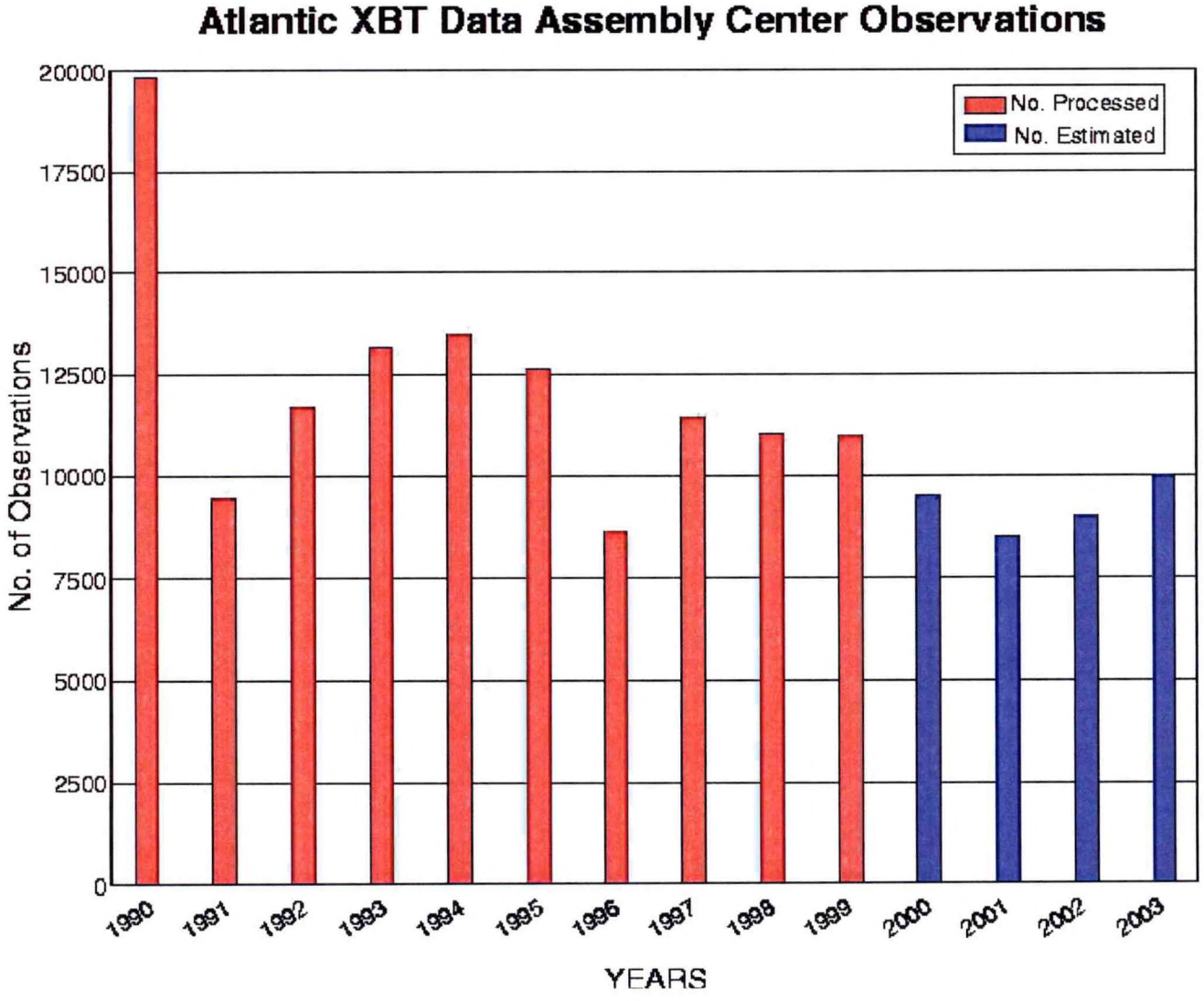
CALL SIGN	SHIP NAME
April 2003	
9VRA	DIRECT EAGLE
KGJB	SEA-LAND DEFENDER
LADB2	SKAUGRAN
V2CA2	POLYNESAI
V2FA2	TAUSALA SAMOA
May 2003	
LAJV4	SKAUBRYN
June 2003	
3FQTP	TMM SONORA
ELZT3	COLUMBUS FLORIDA
KGJB	SEA-LAND DEFENDER
KIRF	HORIZON HAWAII
KRGB	HORIZON ENTERPRISE
LADB2	SKAUGRAN
WMLG	DELAWARE BAY
July 2003	
KRGB	CSX ENTERPRISE
August 2003	
ELZT3	COLUMBUS FLORIDA
KGJB	SEA-LAND DEFENDER
KRGB	HORIZON ENTERPRISE

