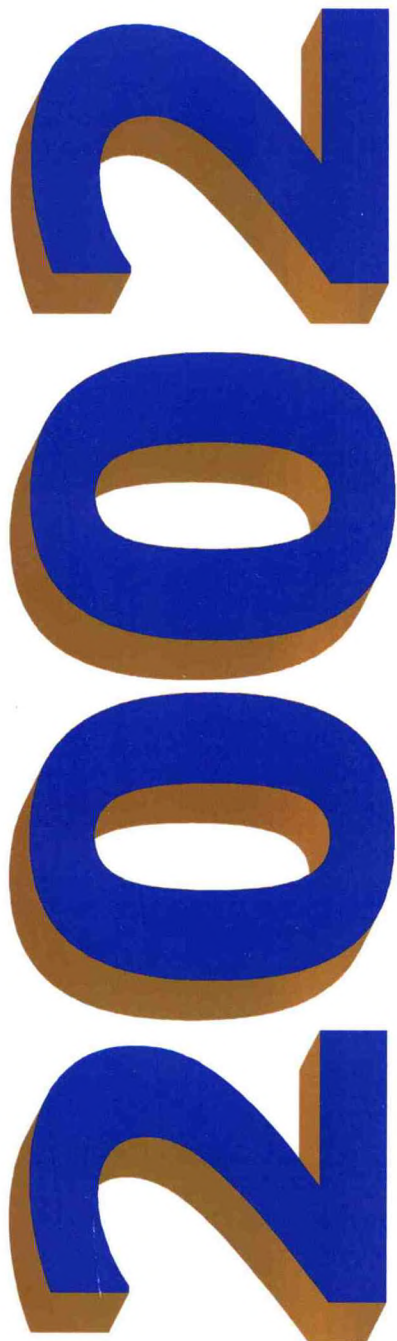


**GLOBAL OCEAN
OBSERVING SYSTEM
(GOOS)
CENTER**

2002 ANNUAL REPORT





**The
Global
Ocean
Observing
System
(GOOS)
Center**

***Annual Report
January through December 2002***

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Executive Summary

Steven K. Cook
GOOS Center Manager
NOAA/AOML

The GOOS Center manages and operates NOAA's Global Drifter, Expendable-Bathythermograph and SEAS Meteorological Programs; migrates long term monitoring projects into operations when appropriate, provides timely, high quality and cost effective oceanographic data and products for NOAA now cast, forecast, detection, attribution and research mission requirements; and represents NOAA on international committees.

During the calendar year 2002 the GOOS Center Global Drifter Program deployed 378 Drifting Buoys; 181 in the Pacific Ocean, 79 in the Atlantic Ocean, 40 in the Indian Ocean and 78 in the southern Oceans. At the end of 2002 the global array totaled 730 Drifters reporting approximately 2500 sea surface temperatures daily. The Upper Ocean Thermal Center SEAS Program globally collected more than 120,000 sea surface meteorological and 9,000 Expendable Bathythermograph (XBT) observations from approximately 350 participating Voluntary Observing Ships (VOS). The GOOS Center XBT observations represented more than 38% of the total inserted by all groups onto the Global Telecommunications System. There were 34 successful deployments of ARGO Floats in the Atlantic Ocean conducted from Voluntary Observing Ships and NOAA research vessels. GOOS Center real-time data tracking activities of subsurface observations monitored more than 168,890 observations consisting of Bathy, Buoy, Float, TAO, Triton and TESAC data.

The Data Assembly Center of the Global Drifter Program 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 1998 and consists of approximately 110,000 observations.

The GOOS Center was able to continue limited XBT support and the upgrade of 20 Drifters with barometer capability for our international colleagues. 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 Phase III by integrating Automated Weather Systems and Thermosalinograph capabilities into operations. The GOOS Center continues to struggle with the recruiting of VOS for both the Low and High Density XBT sampling in the Atlantic and Indian Oceans. The volatile shipping industry, increased price of expendables and lack of infrastructure support in the Indian Ocean region continues to cause serious logistical problems for that area.

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.

Major GOOS Center Operations

Voluntary Observing Ship (VOS) Program

The Global Ocean Observing System (GOOS) Center at NOAA's Atlantic Oceanographic and Meteorological Laboratory presently co-manages, with NWS, a global VOS fleet of about 400 domestic and foreign commercial vessels. The GOOS global fleet represents a subset of the larger National Weather Service Voluntary Observing Ship (VOS) fleet consisting of over 1000 vessels. These vessels voluntarily collect sea surface meteorological observations. A portion of this fleet also collects sub-surface expendable bathythermograph, and shipboard thermosalinograph observations, deploys Drifting Buoys and highly instrumented profiling type floats and sometimes tows Continuous Plankton Recorders. The GOOS global VOS fleet is the mechanism used to collect observations and deploy instrumentation that transmit, in real-time, data to National Operational Centers such as the National Center for Environmental Prediction (NCEP). In any given year this network provides the following approximate number of observations:

- 1,000,000 Sea Surface Temperature Observations from Drifting Buoys
- 110,000 Meteorological Observations from VOS
- 30,000 Thermosalinograph Observations from VOS
- 10,000 Expendable Bathythermograph Observations from VOS

Global Drifter Program (GDP)

The GOOS Center presently operates in cooperation with the Scripps Institution of Oceanography a global Drifting Buoy Center that annually deploys, via the VOS Program, 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 are forwarded to the DAC where the observations are quality controlled. This effort insures that research quality Drifter data are available from other organizations and countries programs. The DAC is a participating member of the Intergovernmental Oceanographic Commission (IOC) - World Meteorological Organization (WMO), Data Buoy Co-operation Panel (DBCP) and as such represents NOAA in this international forum.

Expendable Bathythermograph (XBT) Program

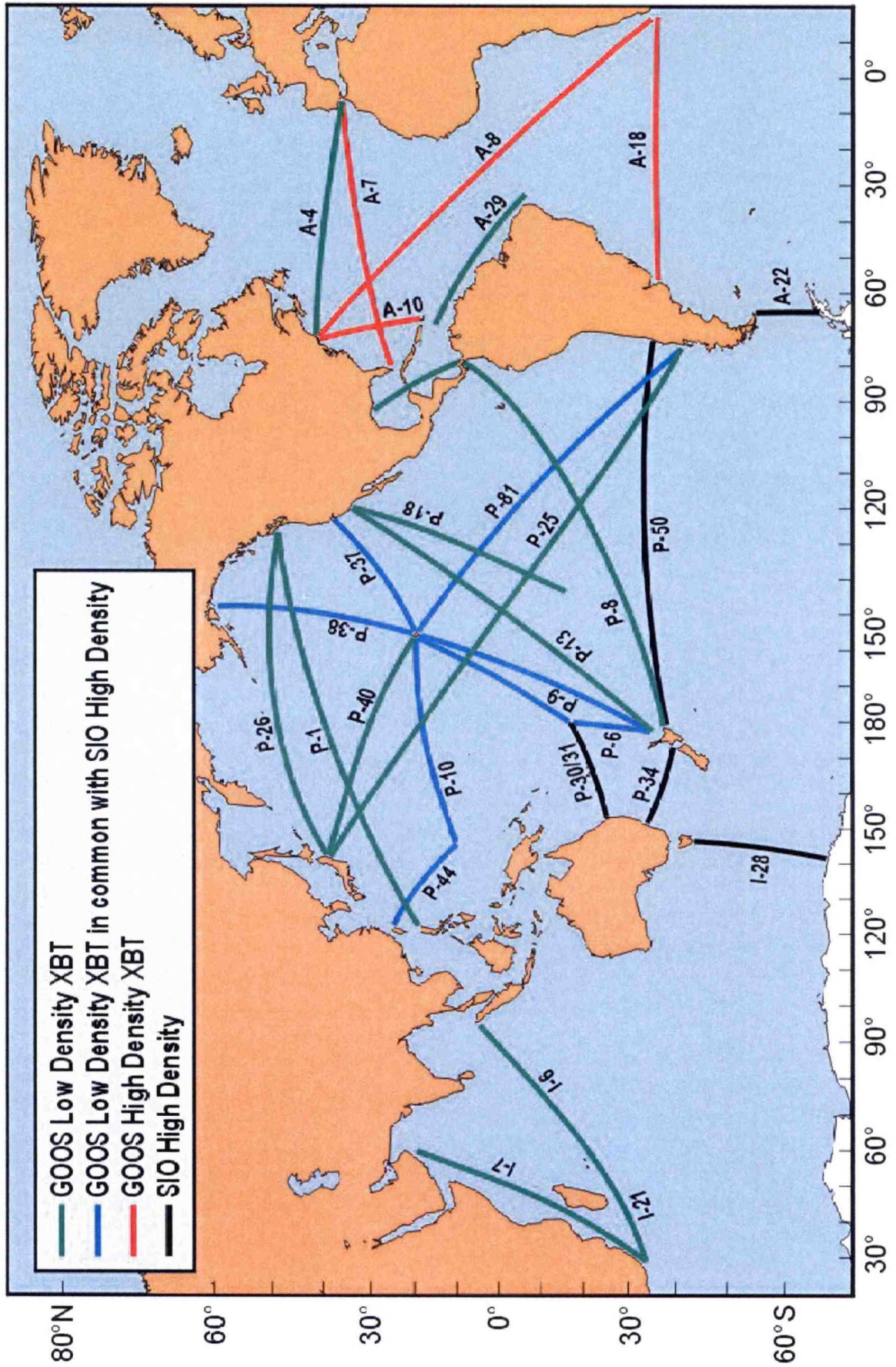
The GOOS Center operates a global XBT Program that utilizes approximately 40 VOS to monitor, on an approximately monthly basis, 22 transects in all three ocean basins. The XBT program is coordinated internationally by the IOC - WMO, Ship of Opportunity Program Implementation Panel (SOOPIP), and Ship 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 22 transects shown in Figure 1 to operate in high (eddy resolving, seasonal resolution) low (4 probes per day, monthly resolution) and frequently sampled (4 probes per day, 18 transects per year) mode.

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 110,000 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 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.

Argo Program

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. This methodology 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 will be 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.

Figure 1. Principle GOOS XBT Routes during 2002



to meet these requirements. The real-time portion of the data management methodology is now operational.

High Density XBT

AOML presently operates a research and development High Density XBT Program utilizing VOS. Three routes: 1) Mediterranean Sea to Miami, FL (A7, Figure 1); 2) New York, NY to San Juan, Puerto Rico (A10, Figure 1); and 3) Cape Town, South Africa to New York City, New York (A8, Figure 1) are sampled four times per year by placing ship riders on board to collect XBT temperature data. 50 km observations are collected at closely spaced intervals. To enable the ship riders to conduct their operations continuously for the duration of a cruise, engineers at AOML designed an XBT Autolauncher which allows the XBT probes to be launched automatically at preset times and/or positions. In addition to allowing around the clock operations, by deploying XBT probes off the fan tail we reduce potential XBT probe failures. 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 gyre and tropical Atlantic. This effort will improve our ability to predict important climatic fluctuations such as the North Atlantic Oscillation. 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.

Future Plans

Data Sparse Areas:

The GOOS Center is working closely with the Naval Oceanographic Office planning air deployments of Drifting Buoys into those traditionally difficult areas to service with VOS. The Gulf of Guinea, mid Indian Ocean, western south Atlantic and eastern south Pacific are areas we are focusing on to increase deployments. We have increased our efforts to work with the South African Weather Service, the U.K. Met Office, the Australian Bureau of Meteorology and the Argentina Hydrographic Office to locate VOS that consistently operate in those data sparse regions.

The GOOS Center is concentrating on improving the XBT sampling both within the Low and High Density networks by integrating hardware and logistical requirements. As SEAS 2000 Phase II software is implemented within the VOS fleet we expect an increase in the quality and quantity of real-time temperature observations. Enhancements to the database have lead to improvements in the production of real-time and delayed mode monitoring products that will assist in identifying under sampling problems in a timely fashion.

Data Availability and Web Products

Websites for obtaining GOOS data and information:

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>

ACKNOWLEDGEMENTS

The 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

Funding Sources:

ENSO Observing Network – Office of Global Programs

Tropical Atlantic Drifter Array – Office of Global Programs

South Atlantic Drifter and XBT Array – Office of Global Program

SEAS 2000 Development – NESDIS (two years)

SEAS Support – U.S. Coast Guard and NWS

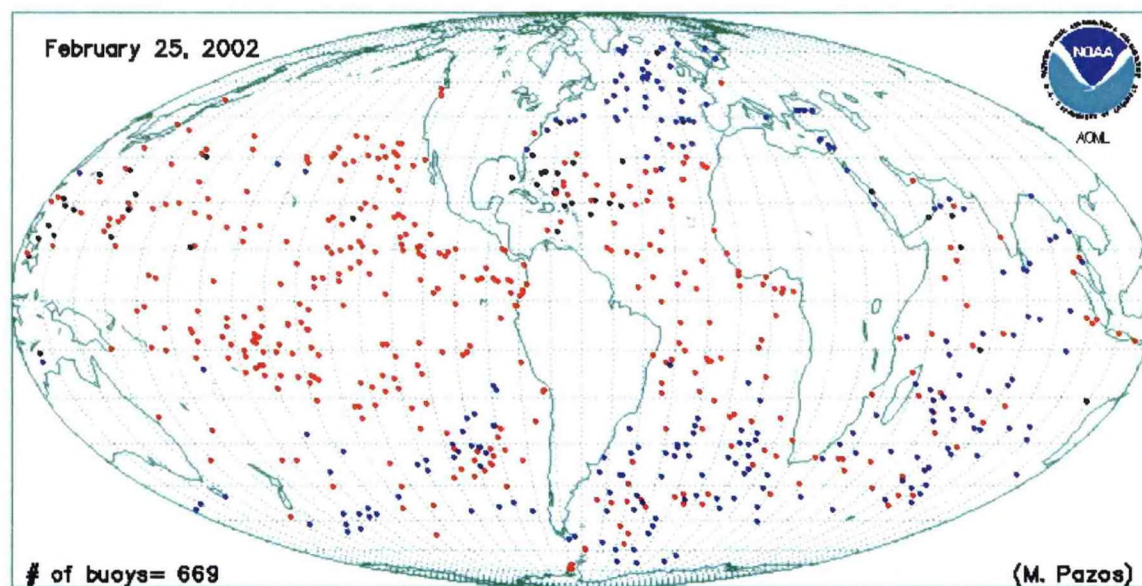
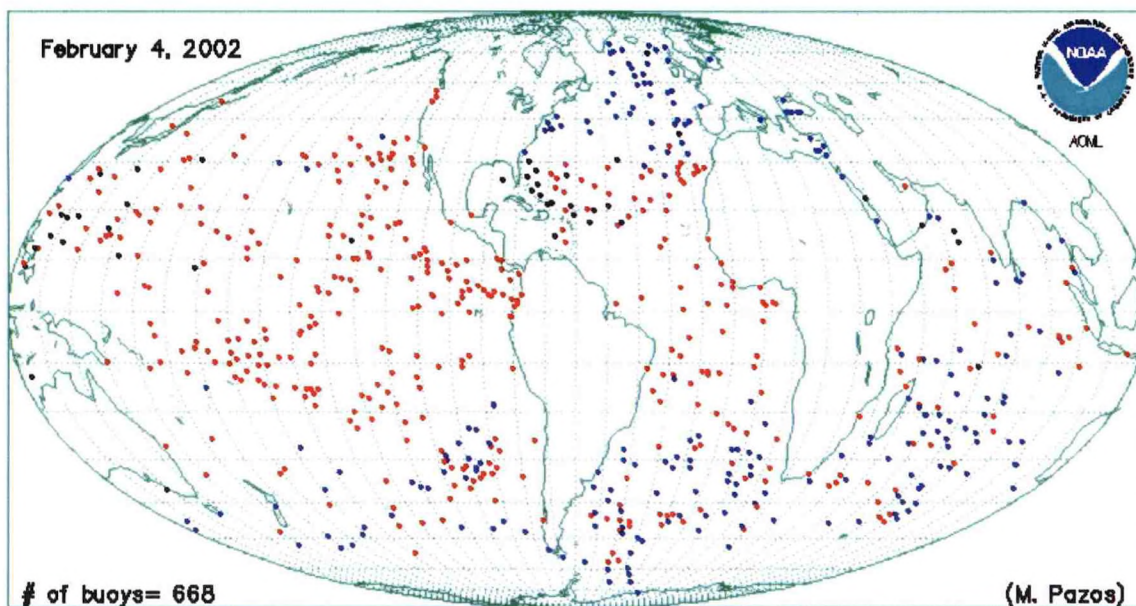
ARGO Float Deployments – National Ocean Partnership Program

PhOD Base – OAR/AOML

GOOS Center Products

Status of Global Drifter Arrays during 2002

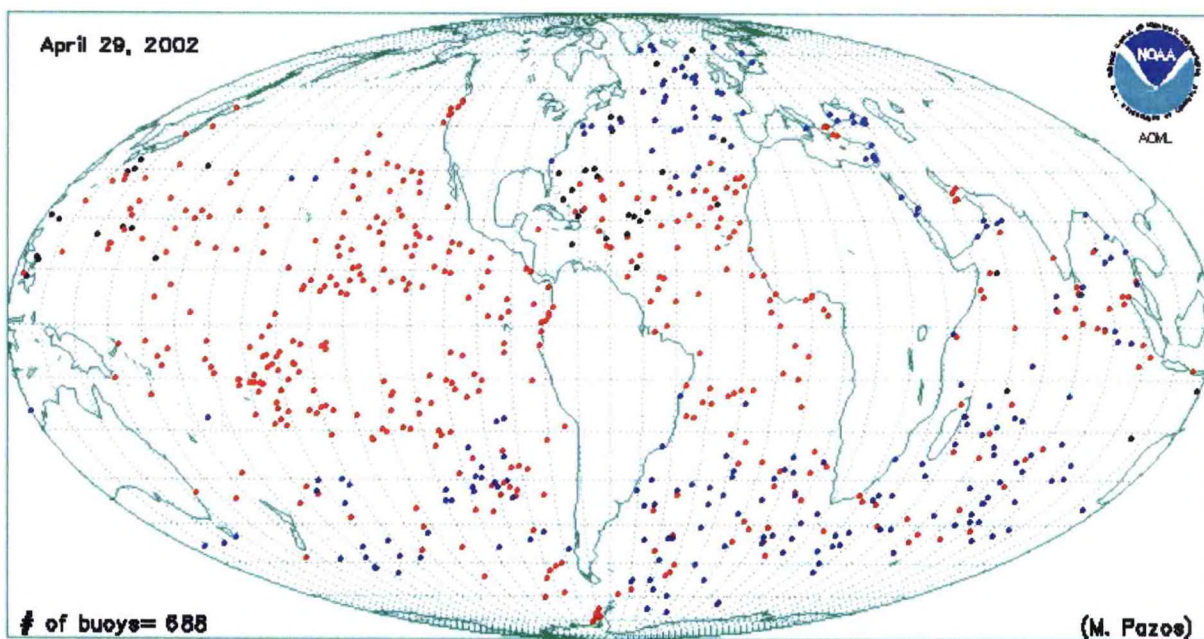
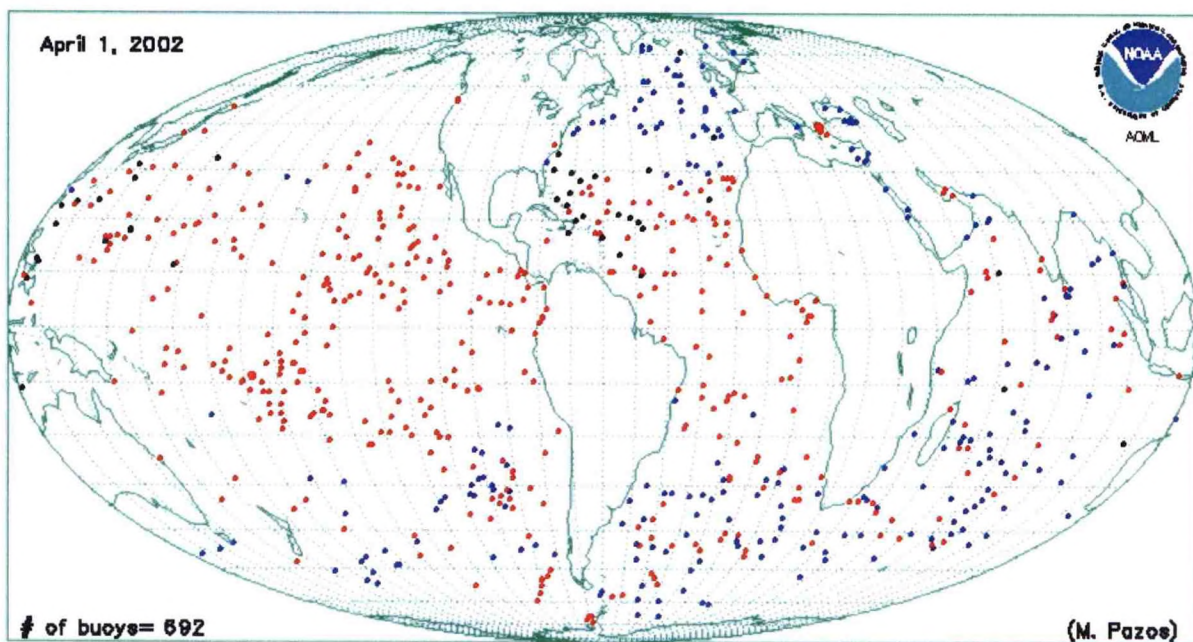
The number in the lower left corner of the plot indicates the number of drifters that were in the water as of the date listed in the upper left corner.