CALL SIGN	SHIP NAME
August 2003 (cont'd)	
LADB2	SKAUGRAN
LAJV4	SKAUBRYN
V2FA2	TAUSALA SAMOA
WAUW	ENDEAVOR
WAUY	ENETERPRISE
September 2003	
KGJB	SEA-LAND DEFENDER
KIRF	HORIZON HAWAII
KRGB	HORIZON ENTERPRISE
LADB2	SKAUGRAN
LAJV4	SKAUBRY
WAUY	ENTERPRISE
October 2003	
KRGB	HORIZON ENTERPRISE
LADB2	SKAUGRAN
WAUY	ENTERPRISE
WMLG	DELAWARE BAY
November 2003	
KGJB	SEA-LAND DEFENDER
KRGB	HORIZON ENTERPRISE
LAJV4	SKAUBRYN
MZBM7	QUEENSLAND STAR
NURO	POLAR SEA
December 2003	
ELZT3	COLUMBUS FLORIDA
KGJB	SEA-LAND DEFENDER
LADB2	SKAUGRAN

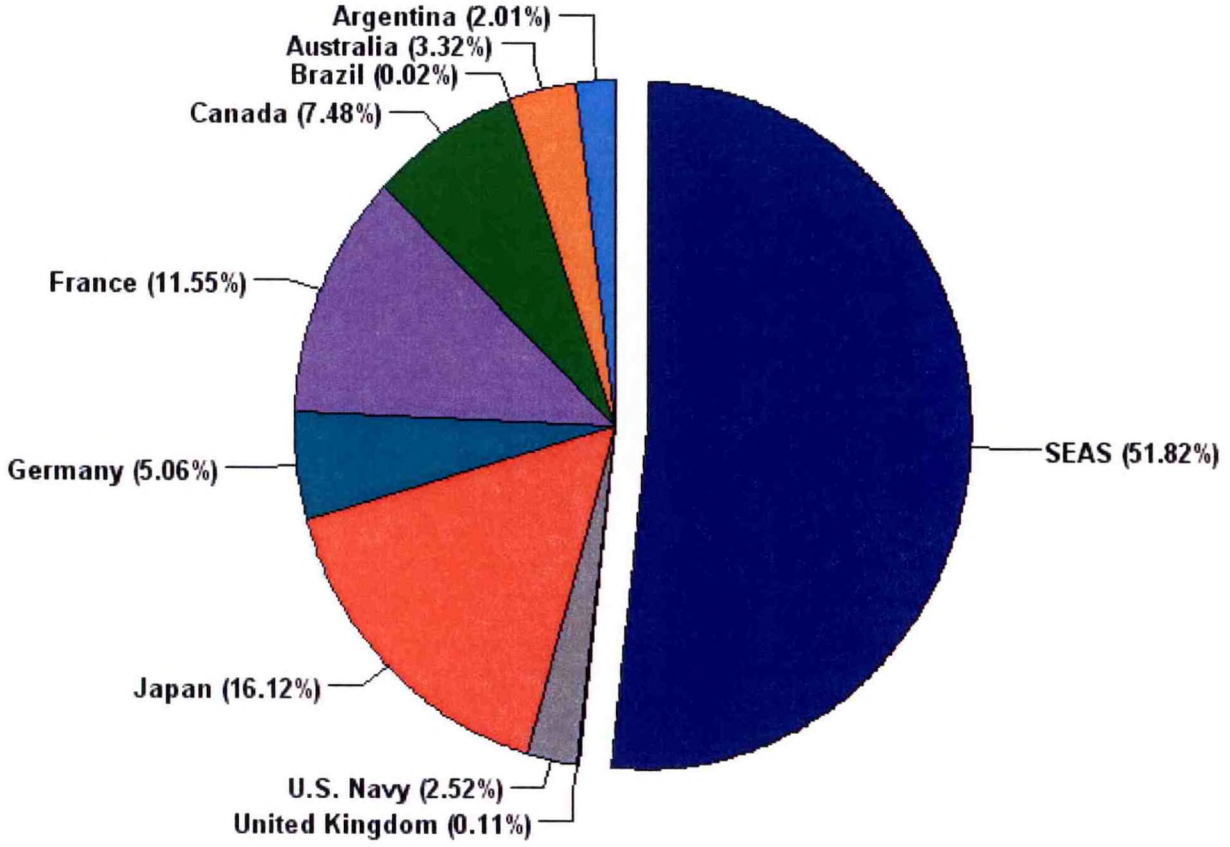
Statistics

Atlantic XBT DAC review of delayed mode data

The XBT Data Assembly Center at AOML is a component of the Global Temperature and Salinity Profile Program (GTSPP) and is responsible for the quality control of delayed mode XBT data from the Atlantic Ocean. The AOML DAC receives delayed mode data from NODC annually. It quality controls the data and returns the edited data to NODC for archiving. Scientific quality control of the delayed mode data has been completed for the years 1990 through 1999. Data collected in 2000 are currently being processed. Data collected from 2001 and 2002 are presently being collated at NODC. Since 1990, the Atlantic XBT DAC has processed and quality controlled over 120,000 observations (see figure below).



GTS XBT Observations
January 1 - December 31, 2003



- Total Observations - 18,285
- BATHY data from moored platforms are excluded.
- Data decoded from GTS msgs by GOOS data tracking decoders.
- All data sources identified by GTS bulletin Header.

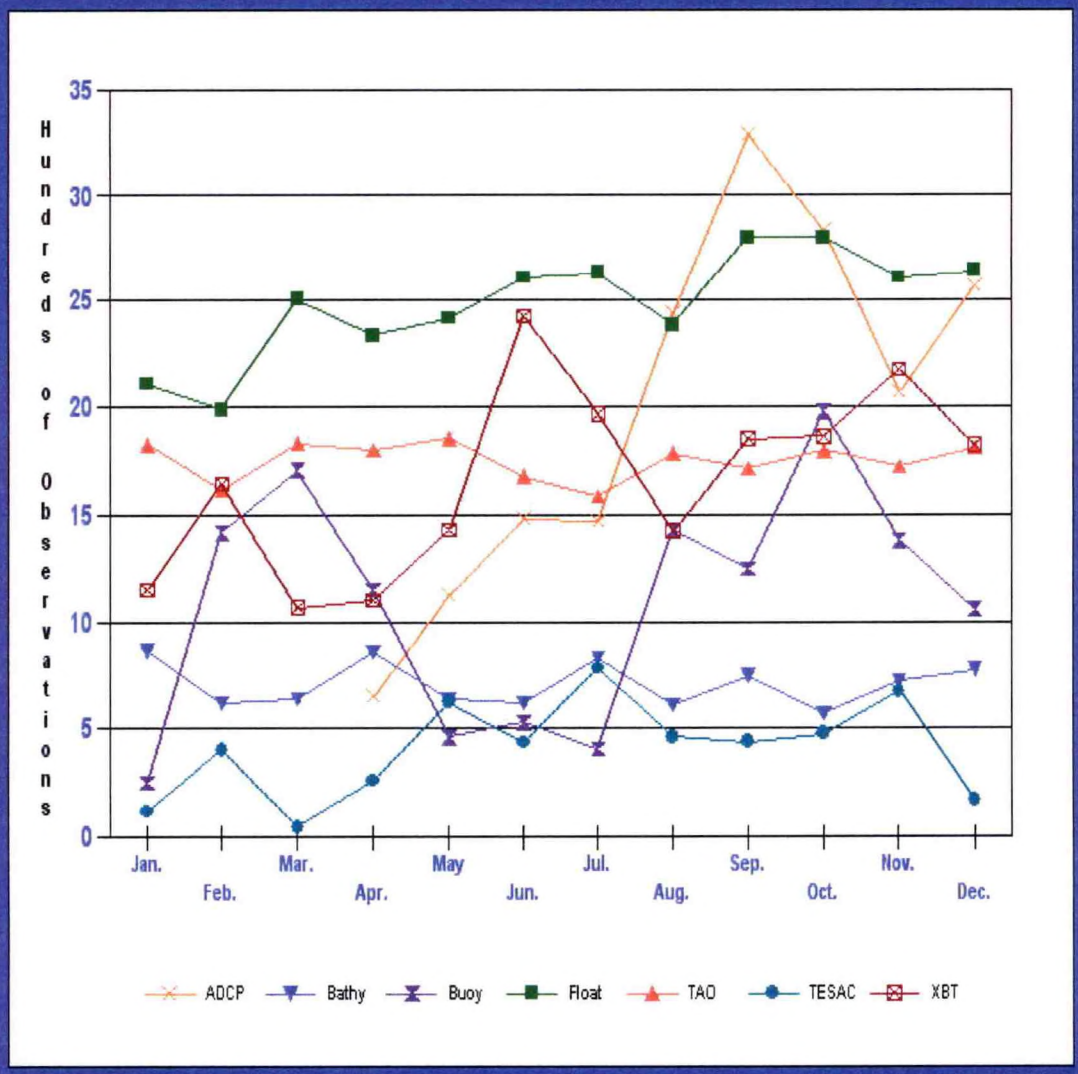
GTS Insertion Points

Buenos Aires, Argentina
Melbourne, Australia
Brasilia, Brazil
Ottawa, Canada
Toulouse, France
Offenbach, Germany
Tokyo, Japan
Bracknell, U.K.
Washington, U.S.A.

For this report, only SEAS is identified as a program. Nations listed represent the GTS insertion point, not necessarily any program associated with those nations.

2003 Summary of Subsurface Data

Data	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Total
ADCP				650	1125	1480	1471	2436	3287	2834	2067	2569	17,919
Bathy	867	618	640	862	633	619	831	608	748	573	726	778	8,503
Buoy	253	1418	1704	1152	462	531	406	1427	1249	1977	1378	1059	13,016
Float	2107	1986	2507	2337	2415	2609	2633	2383	2797	2797	2607	2638	29,816
TAO	1822	1612	1831	1795	1852	1675	1584	1781	1712	1794	1719	1809	20,986
TESAC	116	405	46	262	623	437	782	462	438	478	674	172	4,895
Triton	7682	7293	8148	7747	8111	10630	9124	8229	7784	8214	7944	7524	98,430
XBT	1150	1643	1068	1099	1430	2425	1969	1422	1851	1859	2172	1818	19,906
Total:	13,997	14,975	15,944	15,904	16,651	20,406	18,800	18,748	19,866	20,526	19,287	18,367	213,471