- SST ONLY
- SST/SLP
- SST/SLP/WIND

GLOBAL DRIFTER PROGRAM

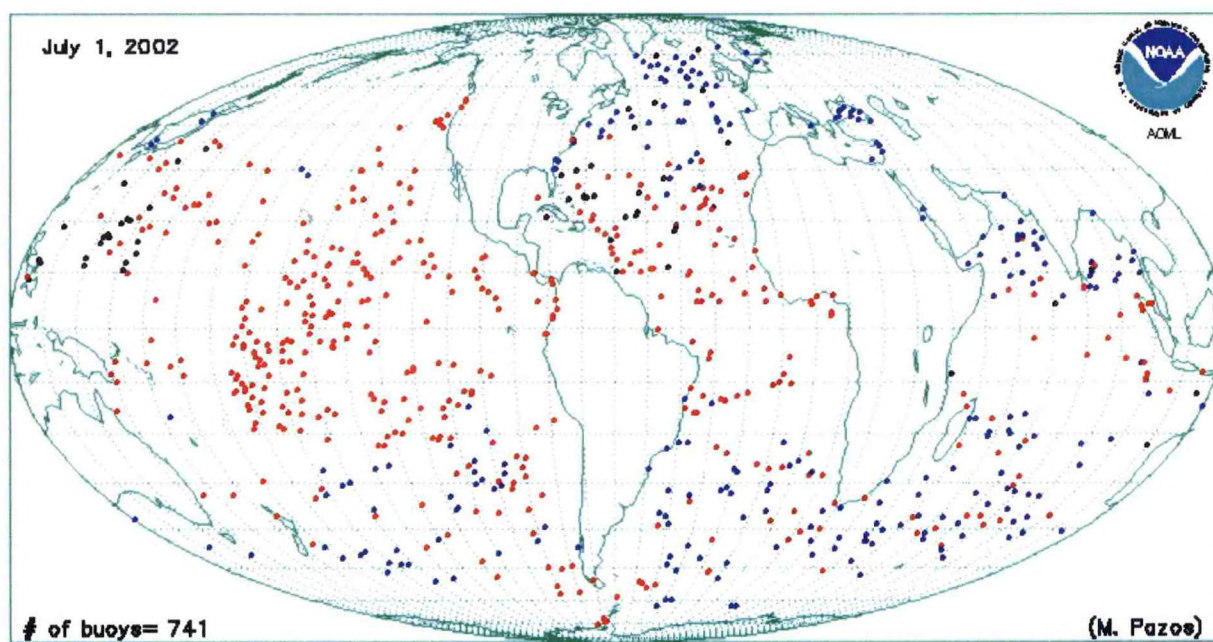
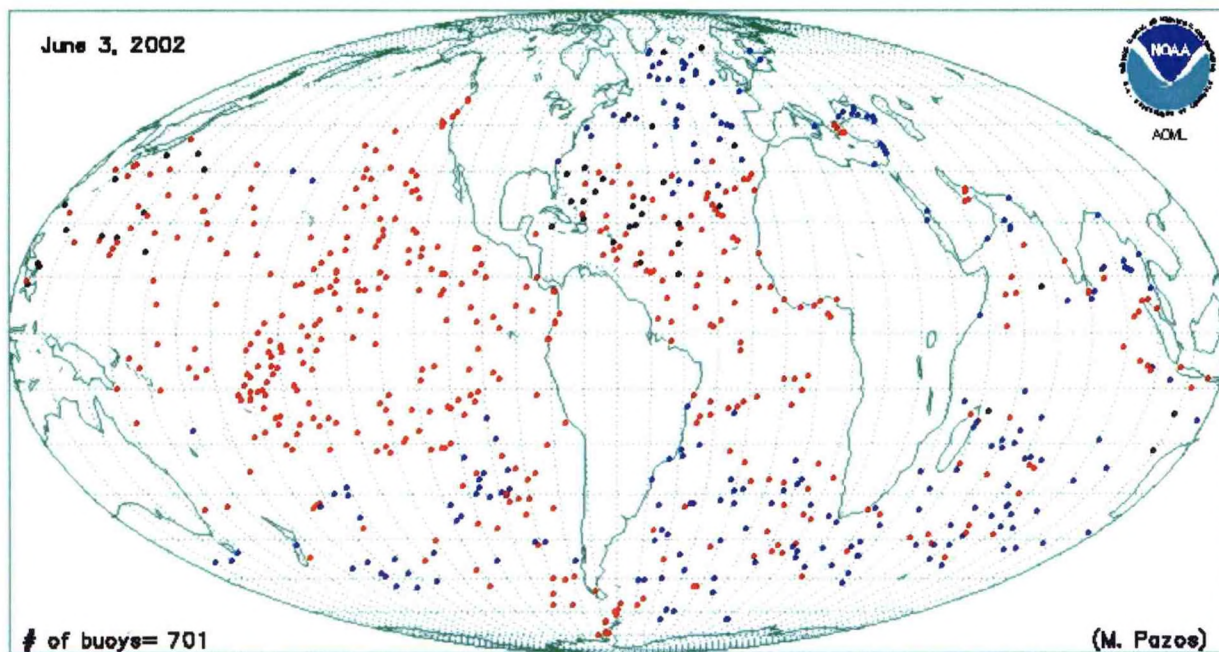
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- SST ONLY
- SST/SLP
- SST/SLP/WIND

GLOBAL DRIFTER PROGRAM

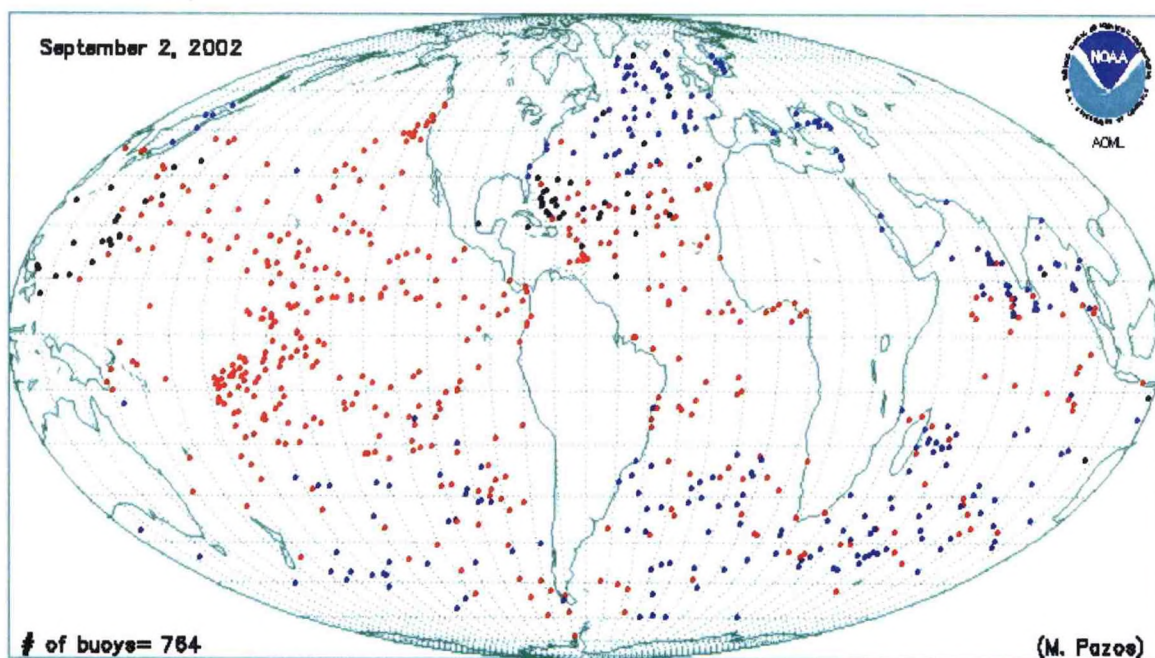
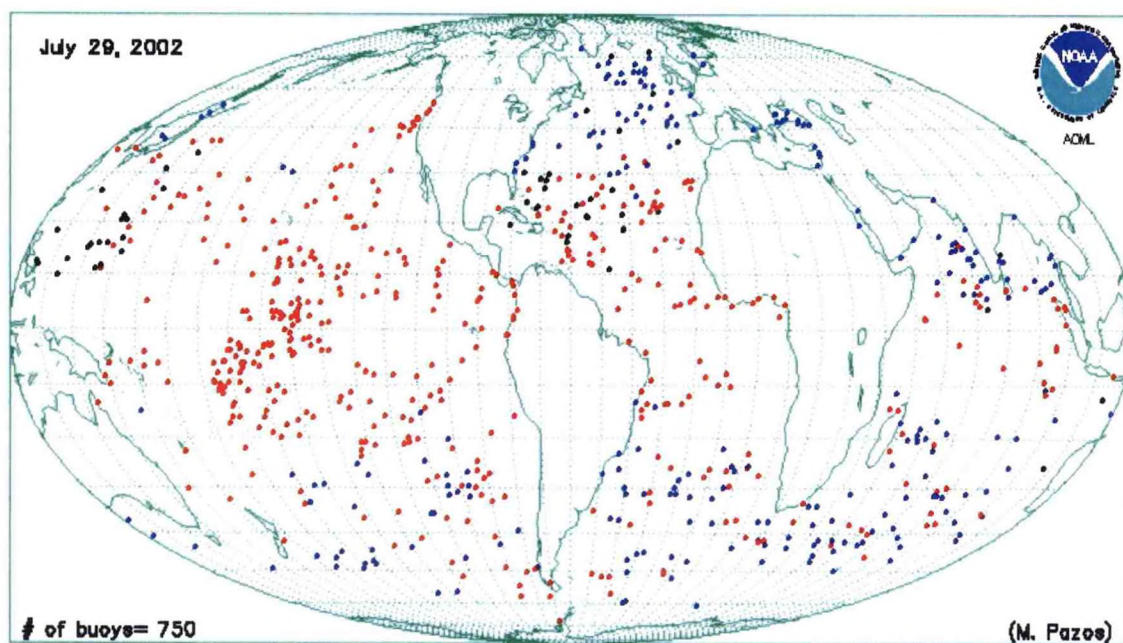
Status of Global Drifter Arrays (cont'd)



- SST ONLY
- SST/SLP
- SST/SLP/WIND

GLOBAL DRIFTER PROGRAM

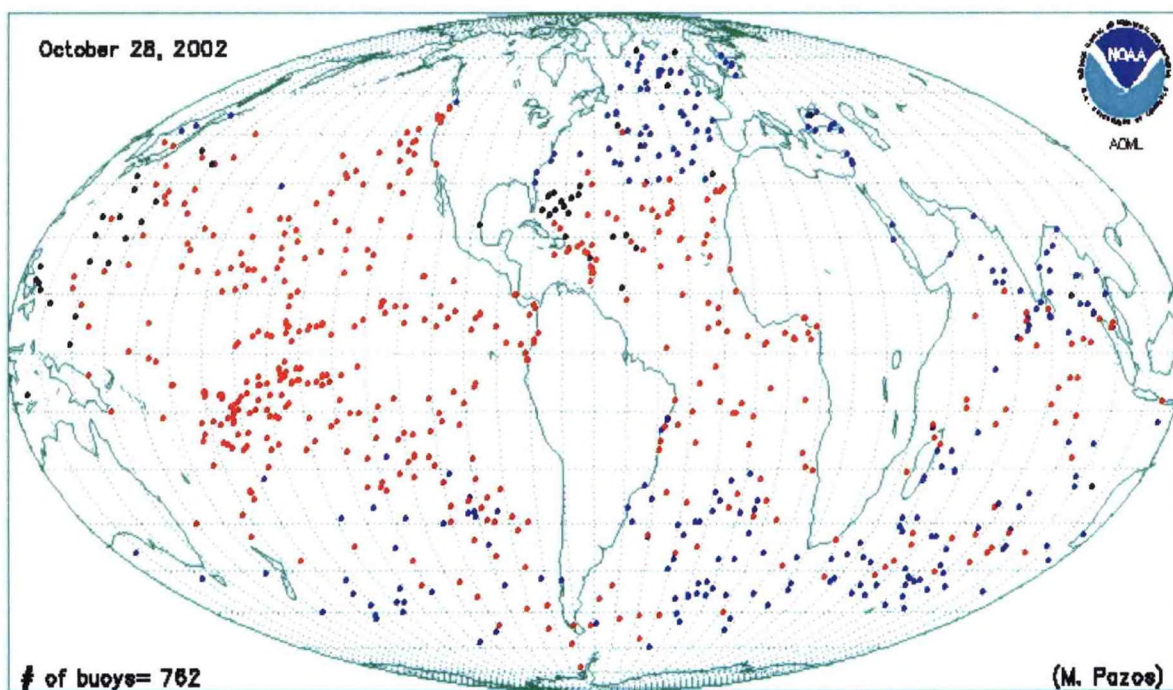
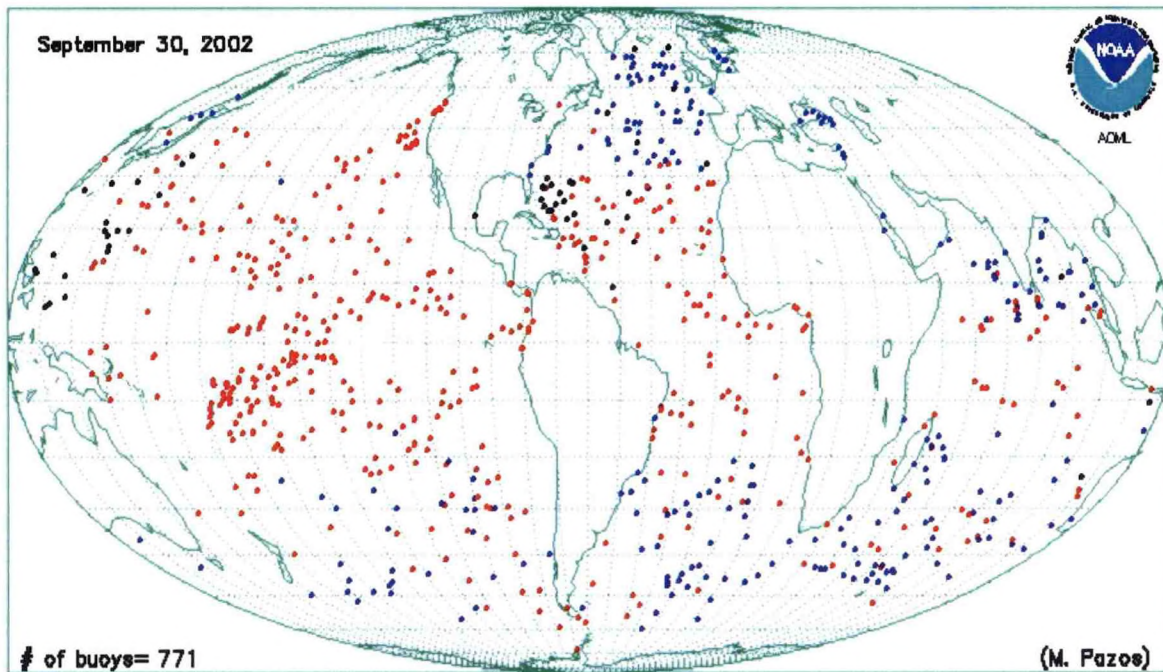
Status of Global Drifter Arrays (cont'd)



- SST ONLY
- SST/SLP
- SST/SLP/WIND

GLOBAL DRIFTER PROGRAM

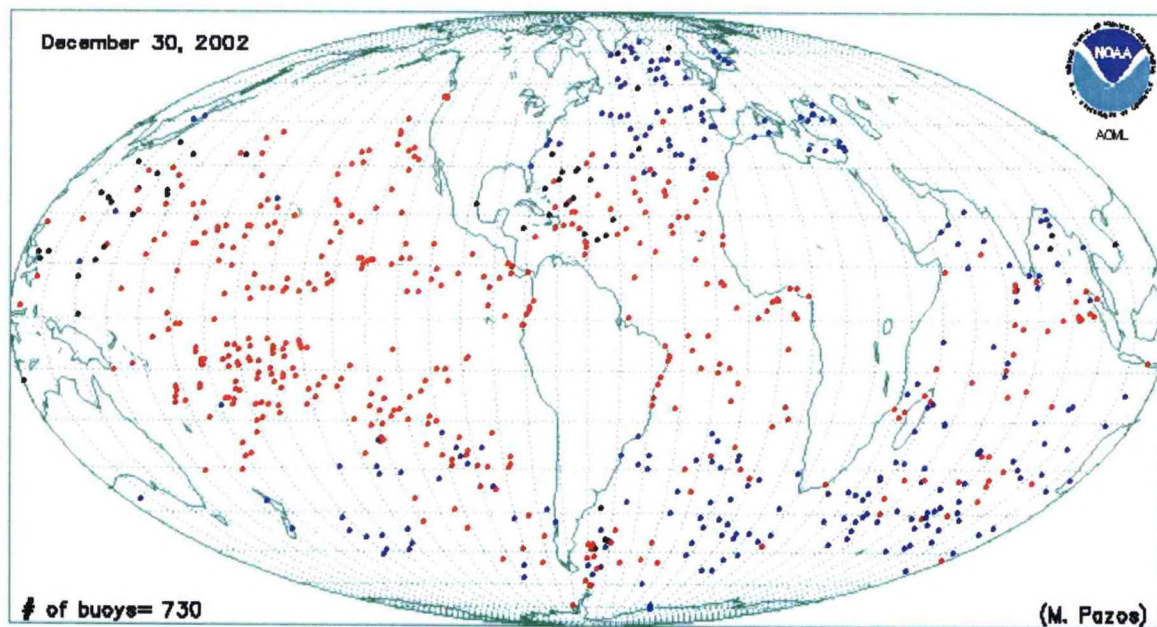
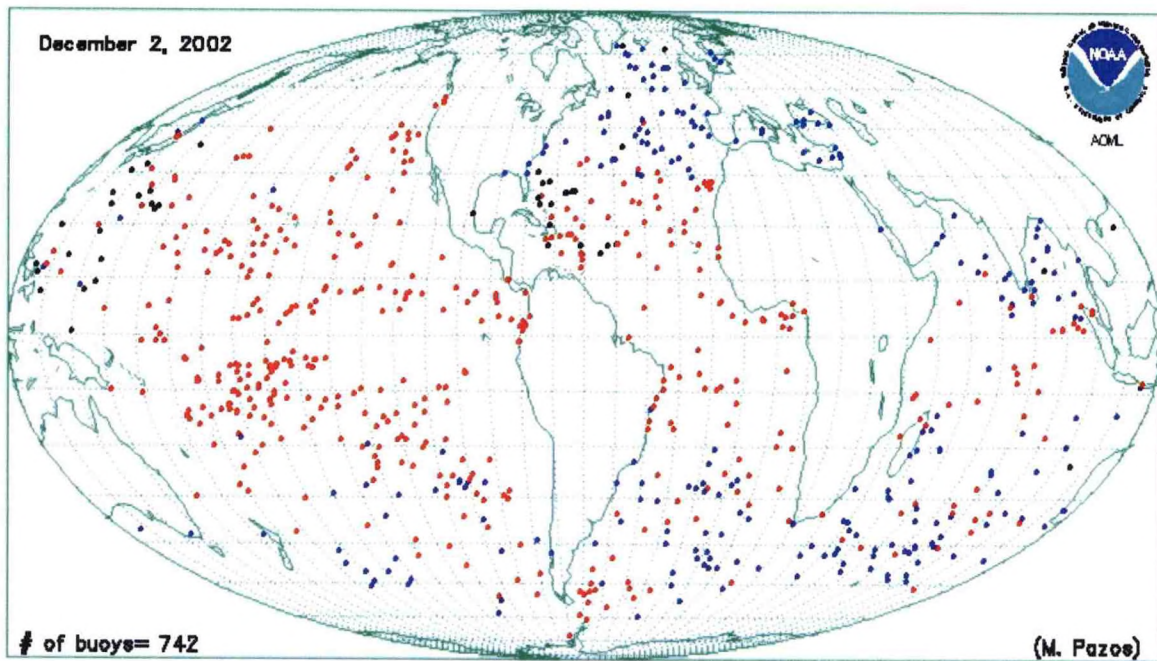
Status of Global Drifter Arrays (cont'd)



- 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 2002 through September 2003

TROPICAL OCEANS (20N - 20S)

Number of Drifters

- Tropical Pacific 200 (100 CORC¹)
- Tropical Atlantic 79
- Tropical Indian 54 (10 SVP² Meteo-France)

EXTRA-TROPICAL OCEANS (20S - 40S)

Number of Drifters

- Pacific 40
- Atlantic 14
- Indian 12

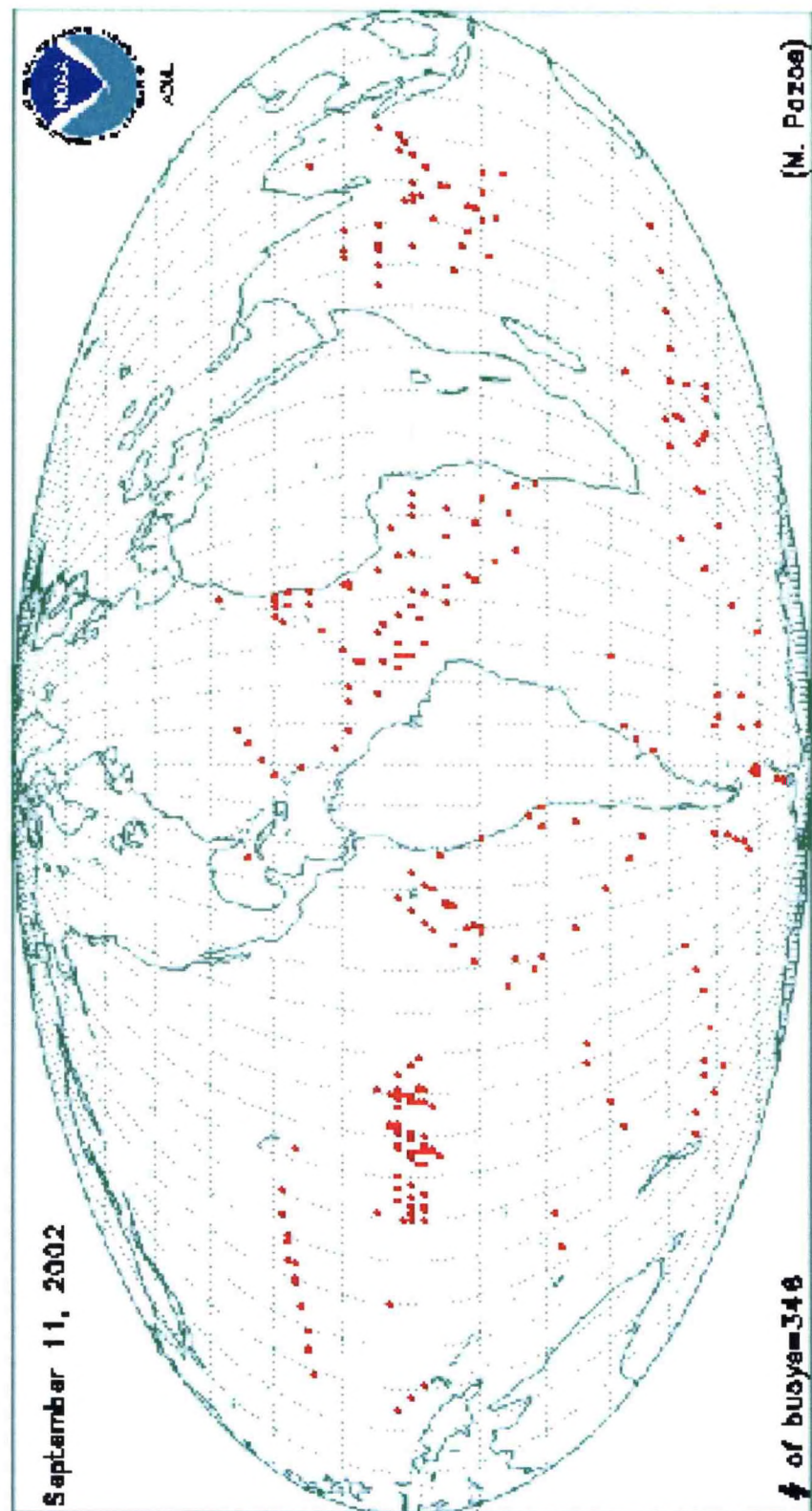
SOUTHERN OCEANS (40S - 60 S)