The Global Telecommunications System (GTS) is the source of all marine data displayed on these plots. In order to facilitate the exchange of data, observations are encoded into a set of internationally agreed upon formats. Knowledge of these formats and the operational data collection programs enable database designers to classify incoming records.

The terms BATHY, BUOY, and TESAC refer to the World Meteorological Organization coded formats for data exchange. All of the subsurface data identified in this report originates in one of these formats. TAO and Float program observations are received in BUOY and TESAC format respectively. They are distinguished from other observations arriving in these formats because more is known about the programs supporting those data.

BATHY format is typically associated with XBT observations and is characterized by five digit depth/temperature groups. It is important to recognize that not all BATHY observations are from XBTs. Fixed platforms equipped with thermistors also report in BATHY format. The format has only limited meteorological information associated with it.

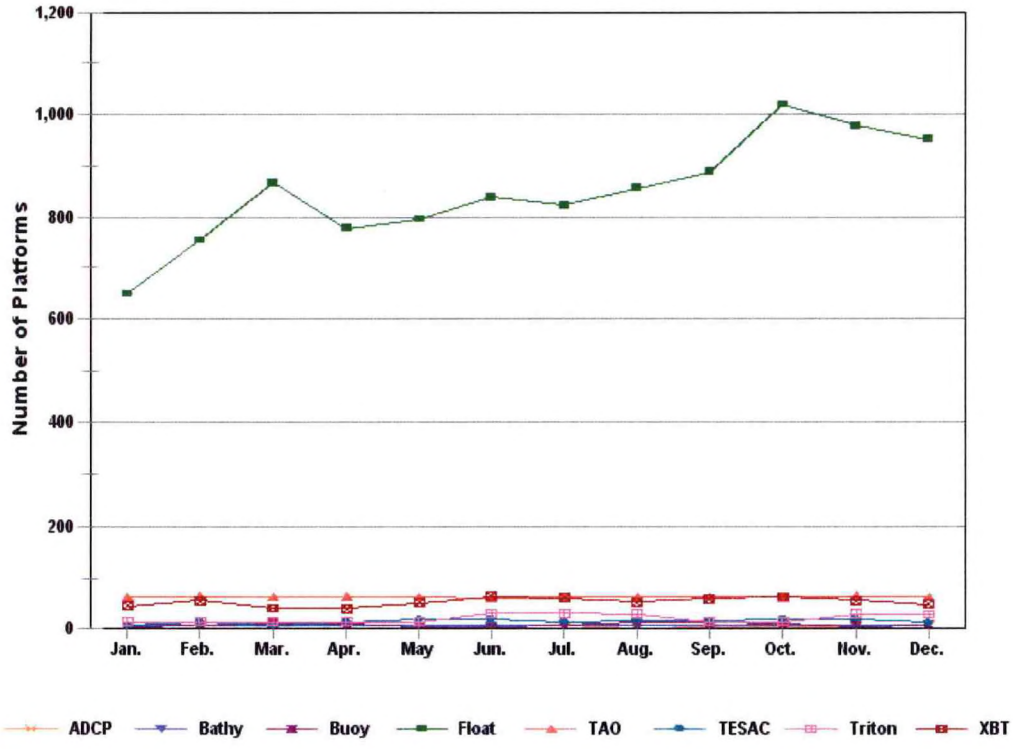
BUOY format is the most comprehensive format decoded. It permits an extensive list of atmospheric variables as well as oceanographic information. The oceanographic variables include depth/temperature/salinity as well as surface temperature and drift. TAO observations are received in BUOY format.