Number of Drifters

- Pacific 26 (20 SVP-B³ NOAA/SIO⁴, 6 SVP-B, MSNZ⁵)
- Atlantic 30 (10 SVP-B NOAA/SIO, 20 SVP-B SAWS⁶)
- Indian 21 (6 SVP-B NOAA/SIO, 10 SVP-B ABOM⁷,
5 SVP-B Meteo-France)

- ¹CORC Consortium of Ocean Research in Climate
²SVP Standard Surface Velocity Program drifter
³SVP-B Standard Surface Velocity Program drifter with Barometer upgrade
⁴SIO Scripps Institution of Oceanography
⁵MSNZ Meteorological Service of New Zealand
⁶SAWS South African Weather Service
⁷ABOM Australia Bureau of Meteorology

Deployments by Global Drifter Center in Fiscal Year 2002

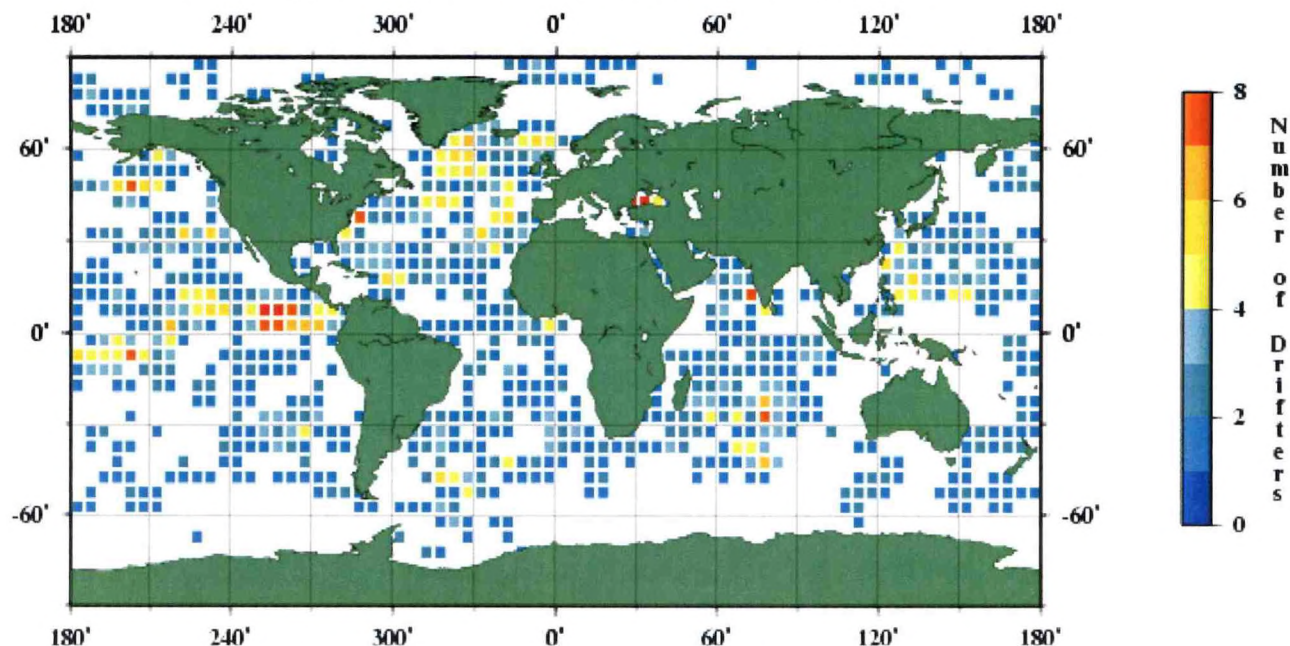


DRIFTER DATA ASSEMBLY CENTER

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 2002. 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.

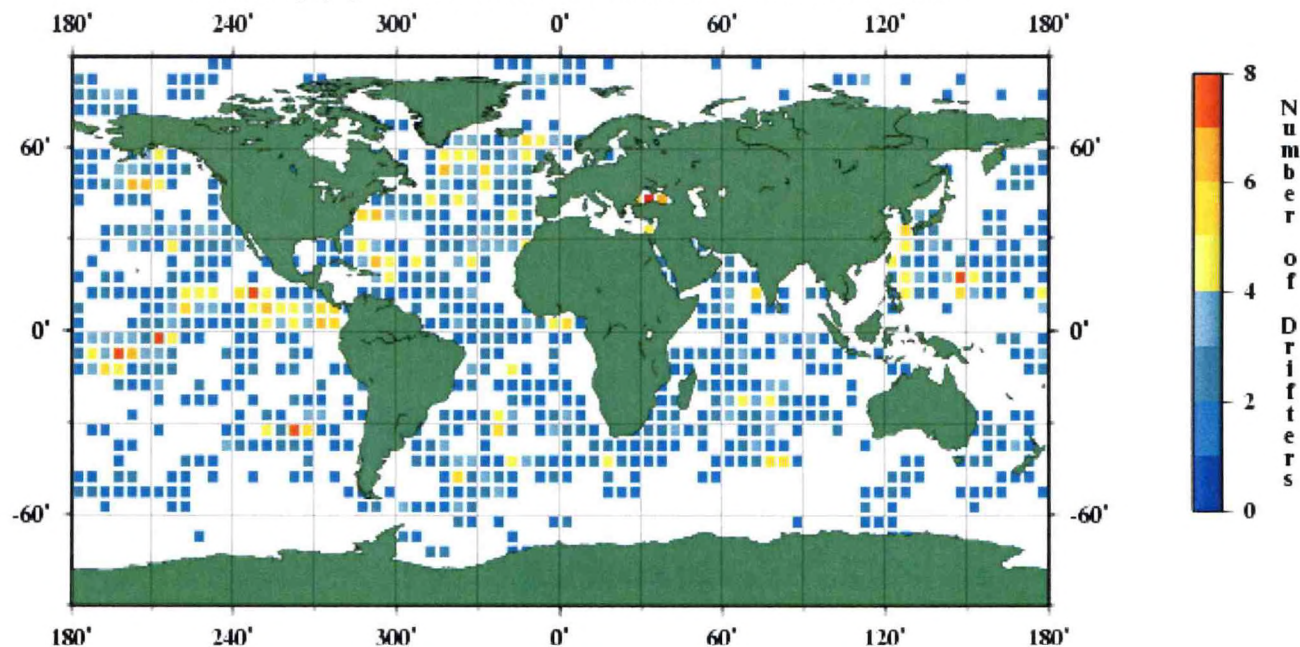
January 2002

Availability (%) of drifter data at $5^{\circ} \times 5^{\circ}$ boxes between 60N-60S = 76%



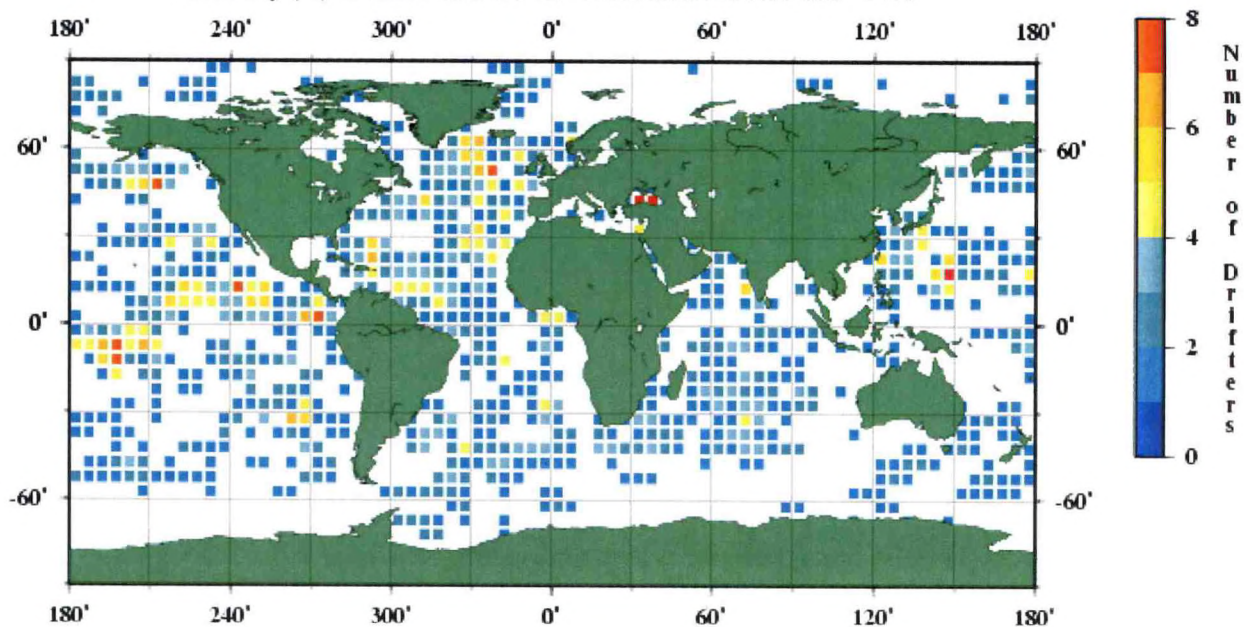
February 2002

Availability (%) of drifter data at $5^{\circ} \times 5^{\circ}$ boxes between 60N-60S = 73%



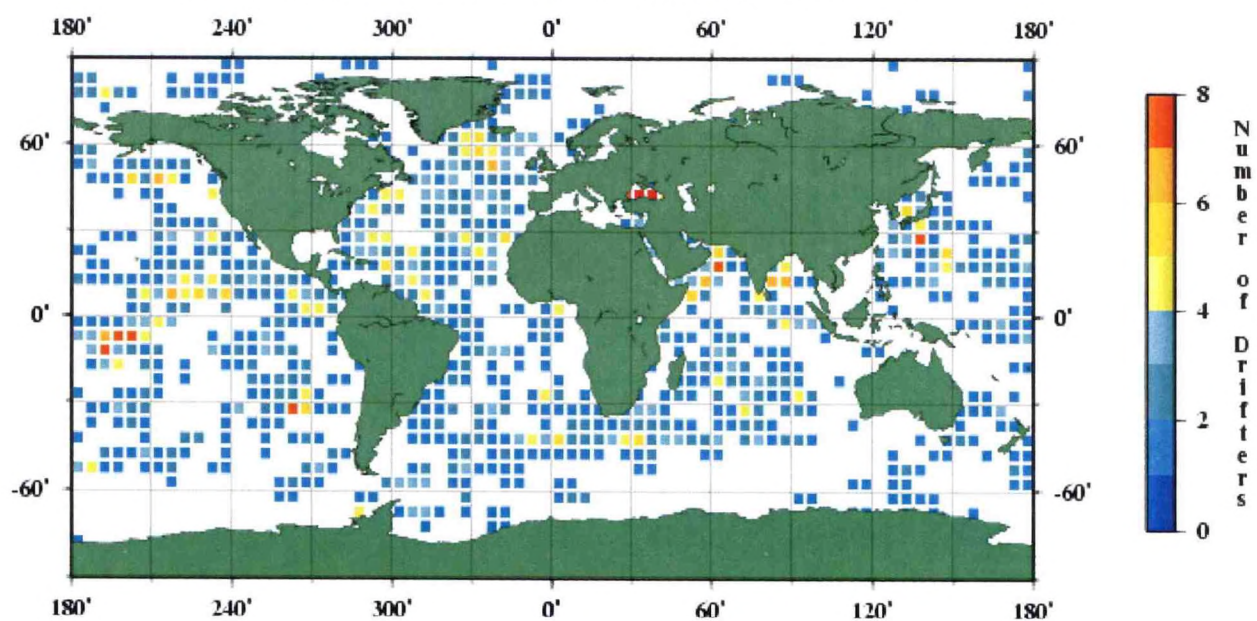
March 2002

Availability (%) of drifter data at $5^{\circ} \times 5^{\circ}$ boxes between 60N-60S = 74%

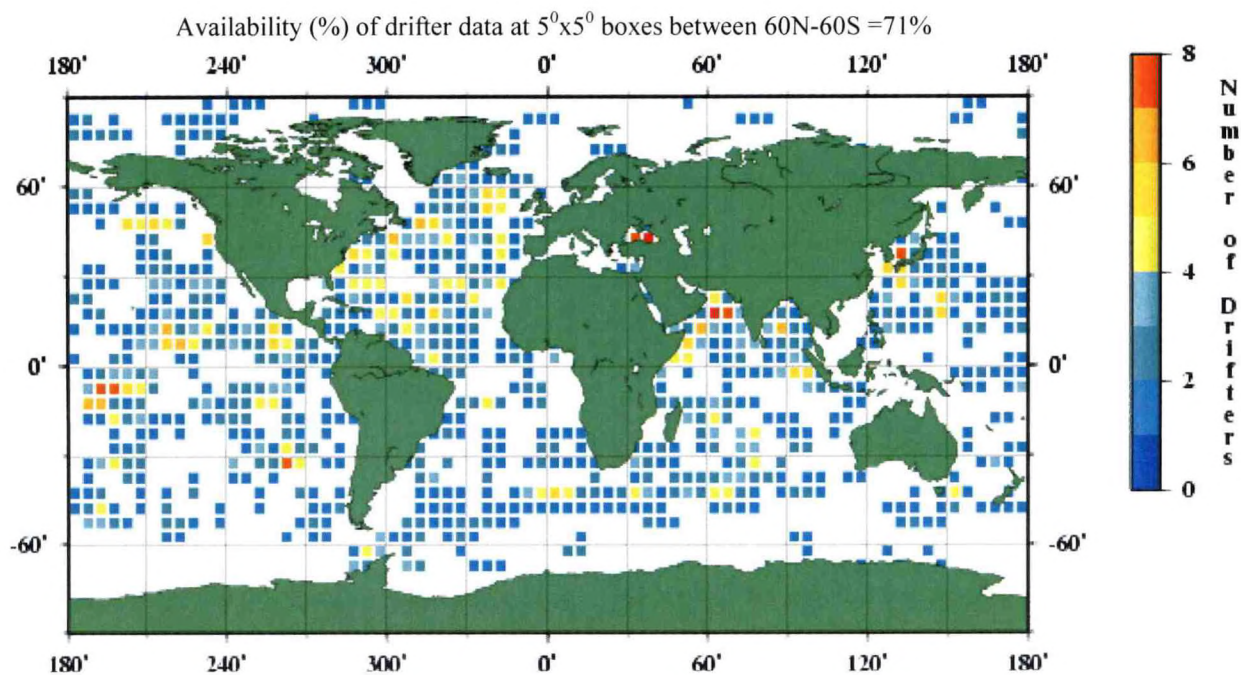


April 2002

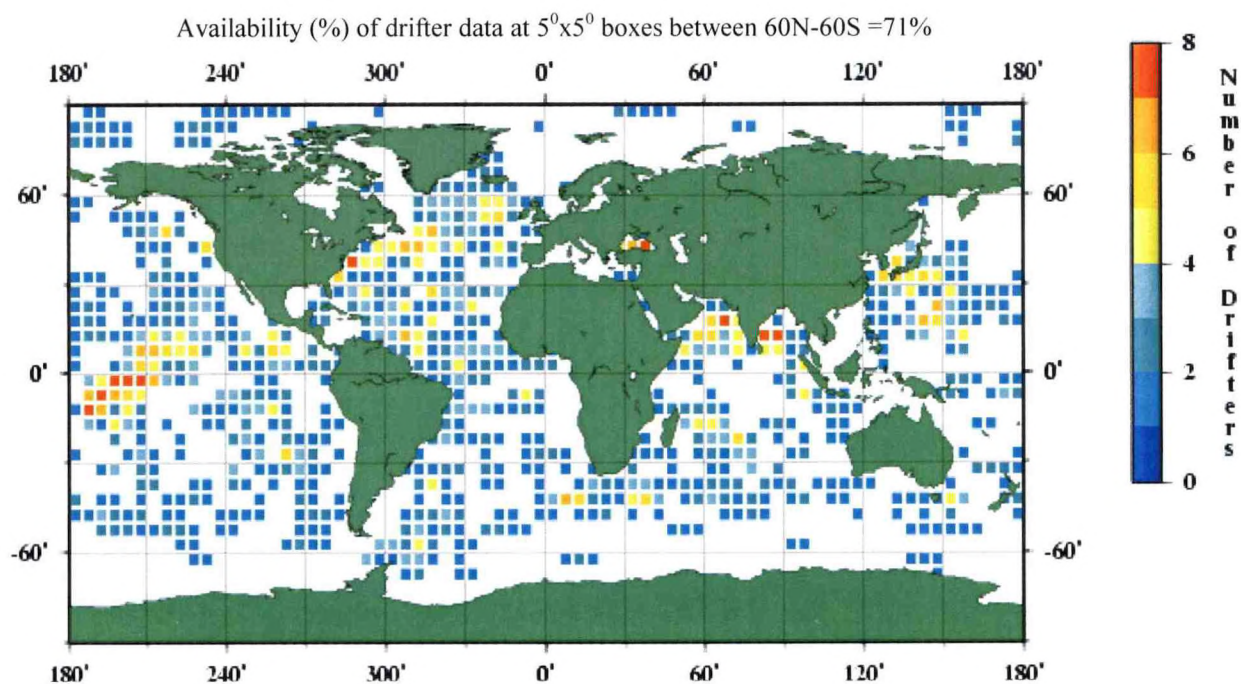
Availability (%) of drifter data at $5^{\circ} \times 5^{\circ}$ boxes between 60N-60S = 74%