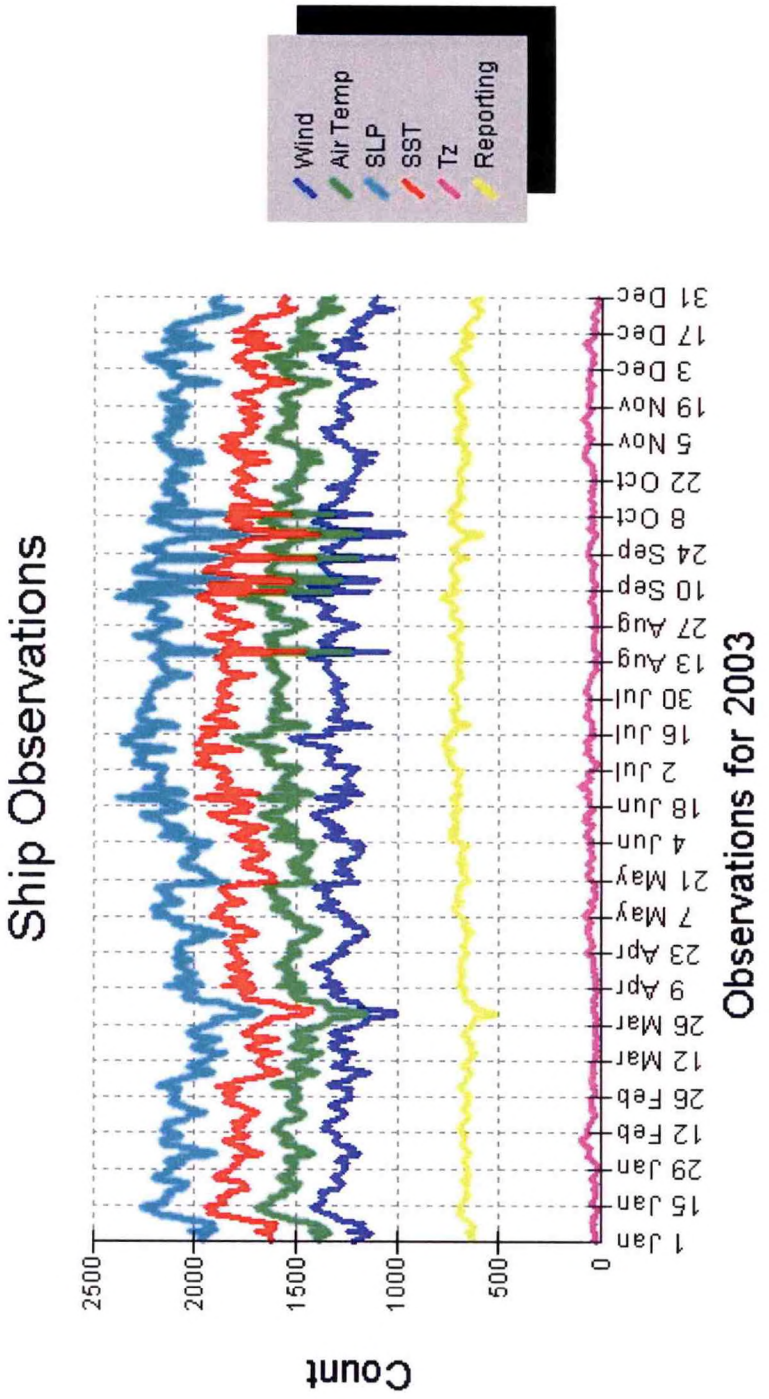
TESAC format is used when any combination of depth/temperature/salinity/current data are available. There is no accommodation for atmospheric information in the code. TESAC observations are associated with CTD's and profiling floats.