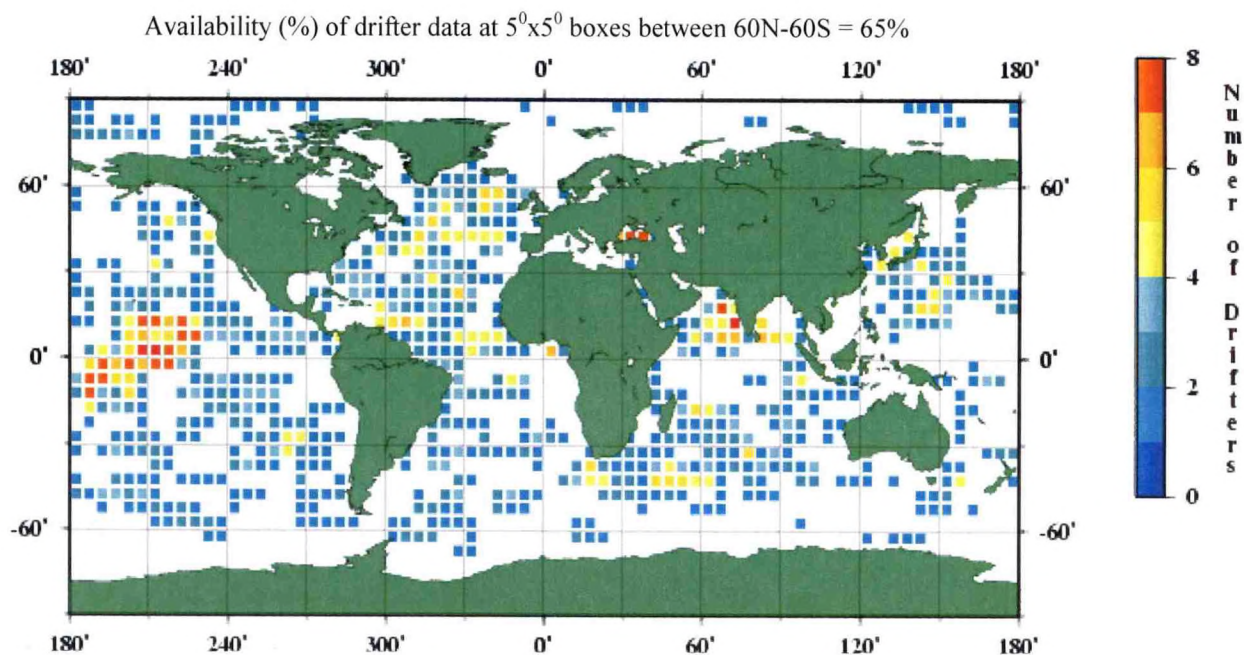
May 2002



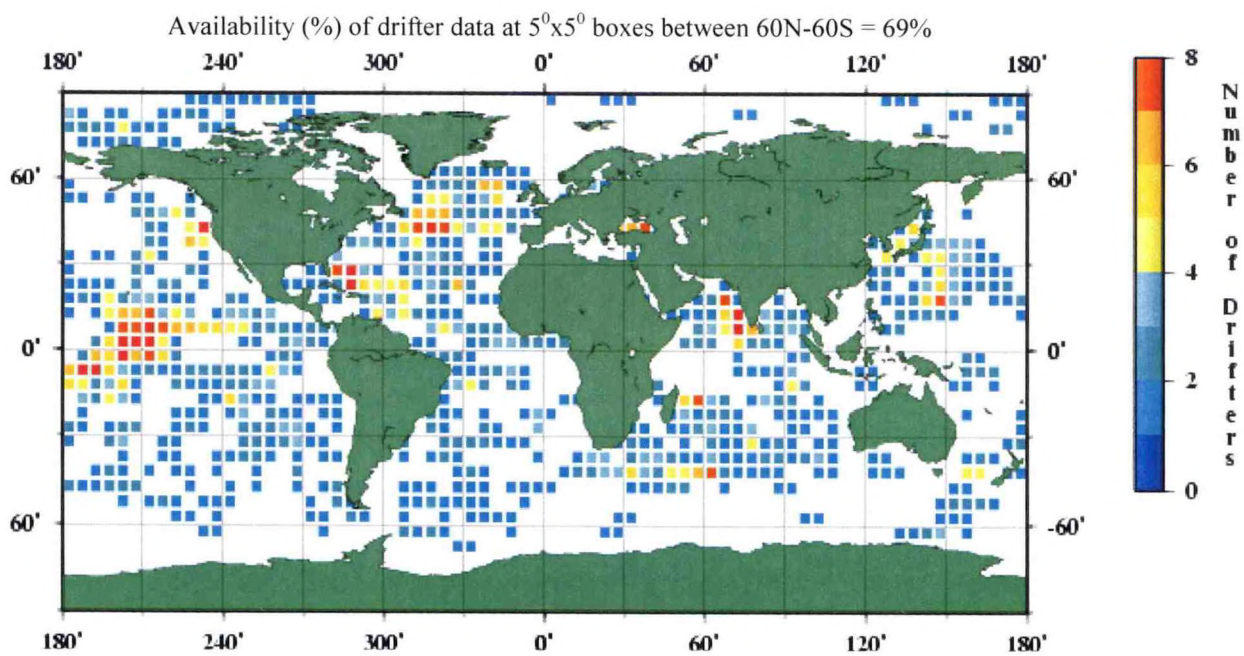
June 2002



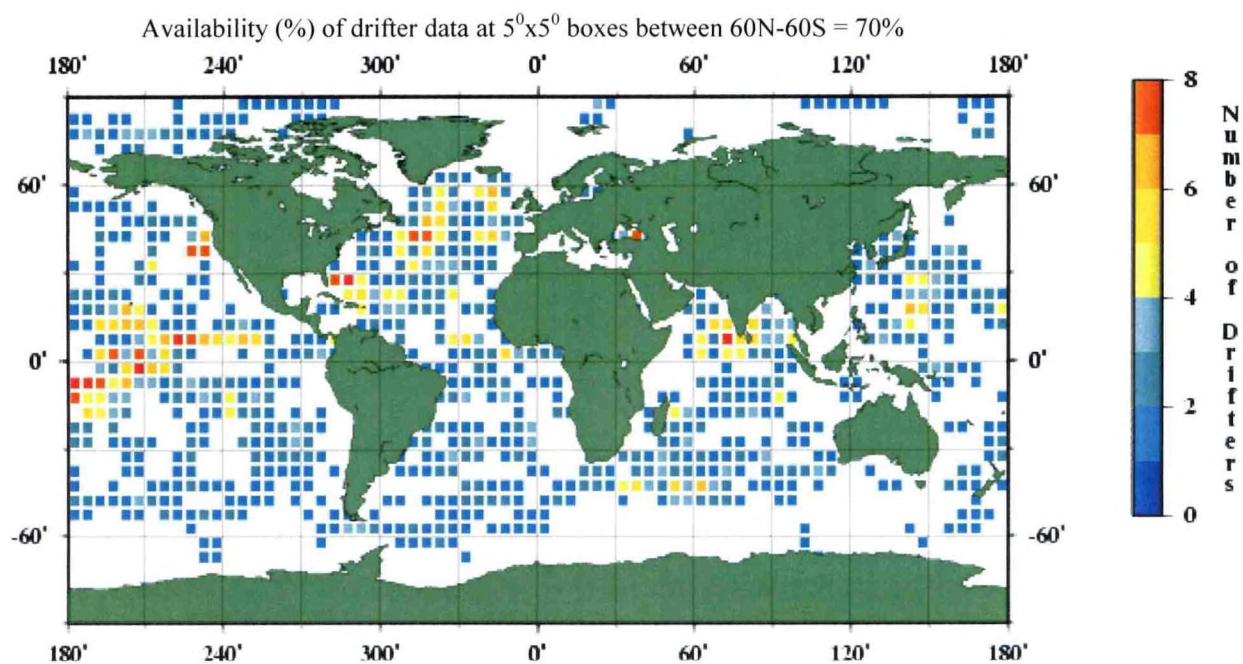
July 2002



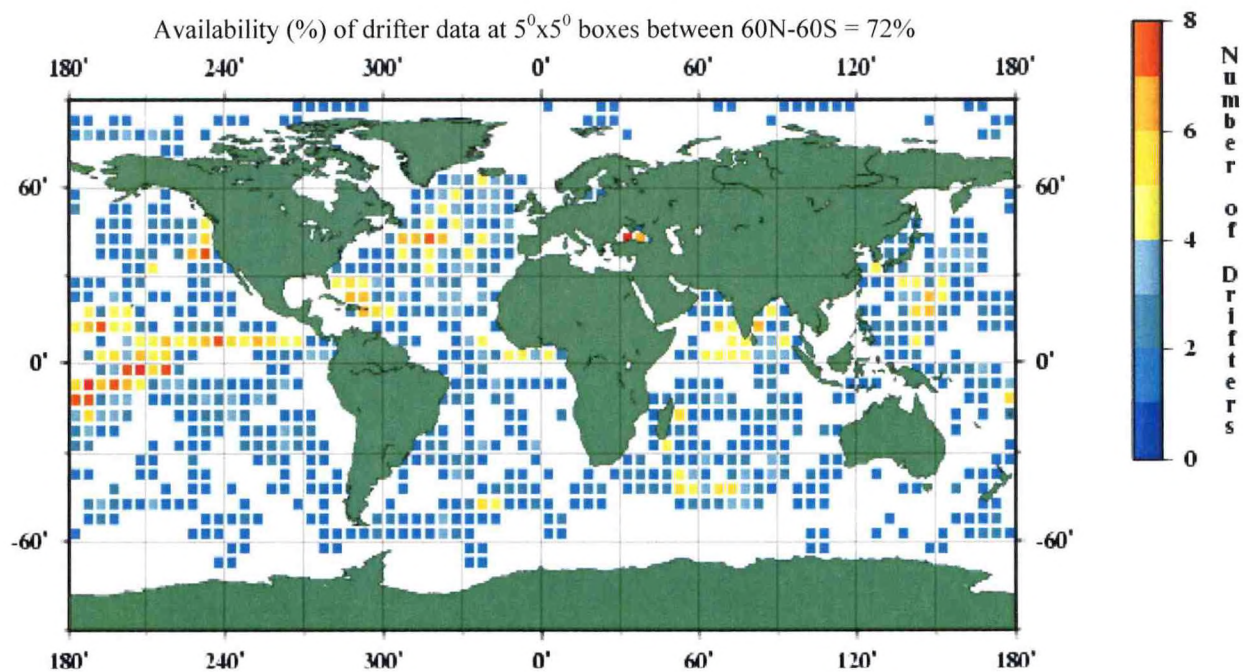
August 2002



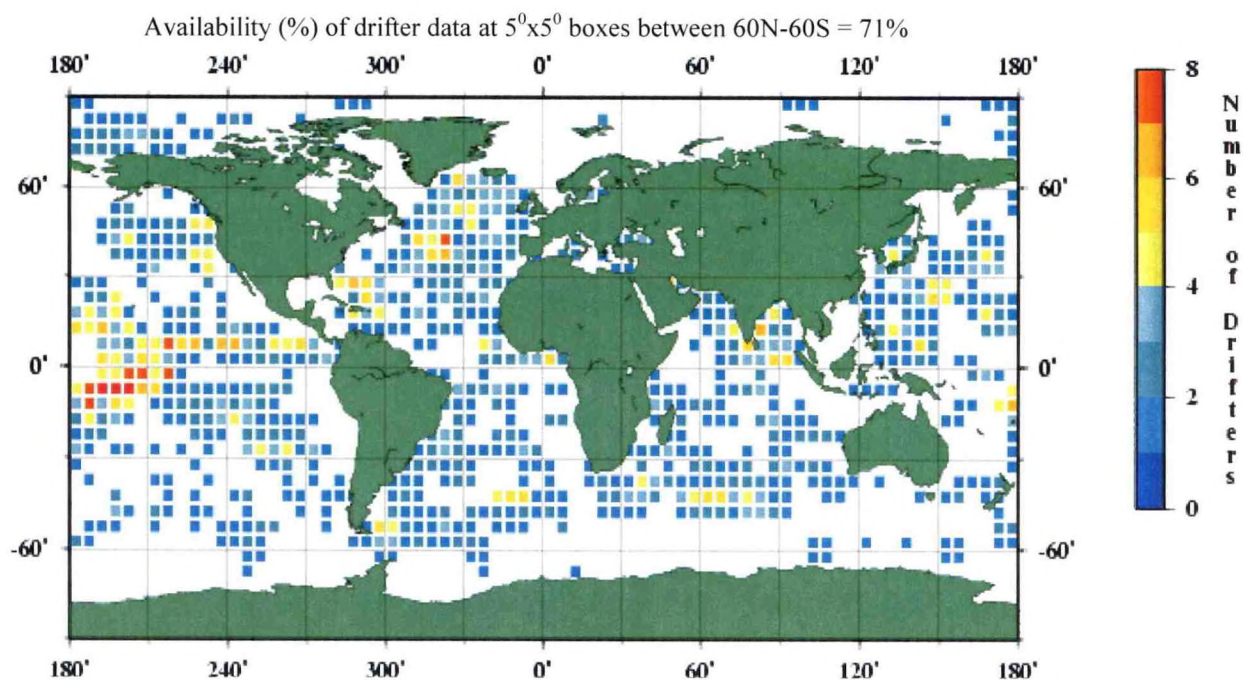
September 2002



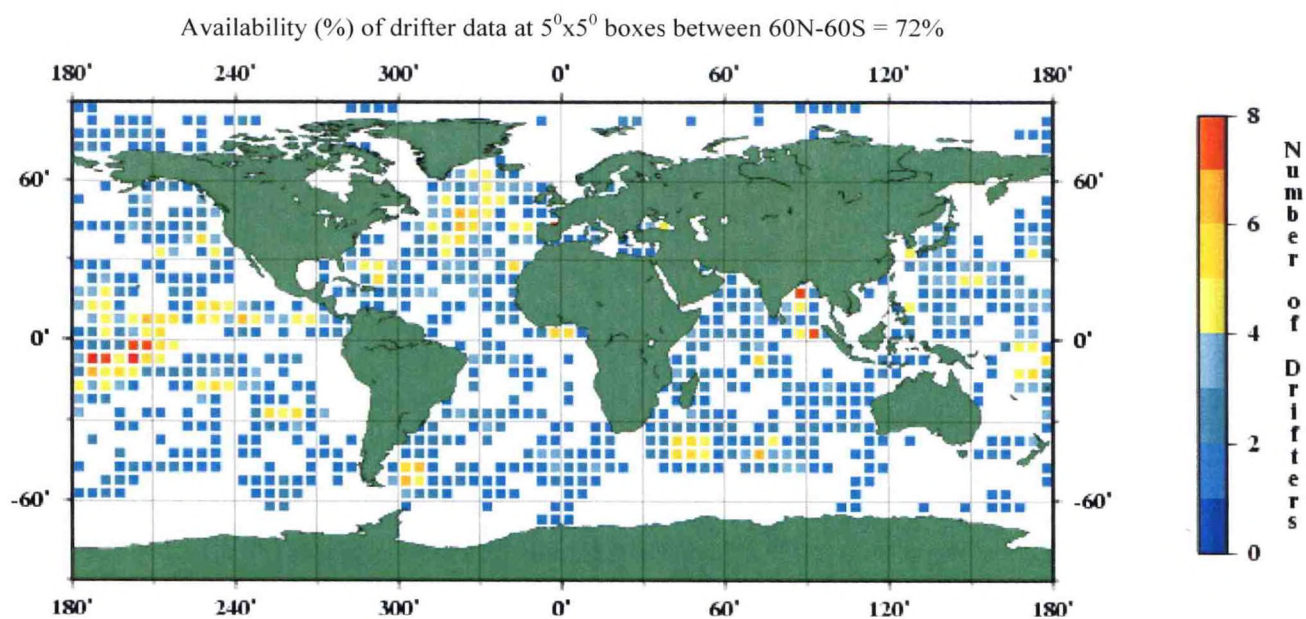
October 2002



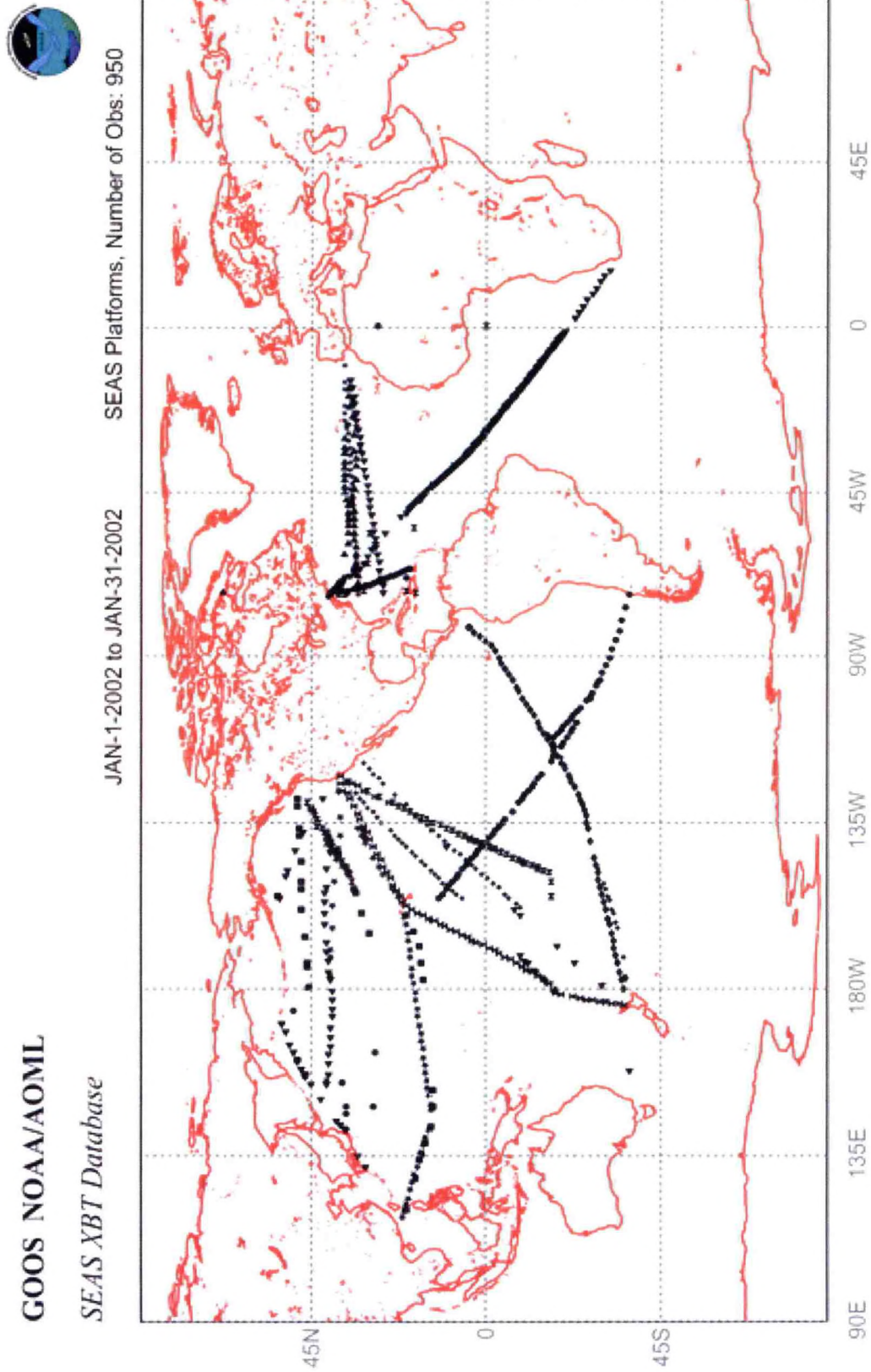
November 2002



December 2002



Plot of XBT observations (real-time and delayed mode) taken by all SEAS ships during January 2002



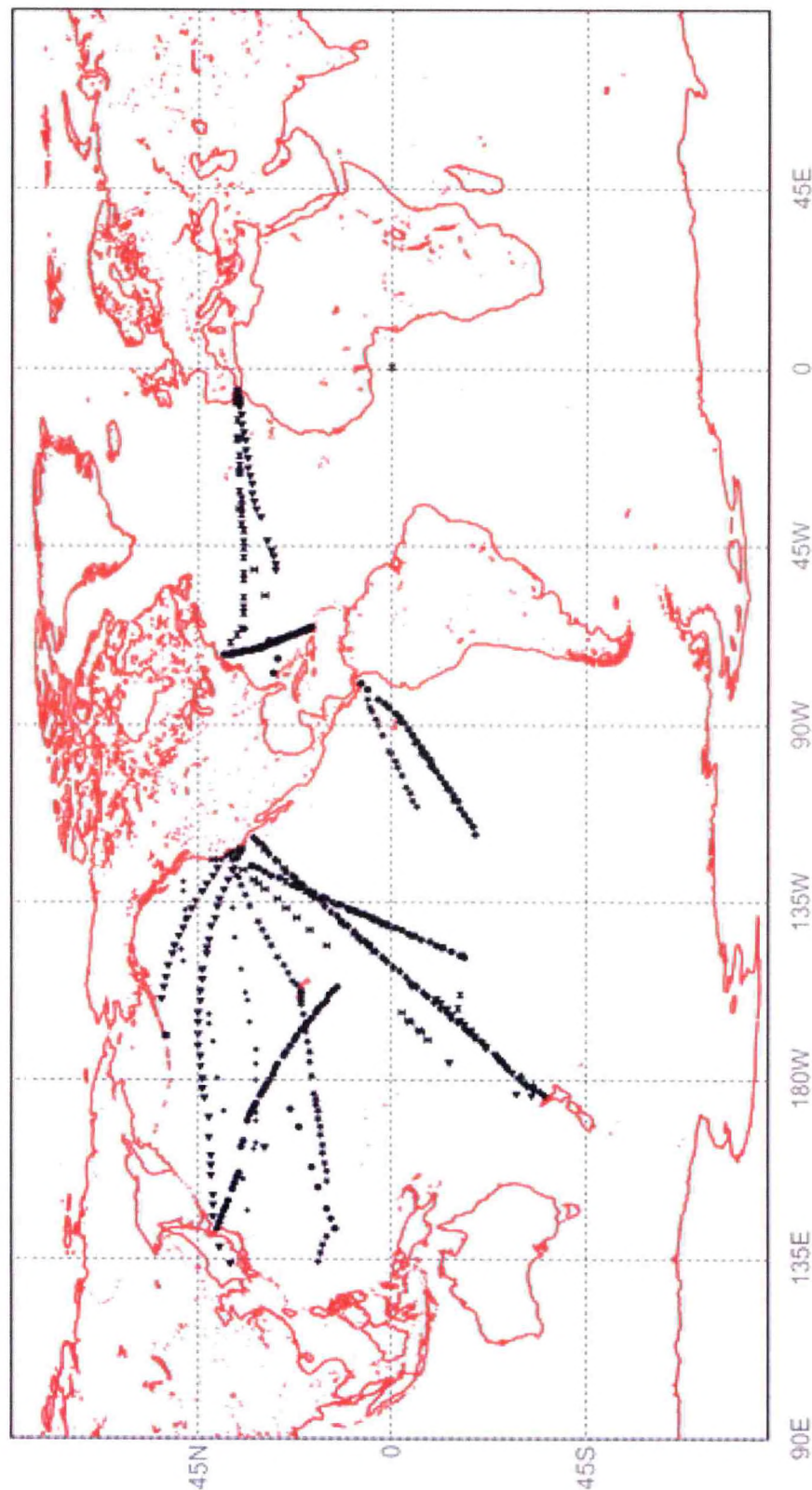
Plot of XBT observations (real-time and delayed mode) taken by all SEAS ships during February 2002



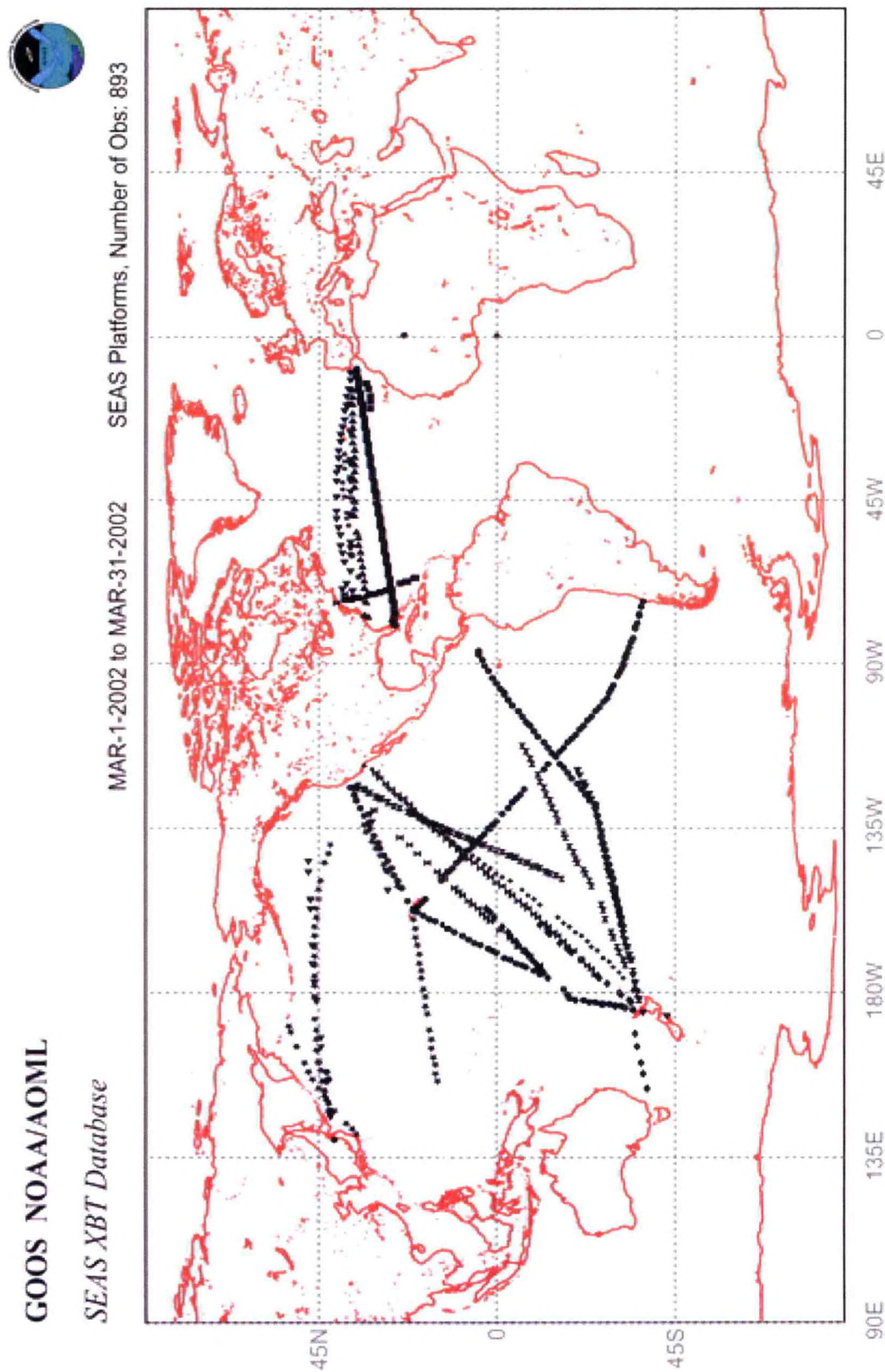
GOOS NOAA/AOML

SEAS XBT Database

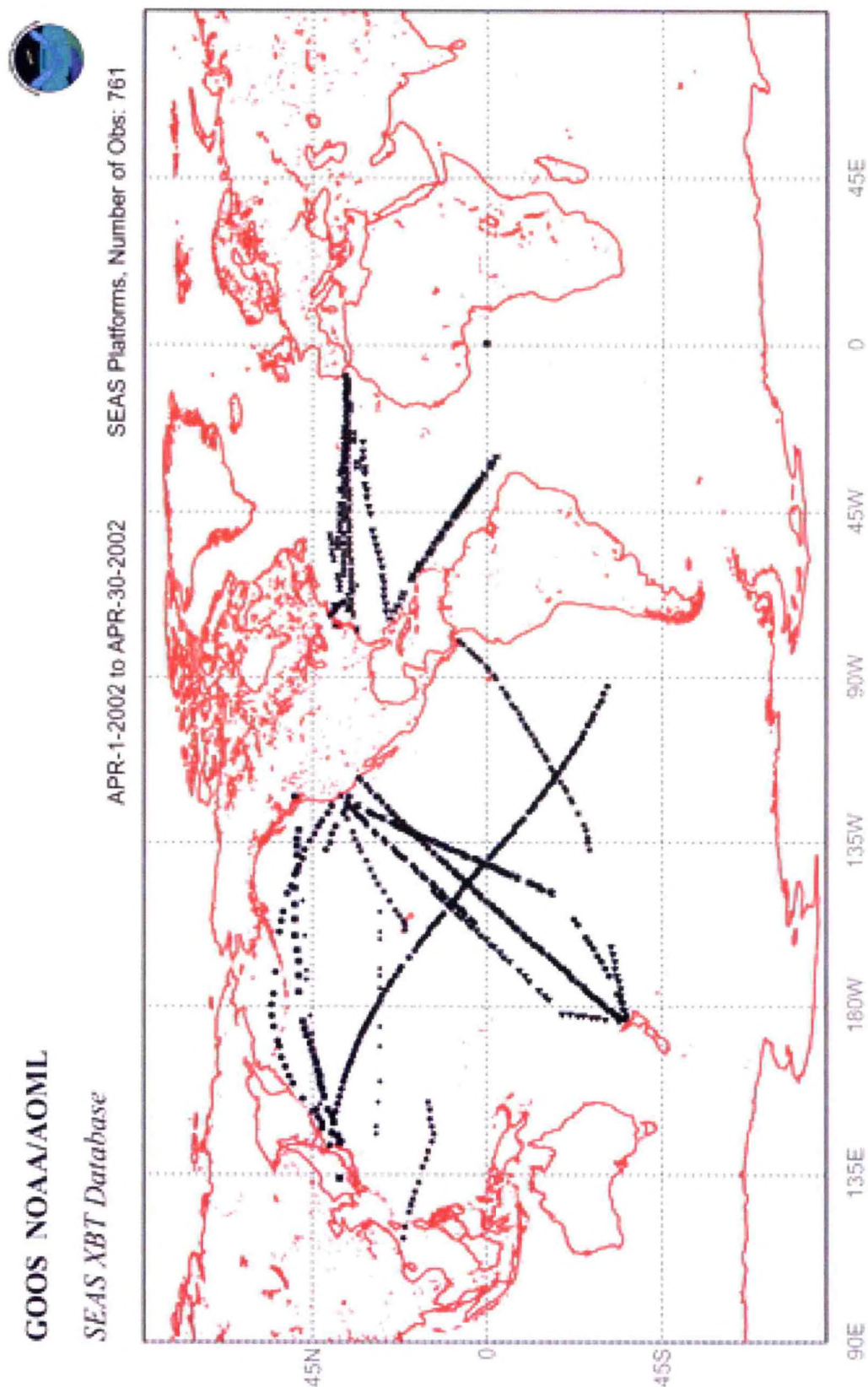
FEB-1-2002 to FEB-28-2002 SEAS Platforms, Number of Obs: 579



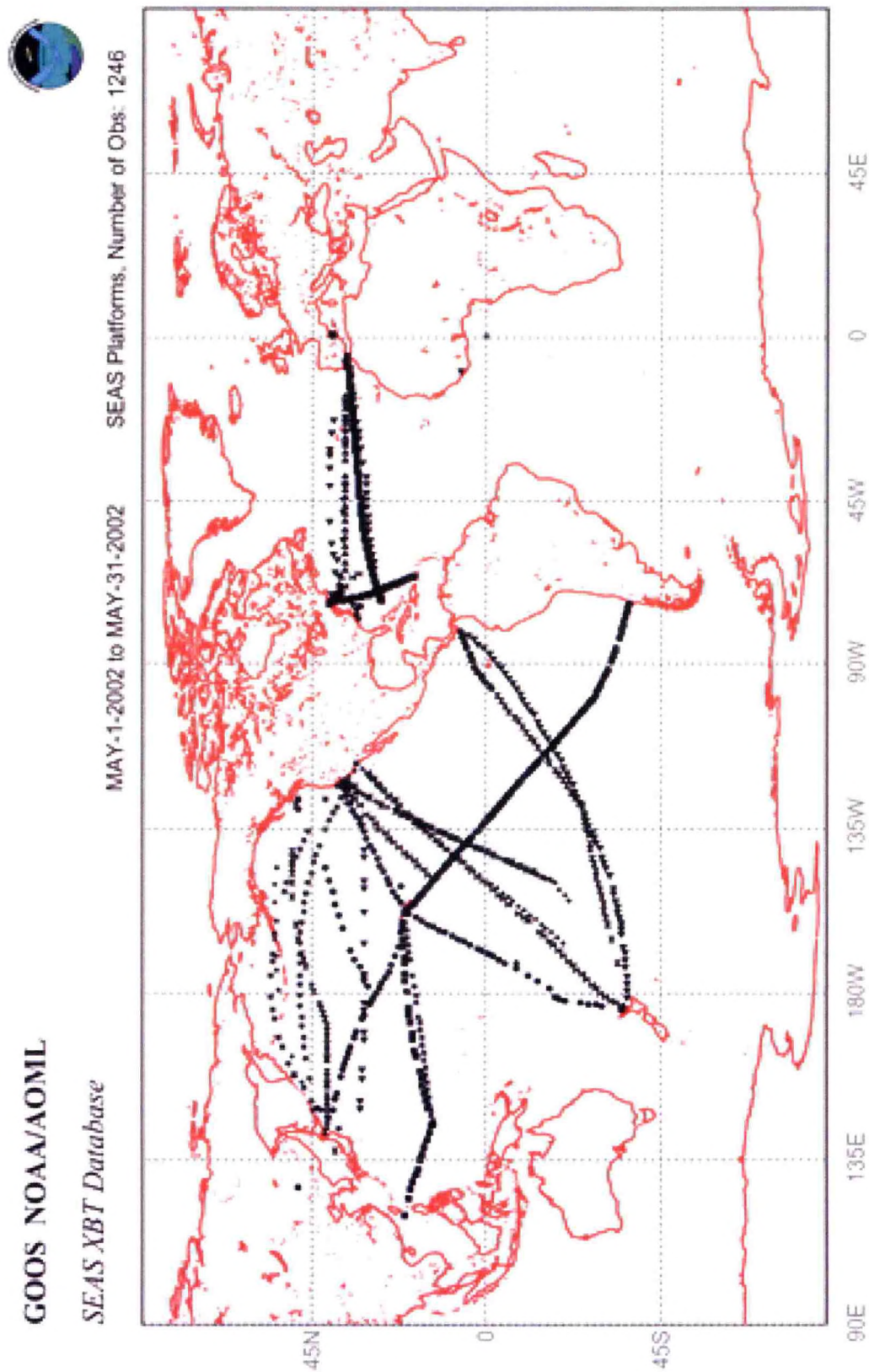
Plot of XBT observations (real-time and delayed mode) taken by all SEAS ships during March 2002



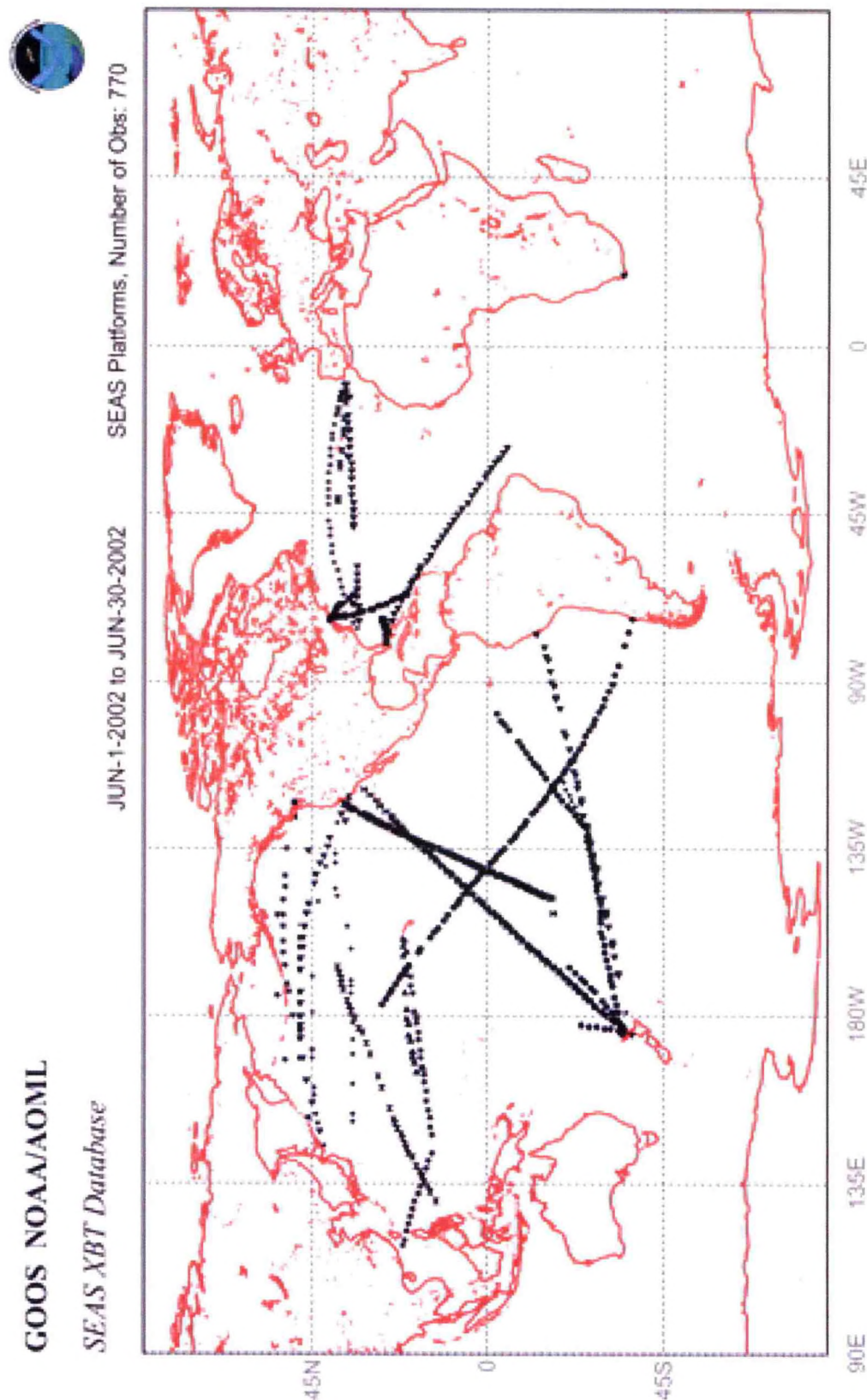
Plot of XBT observations (real-time and delayed mode) taken by all SEAS ships during April 2002



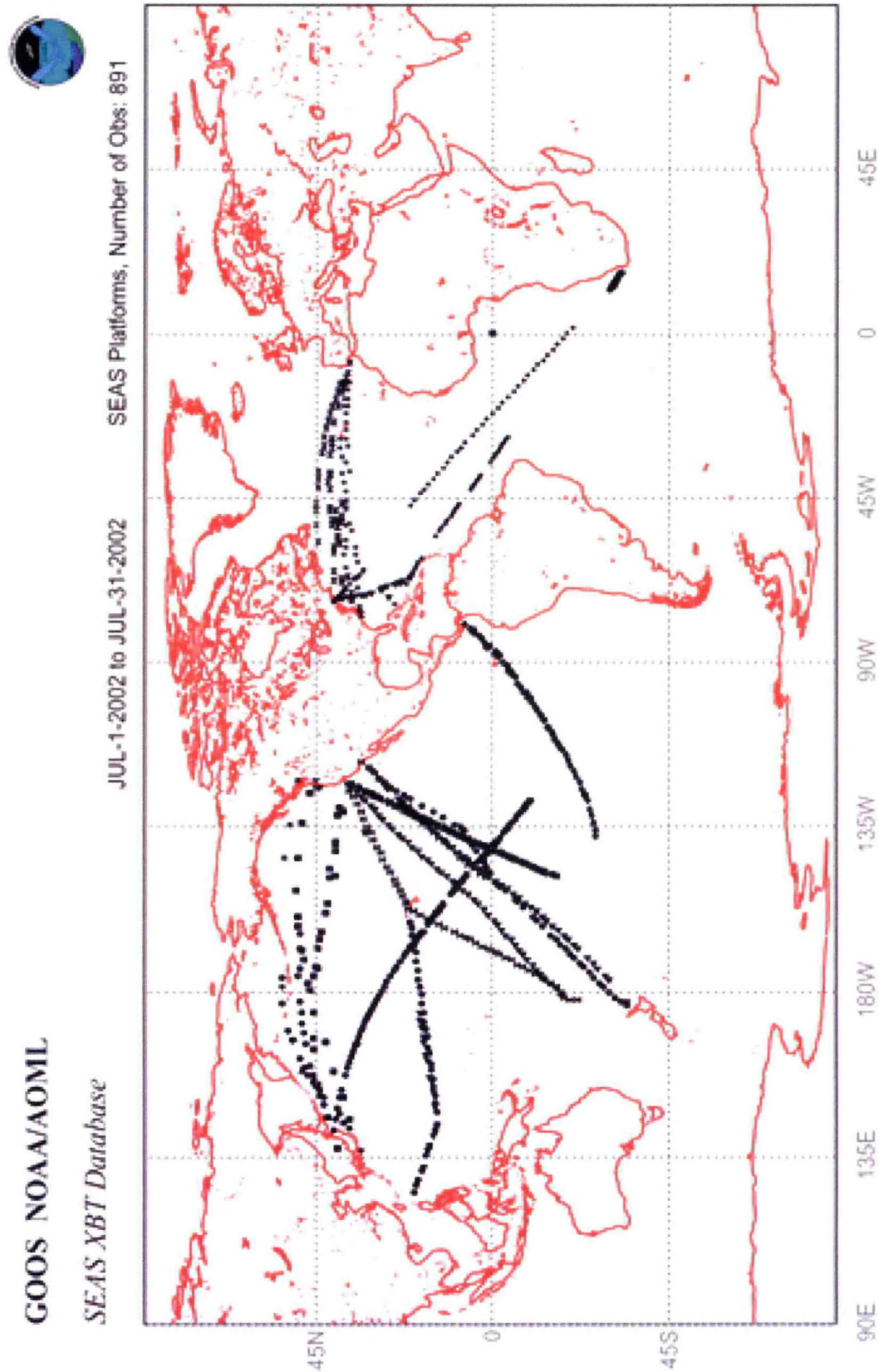
Plot of XBT observations (real-time and delayed mode) taken by all SEAS ships during May 2002



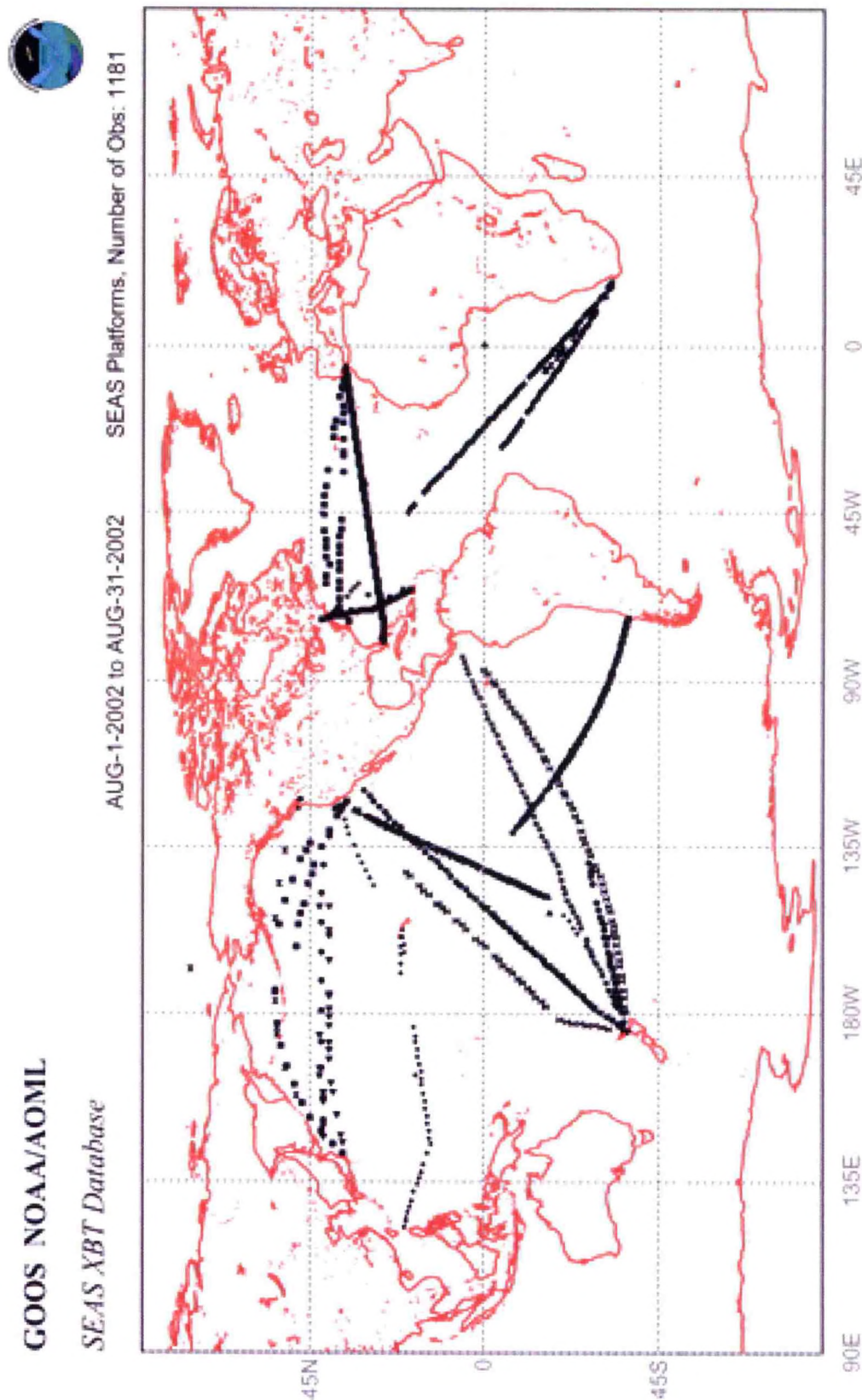
Plot of XBT observations (real-time and delayed mode) taken by all SEAS ships during June 2002



Plot of XBT observations (real-time and delayed mode) taken by all SEAS ships during July 2002



Plot of XBT observations (real-time and delayed mode) taken by all SEAS ships during August 2002