2003 Summary of the Number of Platforms Contributing Data

Data	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
ADCP				1	2	4	2	7	5	5	3	7
Bathy	7	6	6	7	7	7	7	6	7	7	8	8
Buoy	5	8	11	9	4	4	6	13	12	10	5	8
Float	647	755	867	778	796	839	823	857	888	1019	977	951
TAO	64	65	64	65	64	62	63	64	64	63	65	64
TESAC	7	15	7	13	19	20	15	16	16	20	20	12
Triton	15	15	15	15	15	31	31	30	15	15	30	29
XBT	46	57	42	41	52	65	62	53	59	64	56	50
Total:	791	921	1012	929	959	1032	1009	1046	1066	1203	1164	1129

Below is a graphical presentation of data shown in the table above.




Ship Observations
Count
2500
2000
1500
1000
500
0
1 Jan
15 Jan
29 Jan
12 Feb
26 Feb
12 Mar
26 Mar
9 Apr
23 Apr
7 May
21 May
4 Jun
18 Jun
2 Jul
16 Jul
30 Jul
13 Aug
27 Aug
10 Sep
24 Sep
8 Oct
22 Oct
5 Nov
19 Nov
3 Dec
17 Dec
31 Dec
Observations for 2003
Wind
Air Temp
SLP
SST
Tz
Reporting

Acronyms List

ADCP	-	Acoustic Doppler Current Profiler
AMVER	-	Automated Mutual assistance Vessel Rescue System
AOML	-	Atlantic Oceanographic and Meteorological Laboratory
ARGO	-	Array for Real-time Geostrophic Oceanography program
AWS	-	Automated Weather System
BATHY	-	Bathythermograph format for data exchange
BUOY	-	Buoy format for data exchange
CO2	-	Carbon Dioxide
CTD	-	Conductivity, Temperature and Depth
DAC	-	Data Assembly Center
DBCP	-	Data Buoy Cooperation Panel
FLOAT	-	Argo subsurface profiling floats
GCOS	-	Global Climate Observing System
GDC	-	Global Drifter Center
GDP	-	Global Drifter Program
GOOS	-	Global Ocean Observations Systems
GTS	-	Global Telecommunications System
GTSPP	-	Global Temperature-Salinity Project
IOC	-	International Oceanographic Commission
IOCCP	-	International Ocean Carbon Coordination Project
IODE	-	International Oceanographic Data and Information Exchange
IRD	-	Institute Research and Development (France)
JCOMM	-	Joint WMO/IOC Technical Commission for Oceanography and Marine Meteorology
JCOMMOPS	-	JCOMM Observing Platform Support center
MEDS	-	Marine Environmental Data Service (Canada)
NCEP	-	National Center for Environmental Prediction
NDBC	-	National Data Buoy Center
NESDIS	-	National Environmental Satellite and Data Information Service
NOAA	-	National Oceanic and Atmospheric Administration
NWS	-	National Weather Service
OAR	-	Office of Oceanography and Atmospheric Research
OGP	-	Office of Global Programs
PCO2	-	Partial Carbon Dioxide
PMEL	-	Pacific Marine Environmental Laboratory
PMO	-	Port Meteorological Officer
SEAS	-	Shipboard Environmental data Acquisition System (Phase I = Met & AMVER, Phase II = XBT, Phase III = AWS & TSG)
SEAS 2000	-	Windows version of SEAS shipboard software
SLP	-	Sea Level Pressure
SOOPIP	-	Ship of Opportunity Implementation Panel
SOOP	-	Ship of Opportunity Program
SOT	-	Ship Observations Team
SST	-	Sea Surface Temperature
SVPB	-	Surface Velocity Program Barometer drifter
SVP	-	Surface Velocity Program drifter
TAO	-	Tropical Atmosphere Ocean array
TESAC	-	Temperature, Salinity, Currents (format for data exchange)
TRACKOB	-	Track Observation (TSG data along a ships route) (format for data exchange)

TRITON	-	Triton moored buoy
TSG	-	Thermosalinograph
T_z	-	Temperature vs. Depth
VOS	-	Voluntary Observing Ship
VOSClim	-	Voluntary Observing Ship Climatology
WMO	-	World Meteorological Organization
WOCE	-	World Ocean Circulation Experiment
XBT	-	Expendable Bathythermograph