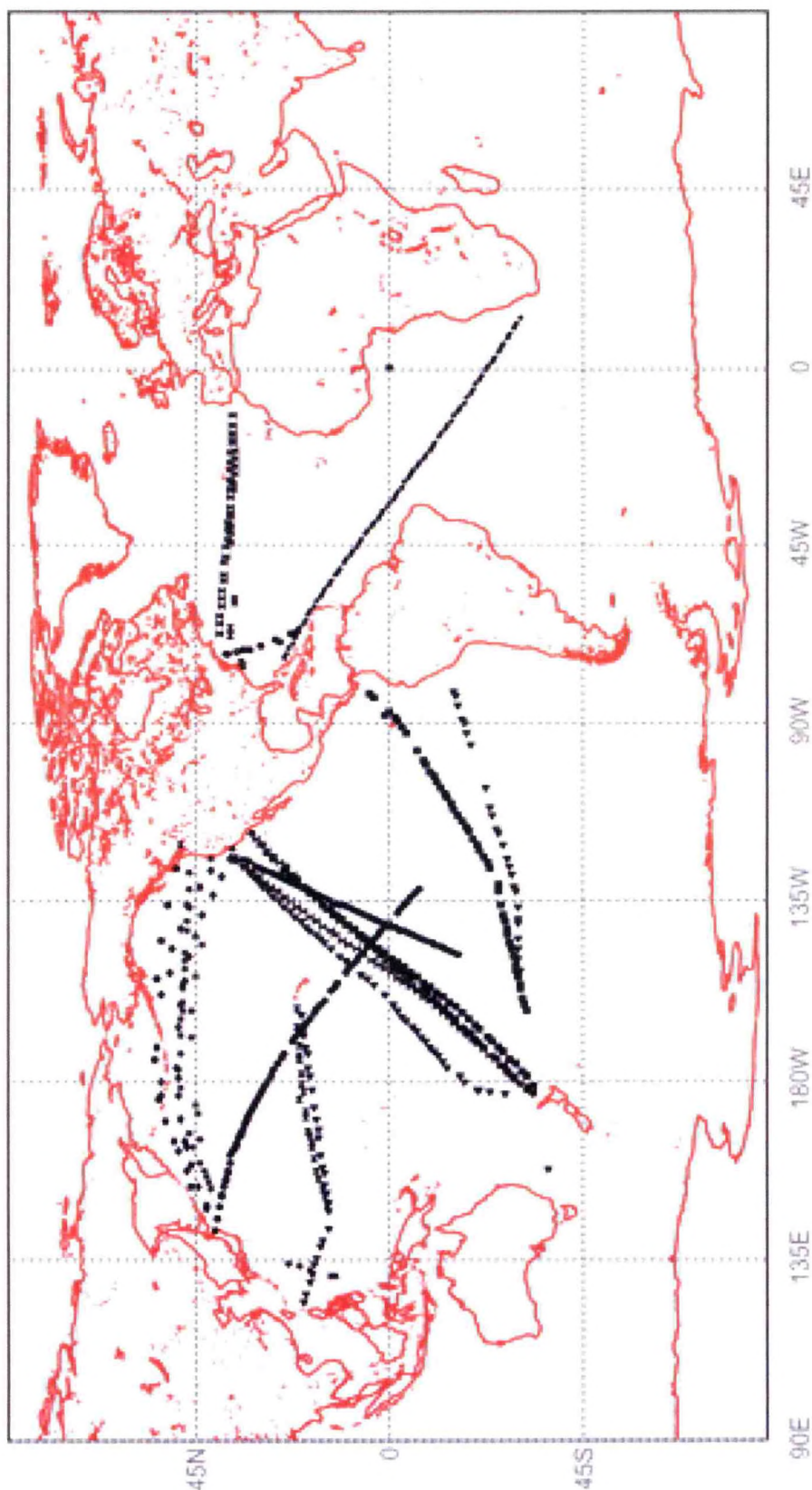
Plot of XBT observations (real-time and delayed mode) taken by all SEAS ships during September 2002



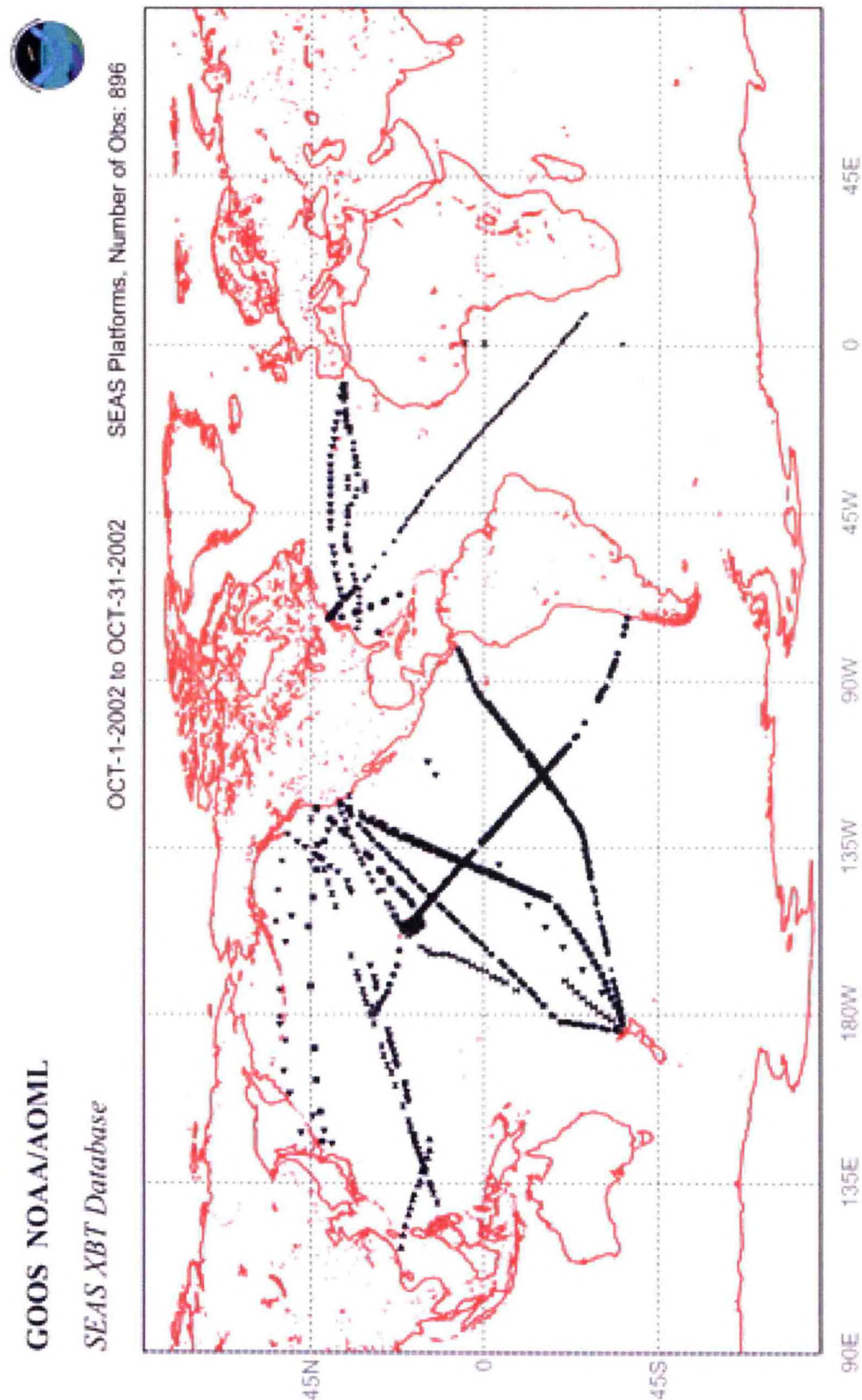
GOOS NOAA/AOML

SEAS XBT Database

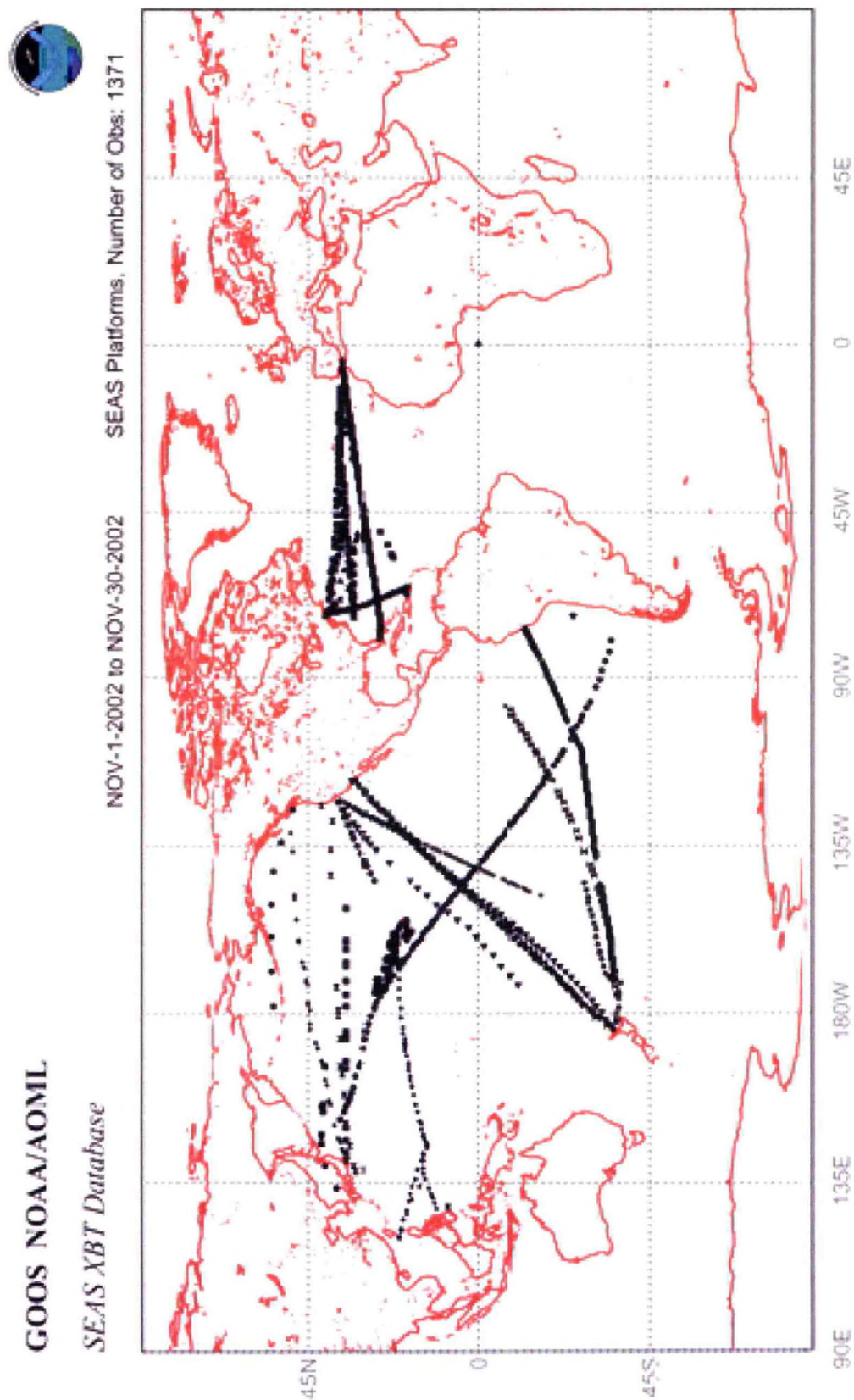
SEP-1-2002 to SEP-30-2002 SEAS Platforms, Number of Obs: 762



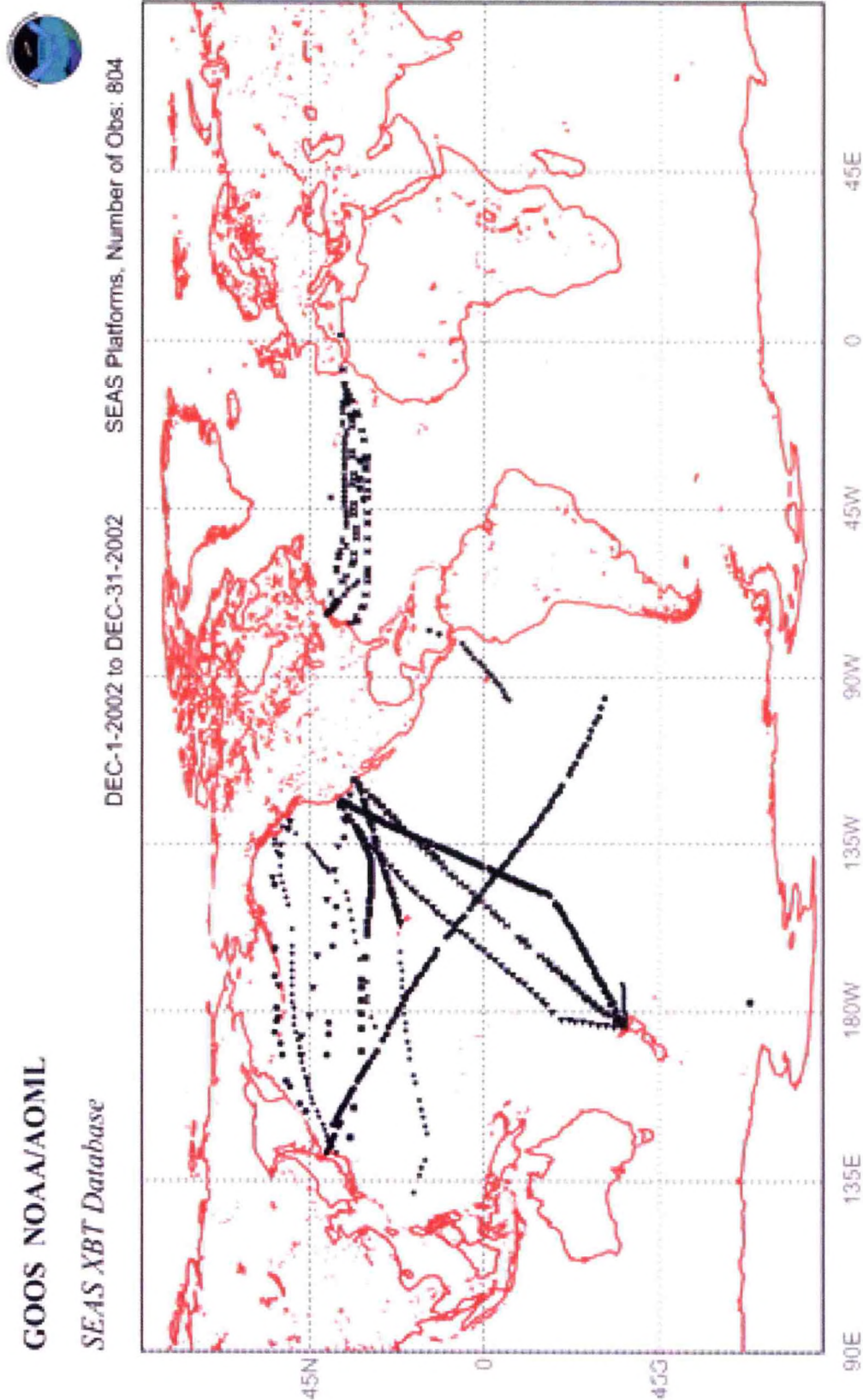
Plot of XBT observations (real-time and delayed mode) taken by all SEAS ships during October 2002



Plot of XBT observations (real-time and delayed mode) taken by all SEAS ships during November 2002

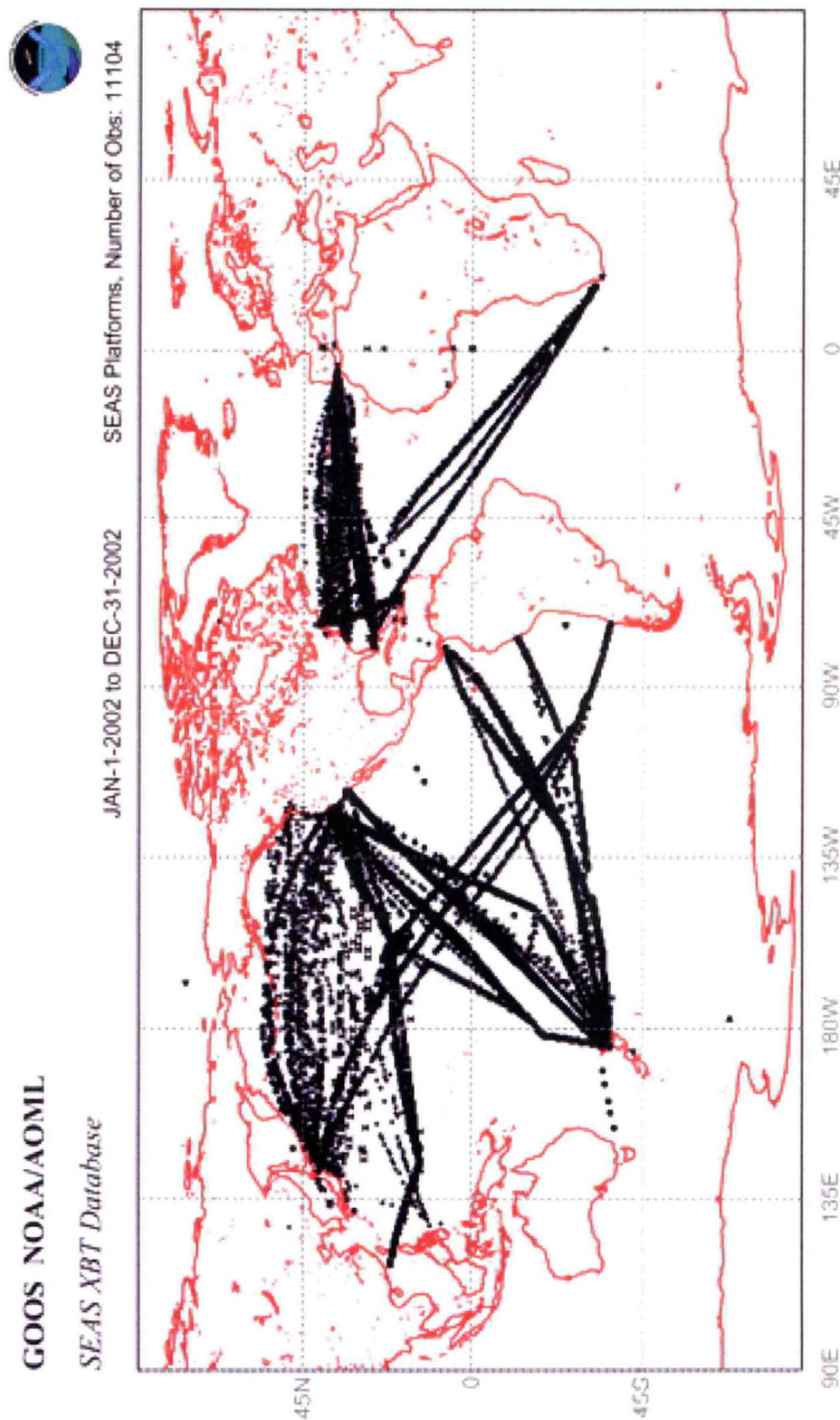


Plot of XBT observations (real-time and delayed mode) taken by all SEAS ships during December 2002



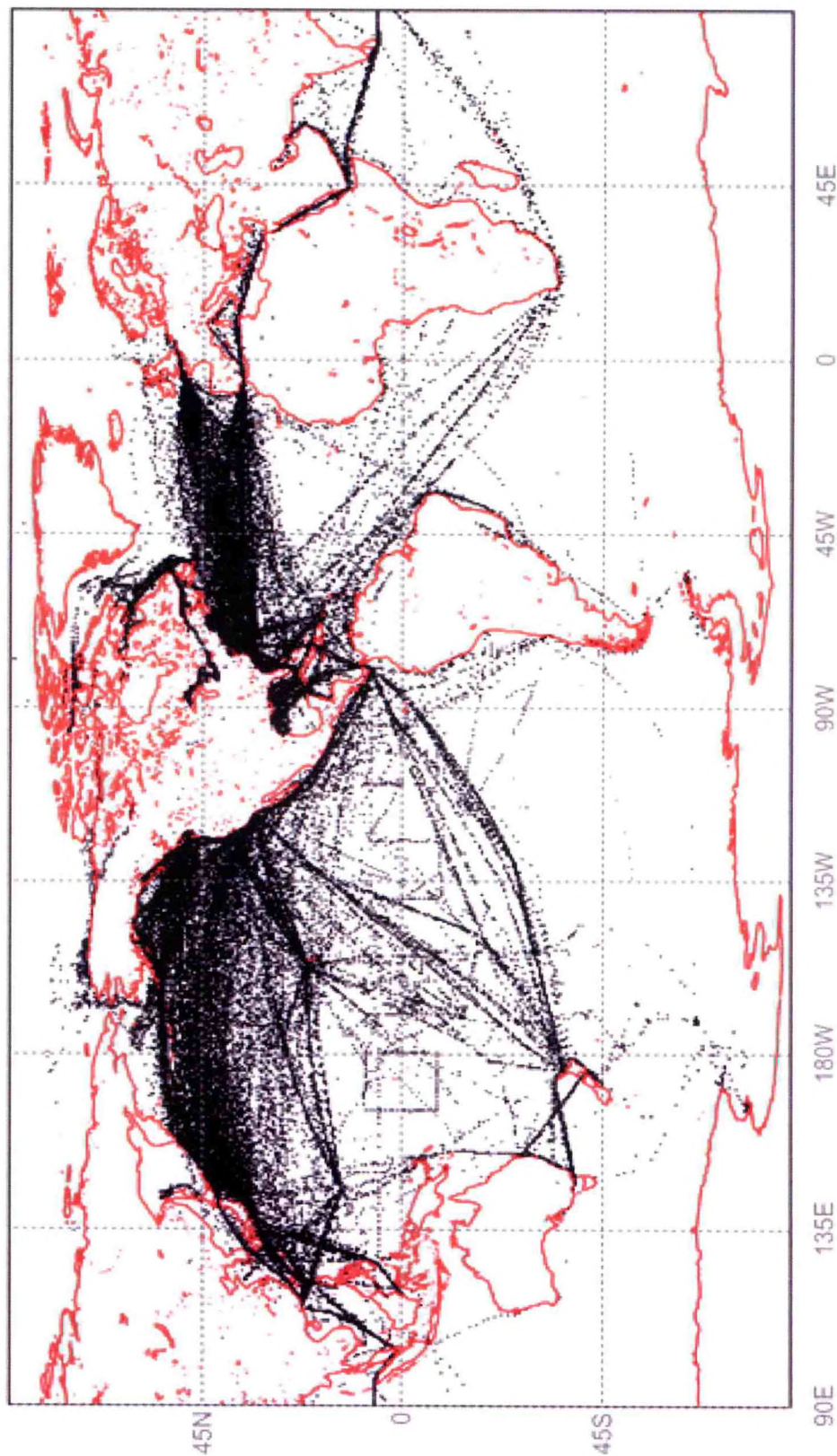
Data Collection

Plot of all XBT observations collected via SEAS during the year 2002. Total number of XBT observations = 11,104



Plot of all Meteorological observations collected via SEAS during the year 2002. Total number of SEAS Meteorological observations = 79,515

JAN-1-2002 to DEC-31-2002 SEAS Platforms, Number of Obs: 79515



Key to Call Signs for the ships listed in the 2002 XBT Counts by Route tables:

CALL SIGN

3EZI6
3FCS7
3FPA9
3FRY9
9VND
9VRA
BOAB
DDGY
DDQI
ELRR4
ELYT5
ELTZ3
GOVL
GZKA
H9IM
KGJB
KIRF
KRGB
LADB2
LAJV4
MZBM7
NBTM
NRUO
P3XQ7
PJJU
S6ID
V2CA2
V2FA2
V2XM
WAUW
WAUY
WCX5083
WMLG
WPGK
WSRL
WTEJ

SHIP NAME

NACRE
MOL KAURI
NUEVO LEON
LYKES COMMANDER
RUBY INDAH
DIRECT EAGLE
TAI HE
COLUMBUS COROMANDEL
CONTI ASIA
SAFMARINE TUGELA
DIRECT FALCON
COLUMBUS FLORIDA
MELBOURNE STAR
AMERICA STAR
WESTWOOD BELINDA
SEA-LAND DEFENDER
CSX HAWAII
CSX ENTERPRISE
SKAUGRAN
SKAUBRYN
QUEENSLAND STAR
POLAR STAR
POLAR SEA
LYKES WINNER
OLEANDER
EMERALD INDAH
POLYNESIA
TAUSALA SAMOA
SKOGAFOSS
ENDEAVOR
ENTERPRISE
MAERSK CALIFORNIA
DELAWARE BAY
CSX NAVIGATOR
CSX PACIFIC
MCARTHUR

SEAS XBT Counts by Route

The Chart below is a list showing the XBT routes and the number of XBTs collected by each VOS ship for each month during the year 2002. The number per year indicates the required number of XBTs that should be collected 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 month.

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

AX04, New York to Spain

#/Year = 440

#/Mon = 37

| | | | | | | | | | | | | | |
|--------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|------------|
| WAUW | 16 | 5 | 17 | 4 | 20 | 12 | 26 | 9 | 6 | 23 | 26 | 43 | 207 |
| WAUY | 33 | 1 | 40 | 35 | 0 | 26 | 17 | 0 | 0 | 0 | 1 | 8 | 161 |
| WMLG | 45 | 24 | 30 | 46 | 26 | 20 | 19 | 17 | 35 | 20 | 51 | 25 | 358 |
| TOTAL | 94 | 30 | 87 | 85 | 46 | 58 | 62 | 26 | 41 | 43 | 78 | 76 | 726 |

AX07, Gulf of Mexico to Gibraltar

#/Year = 520

#/Mon = 43

| | | | | | | | | | | | | | |
|--------------|-----------|-----------|------------|-----------|------------|-----------|----------|-----------|----------|----------|-----------|----------|------------|
| 3FPA9 | 31 | 21 | 6 | 24 | 18 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 101 |
| 3FRY9 | 0 | 16 | 222 | 0 | 186 | 44 | 0 | 76 | 0 | 0 | 95 | 0 | 639 |
| TOTAL | 31 | 37 | 228 | 24 | 204 | 44 | 0 | 77 | 0 | 0 | 95 | 0 | 740 |

AX08, New York to Cape of Good Hope

#/Year = 960

#/Mon = 80

| | | | | | | | | | | | | | |
|--------------|------------|----------|----------|----------|----------|----------|-----------|------------|-----------|-----------|----------|----------|------------|
| WCX 5083 | 250 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 250 |
| ELRR4 | 0 | 0 | 0 | 0 | 0 | 0 | 29 | 100 | 66 | 56 | 0 | 0 | 251 |
| P3XQ7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 21 | 0 | 0 | 0 | 0 | 21 |
| TOTAL | 250 | 0 | 0 | 0 | 0 | 0 | 29 | 121 | 66 | 56 | 0 | 0 | 522 |

AX10, New York to Trinidad/Caracas

#/Year = 200

#/Mon = 17

| | | | | | | | | | | | | | |
|--------------|-----------|------------|-----------|----------|------------|-----------|-----------|----------|----------|----------|----------|----------|------------|
| KIRF | 32 | 126 | 13 | 0 | 124 | 12 | 21 | 6 | 9 | 7 | 0 | 0 | 350 |
| TOTAL | 32 | 126 | 13 | 0 | 124 | 12 | 21 | 6 | 9 | 7 | 0 | 0 | 350 |

AX29, New York to Brazil

#/Year = 360

#/Mon = 30

| | | | | | | | | | | | | | |
|--------------|----------|----------|----------|-----------|----------|-----------|-----------|----------|----------|----------|----------|----------|------------|
| ELRR4 | 0 | 0 | 0 | 76 | 0 | 31 | 34 | 0 | 0 | 0 | 0 | 0 | 141 |
| TOTAL | 0 | 0 | 0 | 76 | 0 | 31 | 34 | 0 | 0 | 0 | 0 | 0 | 141 |

AX32, New York to Bermuda

#/Year = 120

#/Mon = 10

| | | | | | | | | | | | | | |
|--------------|-----------|----------|----------|----------|-----------|-----------|-----------|----------|----------|----------|-----------|----------|------------|
| PJJU | 29 | 1 | 2 | 1 | 22 | 21 | 26 | 0 | 0 | 8 | 16 | 7 | 133 |
| TOTAL | 29 | 1 | 2 | 1 | 22 | 21 | 26 | 0 | 0 | 8 | 16 | 7 | 133 |



NOAA Miami Library/AOML
4301 Rickenbacker Causeway
Miami, FL 33149

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

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

| | | | | | | | | | | | | | |
|--------------|-----------|----------|----------|----------|-----------|-----------|----------|----------|-----------|-----------|-----------|-----------|------------|
| 9VND | 12 | 8 | 0 | 0 | 14 | 0 | 0 | 0 | 35 | 0 | 7 | 0 | 76 |
| S6ID | 22 | 0 | 0 | 0 | 0 | 32 | 0 | 0 | 0 | 26 | 4 | 28 | 112 |
| TOTAL | 34 | 8 | 0 | 0 | 14 | 32 | 0 | 0 | 35 | 26 | 11 | 28 | 188 |

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

| | | | | | | | | | | | | | |
|--------------|-----------|----------|-----------|-----------|----------|----------|----------|-----------|----------|-----------|----------|----------|-----------|
| DDGY | 0 | 0 | 0 | 20 | 0 | 0 | 0 | 10 | 0 | 10 | 0 | 0 | 40 |
| ELYT5 | 0 | 0 | 6 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 10 |
| ELZT3 | 11 | 0 | 10 | 0 | 9 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 30 |
| 9VRA | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 9 | 9 |
| TOTAL | 11 | 0 | 16 | 20 | 9 | 0 | 0 | 10 | 4 | 10 | 0 | 9 | 89 |

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

| | | | | | | | | | | | | | |
|--------------|-----------|-----------|------------|-----------|------------|------------|-----------|------------|-----------|------------|------------|-----------|-------------|
| 3FCS7 | 0 | 0 | 2 | 0 | 0 | 40 | 0 | 7 | 25 | 0 | 1 | 0 | 75 |
| DDQI | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 184 | 11 | 195 |
| GOVL | 0 | 27 | 35 | 9 | 54 | 0 | 32 | 20 | 0 | 46 | 0 | 0 | 223 |
| GZKA | 57 | 0 | 49 | 10 | 10 | 48 | 0 | 39 | 0 | 27 | 21 | 0 | 261 |
| MZBM7 | 20 | 23 | 51 | 39 | 47 | 13 | 26 | 55 | 40 | 32 | 26 | 13 | 385 |
| TOTAL | 77 | 50 | 137 | 58 | 111 | 101 | 58 | 121 | 65 | 105 | 232 | 24 | 1139 |

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

| | | | | | | | | | | | | | |
|--------------|-----------|----------|-----------|----------|-----------|-----------|-----------|-----------|----------|-----------|----------|----------|------------|
| DDGY | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 23 | 0 | 35 | 0 | 0 | 58 |
| ELZT3 | 39 | 0 | 27 | 0 | 23 | 0 | 38 | 0 | 0 | 24 | 0 | 0 | 151 |
| TOTAL | 39 | 0 | 27 | 0 | 23 | 00 | 38 | 23 | 0 | 59 | 0 | 0 | 209 |

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

| | | | | | | | | | | | | | |
|--------------|-----------|-----------|-----------|----------|-----------|-----------|-----------|-----------|-----------|----------|-----------|-----------|------------|
| KRGB | 28 | 22 | 19 | 0 | 25 | 24 | 19 | 18 | 16 | 0 | 26 | 0 | 197 |
| WPGK | 7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 7 |
| WSRL | 0 | 0 | 0 | 0 | 0 | 14 | 11 | 2 | 17 | 0 | 11 | 17 | 72 |
| TOTAL | 35 | 22 | 19 | 0 | 25 | 38 | 30 | 20 | 33 | 0 | 37 | 17 | 276 |

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

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

| | | | | | | | | | | | | | |
|--------------|-----------|------------|------------|------------|------------|------------|------------|-----------|------------|-----------|------------|------------|-------------|
| 9VRA | 0 | 0 | 44 | 14 | 59 | 12 | 34 | 22 | 34 | 35 | 41 | 37 | 323 |
| DDGY | 53 | 21 | 69 | 23 | 75 | 0 | 43 | 0 | 35 | 0 | 43 | 20 | 382 |
| ELYT5 | 17 | 38 | 34 | 96 | 2 | 49 | 38 | 45 | 34 | 9 | 23 | 61 | 446 |
| ELZT3 | 0 | 52 | 0 | 49 | 0 | 54 | 18 | 26 | 76 | 11 | 58 | 20 | 364 |
| TOTAL | 70 | 111 | 147 | 182 | 136 | 115 | 133 | 93 | 179 | 55 | 165 | 138 | 1515 |

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

| | | | | | | | | | | | | | |
|--------------|-----------|-----------|-----------|-----------|-----------|------------|-----------|-----------|-----------|-----------|-----------|------------|------------|
| DDGY | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 38 | 38 |
| ELZT3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 26 | 26 |
| V2CA2 | 13 | 32 | 25 | 32 | 27 | 61 | 31 | 0 | 0 | 0 | 0 | 0 | 221 |
| V2FA2 | 38 | 20 | 35 | 36 | 57 | 52 | 32 | 35 | 39 | 39 | 12 | 36 | 431 |
| TOTAL | 51 | 52 | 60 | 68 | 84 | 113 | 63 | 35 | 39 | 39 | 12 | 100 | 716 |

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

| | | | | | | | | | | | | | |
|--------------|-----------|-----------|----------|-----------|----------|-----------|------------|------------|-----------|----------|-----------|-----------|------------|
| 3EZ16 | 40 | 40 | 0 | 94 | 0 | 72 | 127 | 118 | 83 | 0 | 88 | 94 | 756 |
| TOTAL | 40 | 40 | 0 | 94 | 0 | 72 | 127 | 118 | 83 | 0 | 88 | 94 | 756 |

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

| | | | | | | | | | | | | | |
|--------------|-----------|-----------|-----------|-----------|------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|------------|
| 9VND | 13 | 0 | 0 | 30 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 43 |
| BOAB | 8 | 29 | 18 | 24 | 21 | 30 | 22 | 19 | 0 | 0 | 0 | 22 | 193 |
| KGJB | 45 | 0 | 41 | 42 | 55 | 27 | 23 | 26 | 28 | 7 | 22 | 15 | 331 |
| KRGB | 0 | 50 | 0 | 0 | 0 | 11 | 0 | 0 | 0 | 0 | 23 | 0 | 84 |
| LADB2 | 3 | 0 | 1 | 2 | 11 | 0 | 5 | 2 | 7 | 9 | 10 | 16 | 66 |
| LAJV4 | 12 | 1 | 4 | 0 | 2 | 6 | 15 | 9 | 12 | 7 | 12 | 5 | 85 |
| S6ID | 0 | 0 | 0 | 0 | 45 | 0 | 0 | 0 | 29 | 0 | 0 | 34 | 108 |
| TOTAL | 81 | 80 | 64 | 98 | 134 | 74 | 65 | 56 | 76 | 23 | 67 | 92 | 910 |

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

| | | | | | | | | | | | | | |
|--------------|-----------|-----------|-----------|-----------|-----------|----------|-----------|-----------|----------|-----------|-----------|-----------|------------|
| ELZT3 | 22 | 0 | 18 | 0 | 23 | 0 | 20 | 0 | 0 | 0 | 0 | 0 | 83 |
| KRGB | 7 | 18 | 10 | 22 | 0 | 0 | 0 | 15 | 0 | 16 | 0 | 0 | 88 |
| WTEJ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 54 | 66 | 43 | 163 |
| TOTAL | 29 | 18 | 28 | 22 | 23 | 0 | 20 | 15 | 0 | 70 | 66 | 43 | 334 |

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

PX40, Hawaii to Japan

#/Year = 450

#/Mon = 38

| | | | | | | | | | | | | | |
|--------------|----|---|----|---|-----|---|---|---|-----|---|---|---|------------|
| 3EZI6 | 25 | 0 | 65 | 0 | 190 | 0 | 0 | 0 | 137 | 0 | 0 | 0 | 417 |
| TOTAL | 25 | 0 | 65 | 0 | 190 | 0 | 0 | 0 | 137 | 0 | 0 | 0 | 417 |

PX44, Taiwan to Guam

#/Year = 160

#/Mon = 13

| | | | | | | | | | | | | | |
|--------------|----|---|---|----|----|----|---|----|----|---|----|---|------------|
| KRGB | 13 | 4 | 0 | 13 | 9 | 13 | 5 | 12 | 7 | 0 | 13 | 0 | 89 |
| WPGK | 8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 8 |
| WSRL | 0 | 0 | 0 | 0 | 39 | 0 | 2 | 0 | 12 | 0 | 9 | 5 | 67 |
| TOTAL | 21 | 4 | 0 | 13 | 48 | 13 | 7 | 12 | 19 | 0 | 22 | 5 | 164 |

PX81, Honolulu to Coronel (Chile)

#/Year = 800

#/Mon = 67

| | | | | | | | | | | | | | |
|--------------|----|---|----|---|-----|---|---|---|-----|---|---|---|------------|
| 3EZI6 | 25 | 0 | 65 | 0 | 190 | 0 | 0 | 0 | 137 | 0 | 0 | 0 | 417 |
| TOTAL | 25 | 0 | 65 | 0 | 190 | 0 | 0 | 0 | 137 | 0 | 0 | 0 | 417 |

GOOS un-specified Routes,

| | | | | | | | | | | | | | |
|--------------|---|---|---|---|---|---|---|---|---|---|---|---|----------|
| H9IM | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| NBTM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| NRUO | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| S6QW | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| TOTAL | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 4 |

Delayed Mode XBT Data Received at AOML
from January through December 2002 and forwarded to the
National Oceanographic Data Center (NODC) for archival

| <u>Call sign</u> | <u>Ship Name</u> | <u>Dates</u> | <u># of Drops</u> |
|------------------|---------------------|---------------------|-------------------|
| 3EZI6 | NACRE | 12/6/99 - 1/24/00 | 86 |
| 3EZI6 | NACRE | 12/6/99 - 4/10/00 | 250 |
| 3EZI6 | NACRE | 5/7/00 - 6/24/00 | 170 |
| 3EZI6 | NACRE | 7/22/00 - 2/13/01 | 631 |
| 3EZI6 | NACRE | 3/7/01 - 4/17/01 | 115 |
| 3FPA9 | TMM NUEVO LEON | 12/20/01 - 2/2/02 | 53 |
| 3FPA9 | TMM NUEVO LEON | 3/2/02 - 4/7/02 | 30 |
| 3FPA9 | TMM NUEVO LEON | 5/1/02 - 5/18/02 | 25 |
| 3FRY9 | LYKES COMMANDER | 2/28/02 - 3/9/02 | 238 |
| 3FRY9 | LYKES COMMANDER | 5/24/02 - 6/1/02 | 228 |
| 3FRY9 | LYKES COMMANDER | 8/18/02 - 8/26/02 | 216 |
| 3FRY9 | LYKES COMMANDER | 11/10/02 - 11/18/02 | 234 |
| 9VND | RUBY INDAH | 3/9/01 - 1/12/02 | 103 |
| 9VRA | DIRECT EAGLE | 3/15/02 - 5/4/02 | 70 |
| 9VRA | DIRECT EAGLE | 5/22/02 - 6/4/02 | 52 |
| 9VRA | DIRECT EAGLE | 7/19/02 - 8/31/02 | 83 |
| 9VRA | DIRECT EAGLE | 9/12/02 - 10/26/02 | 94 |
| BOAB | TAI-HE | 11/22/01 - 12/3/01 | 19 |
| BOAB | TAI-HE | 1/5/02 - 2/7/02 | 20 |
| BOAB | TAI-HE | 2/14/02 - 3/18/02 | 34 |
| BOAB | TAI-HE | 3/27/02 - 4/29/02 | 30 |
| BOAB | TAI-HE | 5/9/02 - 6/11/02 | 33 |
| BOAB | TAI-HE | 6/17/02 - 7/22/02 | 35 |
| BOAB | TAI-HE | 7/29/03 - 8/31/02 | 32 |
| C6CE7 | WESTWOOD BELINDA | 9/21/00 - 1/1/01 | 27 |
| H9IM | WESTWOOD BELINDA | 10/30/01 - 12/11/01 | 51 |
| H9IM | WESTWOOD BELINDA | 12/25/01 - 1/1/02 | 21 |
| DDGY | COLUMBUS COROMANDEL | 11/29/01 - 1/13/02 | 74 |
| DDGY | COLUMBUS COROMANDEL | 1/24/02 - 3/11/02 | 101 |
| DDGY | COLUMBUS COROMANDEL | 3/21/02 - 5/5/02 | 107 |
| DDGY | COLUMBUS COROMANDEL | 5/16/02 - 5/18/02 | 55 |
| DDGY | COLUMBUS COROMANDEL | 7/7/02 - 8/22/02 | 84 |
| DDGY | COLUMBUS COROMANDEL | 9/4/02 - 10/20/02 | 92 |
| DDGY | COLUMBUS COROMANDEL | 11/5/02 - 12/15/02 | 97 |
| ELRR4 | SAFMARINE TUGELA | 4/18/02 - 4/24/02 | 97 |
| ELRR4 | SAFMARINE TUGELA | 6/3/02 - 7/12/02 | 70 |
| ELYT5 | DIRECT FALCON | 11/02/01 - 2/18/02 | 103 |
| ELYT5 | DIRECT FALCON | 2/21/01 - 4/7/01 | 100 |
| ELYT5 | DIRECT FALCON | 4/18/02 - 5/23/02 | 56 |
| ELYT5 | DIRECT FALCON | 6/13/02 - 7/28/02 | 105 |
| ELYT5 | DIRECT FALCON | 8/8/02 - 11/19/02 | 135 |
| ELZT3 | COLUMBUS FLORIDA | 12/13/01 - 1/28/02 | 124 |
| ELZT3 | COLUMBUS FLORIDA | 2/6/02 - 3/25/02 | 75 |
| ELZT3 | COLUMBUS FLORIDA | 4/3/02 - 5/20/02 | 68 |
| ELZT3 | COLUMBUS FLORIDA | 10/12/01 - 5/28/02 | 76 |
| ELZT3 | COLUMBUS FLORIDA | 7/25/02 - 9/14/02 | 105 |
| ELZT3 | COLUMBUS FLORIDA | 9/21/02 - 11/3/02 | 70 |

| <u>Call sign</u> | <u>Ship Name</u> | <u>Dates</u> | <u># of Drops</u> |
|------------------|--------------------|---------------------|-------------------|
| GOVL | MELBOURNE STAR | 12/10/01 - 12/25/01 | 61 |
| GOVL | MELBOURNE STAR | 2/22/02 - 3/9/02 | 62 |
| GOVL | MELBOURNE STAR | 5/6/02 - 5/22/02 | 64 |
| GZKA | AMERICA STAR | 10/24/01 - 11/7/01 | 63 |
| GZKA | AMERICA STAR | 1/1/02 - 1/18/02 | 57 |
| GZKA | AMERICA STAR | 1/1/02 - 5/17/02 | 117 |
| GZKA | AMERICA STAR | 5/29/02 - 6/14/02 | 64 |
| KGJB | SEA-LAND DEFENDER | 12/2/01 - 1/7/02 | 41 |
| KGJB | SEA-LAND DEFENDER | 1/13/02 - 2/20/02 | 58 |
| KGJB | SEA-LAND DEFENDER | 2/24/02 - 4/2/02 | 63 |
| KGJB | SEA-LAND DEFENDER | 4/7/02 - 5/14/02 | 65 |
| KGJB | SEA-LAND DEFENDER | 5/17/02 - 6/24/02 | 52 |
| KGJB | SEA-LAND DEFENDER | 7/4/02 - 8/6/02 | 40 |
| KGJB | SEA-LAND DEFENDER | 8/12/02 - 9/17/02 | 35 |
| KGJB | SEA-LAND DEFENDER | 9/22/02 - 10/29/02 | 26 |
| KGJB | SEA-LAND DEFENDER | 11/4/02 - 12/17/02 | 30 |
| KIRF | CSX HAWAII | 12/12/01 - 3/12/01 | 96 |
| KIRF | CSX HAWAII | 2/23/02 - 2/26/02 | 106 |
| KIRF | CSX HAWAII | 5/18/02 - 5/21/02 | 125 |
| KIRF | CSX HAWAII | 8/10/02 - 8/13/02 | 124 |
| KIRF | CSX HAWAII | 11/16/02 - 11/19/02 | 139 |
| KRGB | SEALAND ENTERPRISE | 10/14/01 - 10/14/01 | 1 |
| KRGB | SEALAND ENTERPRISE | 1/11/02 - 1/26/02 | 49 |
| KRGB | SEALAND ENTERPRISE | 3/22/02 - 4/6/02 | 46 |
| KRGB | SEALAND ENTERPRISE | 7/10/02 - 7/19/02 | 35 |
| KRGB | SEALAND ENTERPRISE | 9/19/02 - 9/28/02 | 31 |
| KRGB | SEALAND ENTERPRISE | 11/15/02 - 11/23/02 | 31 |
| LADB2 | SKAUGRAN | 11/6/01 - 4/8/02 | 17 |
| LADB2 | SKAUGRAN | 4/30/02 - 5/14/02 | 12 |
| LADB2 | SKAUGRAN | 6/30/02 - 8/20/02 | 24 |
| LADB2 | SKAUGRAN | 8/24/02 - 10/10/02 | 16 |
| LADB2 | SKAUGRAN | 10/11/02 - 10/12/02 | 2 |
| LADB2 | SKAUGRAN | 11/2/02 - 12/12/02 | 21 |
| LAJV4 | SKAUBRYN | 7/29/01 - 1/29/02 | 58 |
| LAJV4 | SKAUBRYN | 2/19/02 - 3/15/02 | 5 |
| LAJV4 | SKAUBRYN | 5/10/02 - 5/10/02 | 1 |
| LAJV4 | SKAUBRYN | 6/1/02 - 7/24/02 | 21 |
| LAJV4 | SKAUBRYN | 10/5/02 - 11/26/02 | 21 |
| MZBM7 | QUEENSLAND STAR | 9/23/01 - 11/23/01 | 100 |
| MZBM7 | QUEENSLAND STAR | 12/3/01 - 2/6/02 | 86 |
| MZBM7 | QUEENSLAND STAR | 2/24/01 - 4/10/02 | 72 |
| MZBM7 | QUEENSLAND STAR | 2/24/02 - 7/7/02 | 201 |
| MZBM7 | QUEENSLAND STAR | 7/31/02 - 9/8/02 | 116 |
| NRUO | USCGC POLAR SEA | 7/26/01 - 8/18/01 | 38 |
| P3XT4 | LYKES ENERGIZER | 5/3/02 - 5/22/02 | 264 |
| PJJU | OLEANDER | 12/8/01 - 12/12/01 | 23 |
| PJJU | OLEANDER | 1/12/02 - 1/16/02 | 29 |
| PJJU | OLEANDER | 3/8/02 - 3/13/02 | 21 |
| PJJU | OLEANDER | 4/5/02 - 4/10/02 | 23 |
| PJJU | OLEANDER | 5/2/02 - 5/8/02 | 22 |
| PJJU | OLEANDER | 6/8/02 - 6/8/02 | 7 |
| PJJU | OLEANDER | 6/10/02 - 6/13/02 | 15 |
| PJJU | OLEANDER | 7/12/02 - 7/17/02 | 26 |

| <u>Call sign</u> | <u>Ship Name</u> | <u>Dates</u> | <u># of Drops</u> |
|------------------|-------------------|---------------------|-------------------|
| PJJU | OLEANDER | 8/10/02 - 8/12/02 | 25 |
| PJJU | OLEANDER | 10/19/02 - 10/23/02 | 21 |
| PJJU | OLEANDER | 11/8/02 - 11/13/02 | 21 |
| PJJU | OLEANDER | 12/6/02 - 12/11/02 | 23 |
| S6ID | EMERALD INDAH | 7/26/01 - 12/13/01 | 89 |
| S6ID | EMERALD INDAH | 1/2/02 - 5/21/02 | 67 |
| S6ID | EMERALD INDAH | 10/3/02 - 12/12/02 | 82 |
| S6QW | JUSTICE CONTAINER | 7/6/02 - 7/14/02 | 183 |
| V2CA2 | POLYNESIA | 10/9/01 - 10/17/01 | 25 |
| V2CA2 | POLYNESIA | 12/6/01 - 12/15/01 | 34 |
| V2CA2 | POLYNESIA | 1/6/02 - 1/13/02 | 13 |
| V2CA2 | POLYNESIA | 2/4/02 - 2/12/02 | 32 |
| V2CA2 | POLYNESIA | 3/5/02 - 3/12/02 | 25 |
| V2CA2 | POLYNESIA | 4/3/02 - 4/12/02 | 32 |
| V2CA2 | POLYNESIA | 4/3/02 - 5/9/02 | 58 |
| V2CA2 | POLYNESIA | 5/31/02 - 6/1/02 | 46 |
| V2CA2 | POLYNESIA | 6/28/02 - 7/6/02 | 47 |
| V2CA2 | POLYNESIA | 7/27/02 - 8/4/02 | 46 |
| V2CA2 | POLYNESIA | 8/27/02 - 9/4/02 | 44 |
| V2CA2 | POLYNESIA | 9/24/02 - 10/2/02 | 51 |
| V2CA2 | POLYNESIA | 11/4/02 - 11/12/02 | 50 |
| V2FA2 | TAUSALA SAMOA | 11/24/01 - 12/2/01 | 35 |
| V2FA2 | TAUSALA SAMOA | 12/24/01-1/2/02 | 35 |
| V2FA2 | TAUSALA SAMOA | 1/22/02 - 2/2/02 | 35 |
| V2FA2 | TAUSALA SAMOA | 2/19/02 - 2/28/02 | 31 |
| V2FA2 | TAUSALA SAMOA | 3/12/02 - 3/30/02 | 35 |
| V2FA2 | TAUSALA SAMOA | 4/20/02 - 4/29/02 | 35 |
| V2FA2 | TAUSALA SAMOA | 5/17/02 - 5/27/02 | 57 |
| V2FA2 | TAUSALA SAMOA | 6/15/02 - 6/25/02 | 52 |
| V2FA2 | TAUSALA SAMOA | 7/15/02 - 7/23/02 | 47 |
| V2FA2 | TAUSALA SAMOA | 8/12/02 - 8/21/02 | 43 |
| V2FA2 | TAUSALA SAMOA | 9/10/02 - 9/18/02 | 49 |
| V2FA2 | TAUSALA SAMOA | 9/10/02 - 11/17/02 | 115 |
| V2XM | SKOGAFOSS | 12/4/01 - 12/13/01 | 37 |
| V2XM | SKOGAFOSS | 1/5/02 - 1/5/02 | 8 |
| V2XM | SKOGAFOSS | 2/2/02 - 2/3/02 | 3 |
| V2XM | SKOGAFOSS | 3/31/02 - 3/31/02 | 9 |
| V2XM | SKOGAFOSS | 4/27/02 - 4/29/02 | 32 |
| V2XM | SKOGAFOSS | 5/18/02 - 5/26/02 | 31 |
| V2XM | SKOGAFOSS | 8/17/02 - 8/18/02 | 8 |
| V2XM | SKOGAFOSS | 9/7/02 - 9/14/02 | 40 |
| V2XM | SKOGAFOSS | 10/13/02 - 10/14/02 | 8 |
| V2XM | SKOGAFOSS | 11/9/02 - 11/10/02 | 10 |
| V2XM | SKOGAFOSS | 12/1/02 - 12/11/02 | 21 |
| WAUW | ENDEAVOR | 11/28/01 - 2/22/02 | 49 |
| WAUW | ENDEAVOR | 3/1/02 - 3/9/02 | 17 |
| WAUW | ENDEAVOR | 4/21/02 - 5/20/02 | 35 |
| WAUW | ENDEAVOR | 5/25/02 - 7/3/02 | 40 |
| WAUW | ENDEAVOR | 7/10/02 - 8/9/02 | 37 |
| WAUY | M/V ENTERPRISE | 11/23/01 - 12/4/01 | 15 |
| WAUY | M/V ENTERPRISE | 12/9/01 - 1/15/02 | 35 |
| WAUY | M/V ENTERPRISE | 12/9/01 - 3/7/02 | 79 |
| WAUY | M/V ENTERPRISE | 3/14/02 - 4/27/02 | 61 |

| <u>Call sign</u> | <u>Ship Name</u> | <u>Dates</u> | <u># of Drops</u> |
|------------------|-------------------|---------------------|-------------------|
| WAUY | M/V ENTERPRISE | 6/8/02 - 7/22/02 | 54 |
| WMLG | DELAWARE BAY | 9/9/01 - 1/15/02 | 129 |
| WMLG | DELAWARE BAY | 9/9/01 - 2/28/02 | 62 |
| WMLG | DELAWARE BAY | 3/2/02 - 4/12/02 | 49 |
| WMLG | DELAWARE BAY | 4/20/02 - 5/26/02 | 53 |
| WMLG | DELAWARE BAY | 5/31/02 - 7/11/02 | 51 |
| WMLG | DELAWARE BAY | 7/17/02 - 9/30/02 | 96 |
| WPGK | CSX NAVIGATOR | 11/28/01 - 12/8/01 | 35 |
| WPGK | CSX NAVIGATOR | 1/4/02 - 1/13/02 | 15 |
| WSRL | CSX PACIFIC | 5/7/02 - 5/18/02 | 40 |
| WSRL | CSX PACIFIC | 7/8/02 - 7/26/02 | 19 |
| WSRL | CSX PACIFIC | 8/10/02 - 8/22/02 | 7 |
| WSRL | CSX PACIFIC | 9/14/02 - 10/6/02 | 39 |
| WSRL | CSX PACIFIC | 11/15/02 - 11/25/02 | 25 |
| WTEJ | NOAA MCARTHUR | 11/16/01 - 12/7/01 | 95 |
| WXC5 | MAERSK CALIFORNIA | 1/8/02 - 1/19/02 | 231 |

Delayed Mode Meteorological Data Received at AOML
and submitted to the National Climatic Data Center (NCDC) from January
through December 2002

CALL SIGN

SHIP NAME

January 2002

BOAB
KGJB
PJJU
V2FA2

TAI-HE
SEA-LAND DEFENDER
OLEANDER
TAUSALA SAMOA

February 2002

BOAB
ELYT5
KGJB
V2FA2
WTEJ

TAI-HE
DIRECT FALCON
SEA-LAND DEFENDER
TAUSALA SAMOA
NOAA MCARTHUR

March 2002

3F9PA
9VND
BOAB
C6CE7
GOVL
GZKA
H9IM
KRGB
LAJV4
MZBM7
NRUO
S6ID
V2FA2
WAUW
WAUY
WMLG
WPGK

TMM NUEVO LEON
RUBY INDAH
TAI HE
WESTWOOD BELINDA
MELBOURNE STAR
AMERICA STAR
WESTWOOD BELINDA
SEALAND ENTERPRISE
SKAUBRYN
QUEENSLAND STAR
USCGC POLAR SEA
EMERALD INDAH
TAUSALA SAMOA
ENDEAVOR
M/V ENTERPRISE
DELAWARE BAY
CSX NAVIGATOR

CALL SIGN**SHIP NAME****April 2002**

3FPA9
ELYT5
KGJB
KRGB
LAJV4
V2FA2

TMM NUEVO LEON
DIRECT FALCON
SEA-LAND DEFENDER
SEALAND ENTERPRISE
SKAUBRYN
TAUSALA SAMOA

May 2002

9VRA
BOAB
GOVL
GZKA
KGJB
KIRF
KRGB
LADB2
MZBM7
V2FA2
WAUW
WMLG

DIRECT EAGLE
TAI HE
MELBOURNE STAR
AMERICA STAR
SEA-LAND DEFENDER
CSX HAWAII
SEALAND ENTERPRISE
SKAUGRAN
QUEENSLAND STAR
TAUSALA SAMOA
ENDEAVOR
DELAWARE BAY

June 2002

BOAB
ELRR4
ELYT5
KGJB
V2FA2
WAUY
WMLG

TAI HE
SAFMARINE TUGELA
DIRECT FALCON
SEA-LAND DEFENDER
TAUSALA SAMOA
ENTERPRISE
DELAWARE BAY

CALL SIGN

SHIP NAME

July 2002

BOAB
ELZT3
KRGB
LADB2
LAJV4
S6ID
V2FA2
WHRN

TAI HE
COLUMBUS FLORIDA
CSX ENTERPRISE
SKAUGRAN
SKAUBRYN
EMERALD INDAH
TAUSALA SAMOA
MAHI MAHI

August 2002

3FPA9
ELRR4
ELYT5
GOVL
GZKA
KGJB
KRGB
LAJV4
MZBM7
PJJU
V2FA2
WAUW
WMLG

TMM NUEVO LEON
SAFMARINE TUGELA
DIRECT FALCON
MELBOURNE STAR
AMERICA STAR
SEA-LAND DEFENDER
SEALAND ENTERPRISE
SKAUBRYN
QUEENSLAND STAR
OLEANDER
TAUSALA SAMOA
ENDEAVOR
DELAWARE BAY

September 2002

BOAB
LADB2
V2FA2
WCHF

TAI HE
SKAUGRAN
TAUSALA SAMOA
CSX CONSUMER

CALL SIGN

SHIP NAME

October /November 2002

9VRA
KGJB
KRGB
LADB2
V2CA2

DIRECT EAGLE
SEA-LAND DEFENDER
CSX ENTERPRISE
SKAUGRAN
POLYNESIA

December 2002

BOAB
ELYT5
KIRF
KRGB
LADB2
LAJV4
MZBM7
S6ID
WAUW
WAUY
WMLG
WTEJ

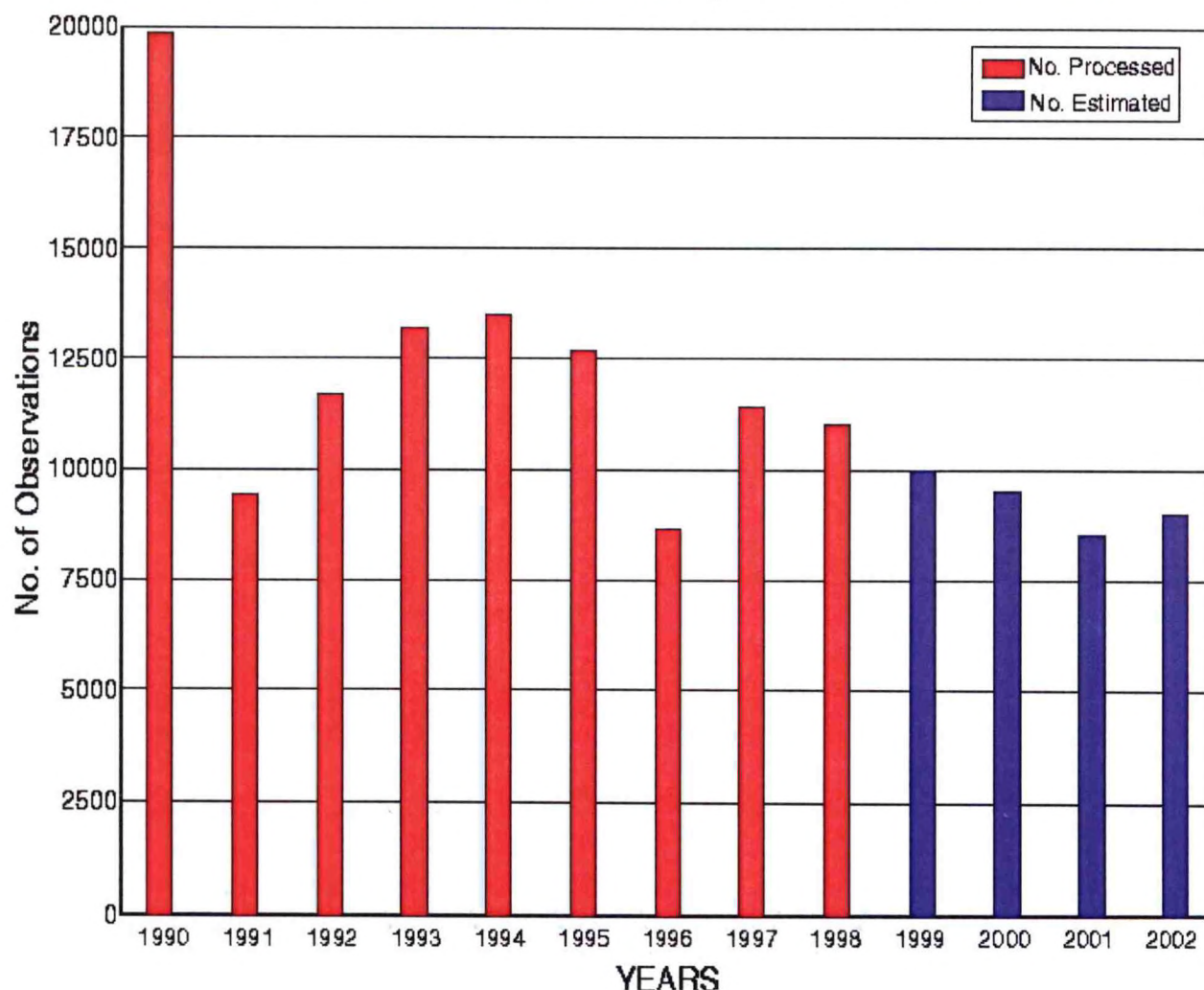
TAI HE
DIRECT FALCON
CSX HAWAII
CSX ENTERPRISE
SKAUGRAN
SKAUBRYN
QUEENSLAND STAR
EMERALD INDAH
ENDEAVOR
ENTERPRISE
DELAWARE BAY
MCARTHUR

Statistics

Atlantic XBT DAC review of delayed mode data

The Atlantic XBT Data Assembly Center at AOML is a component of the Global Temperature and Salinity Profile Program (GTSP). 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 1998. Data collected in 1999 are currently being processed. Data collected from 2000 and 2001 are presently being collated at NODC. Since 1990, the Atlantic XBT DAC has processed and quality controlled over 110,000 observations (see figure below).

Atlantic XBT Data Assembly Center Observations



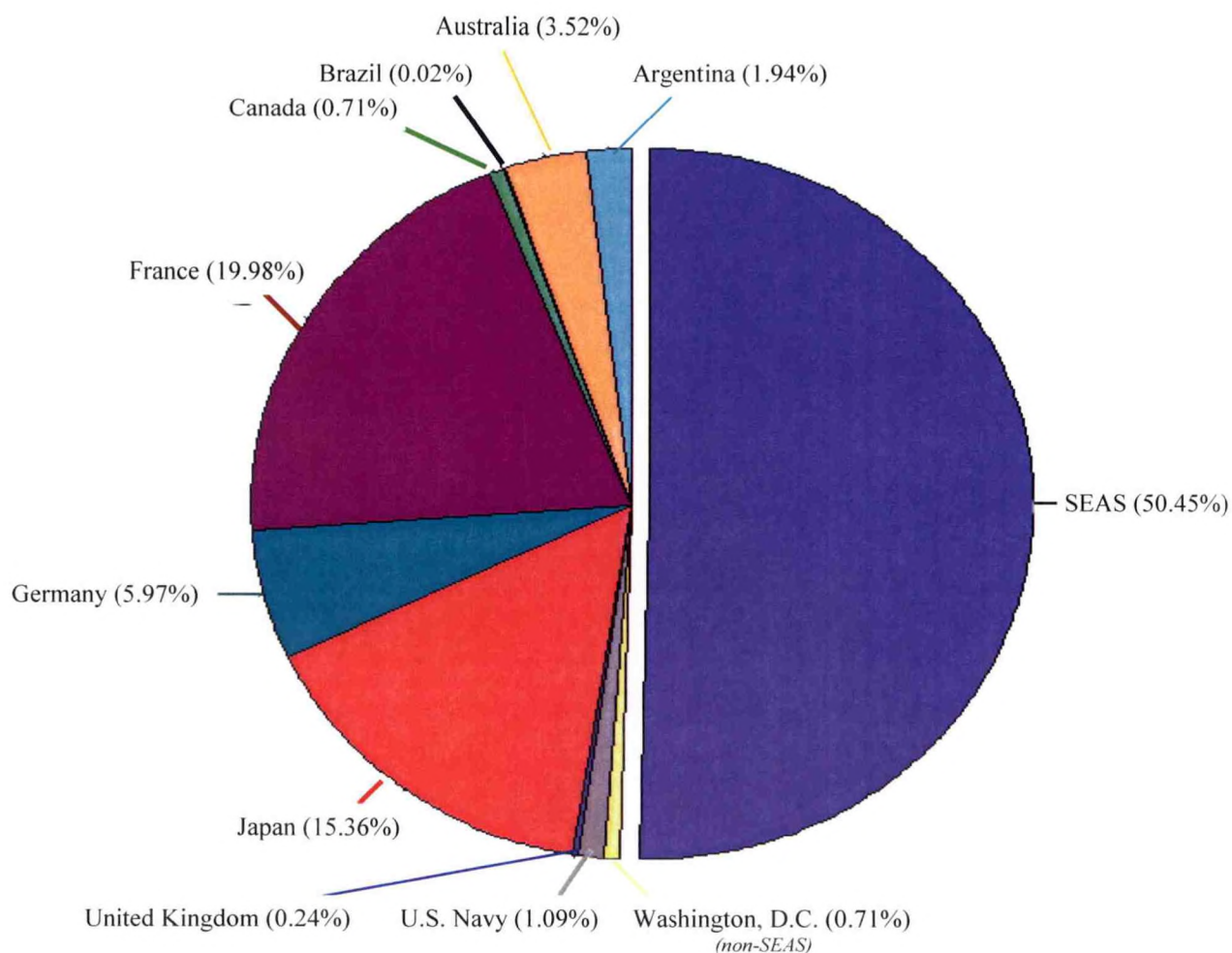
FY 2002 XBT Probe Distribution

| <u>Destination</u> | <u>Cases</u> | <u>Freight</u> | <u>Purchase</u> | <u>Total Cost</u> |
|---------------------------|---------------------|------------------------|--------------------------|--------------------------|
| Bay St.Louis | 81 | \$ 417.19 | \$30,375.00 | \$30,792.19 |
| Cape Town | 81 | 2,264.30 | 30,375.00 | 32,639.30 |
| Honolulu | 108 | 1,323.30 | 40,500.00 | 41,823.30 |
| Houston | 189 | 680.21 | 70,875.00 | 71,555.21 |
| Miami | 81 | 545.10 | 30,375.00 | 30,920.10 |
| Newark | 27 | 237.52 | 10,125.00 | 10,362.52 |
| Norfolk | 135 | 781.50 | 50,625.00 | 51,406.50 |
| San Diego | 54 | 0.00 | 20,250.00 | 20,250.00 |
| Seattle | 513 | 2,145.30 | 192,375.00 | 194,520.30 |
| Terminal Is. | <u>54</u> | <u>247.20</u> | <u>20,250.00</u> | <u>20,497.20</u> |
| <u>Total</u> | <u>1,323</u> | <u>8,641.62</u> | <u>496,125.00</u> | <u>504,766.62</u> |

The Table above includes supporting funds from NMFS and the Naval Oceanographic Office for their operations.

GTS XBT Observations

January 1 - December 31, 2002



GTS Insertion Points

- 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.

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

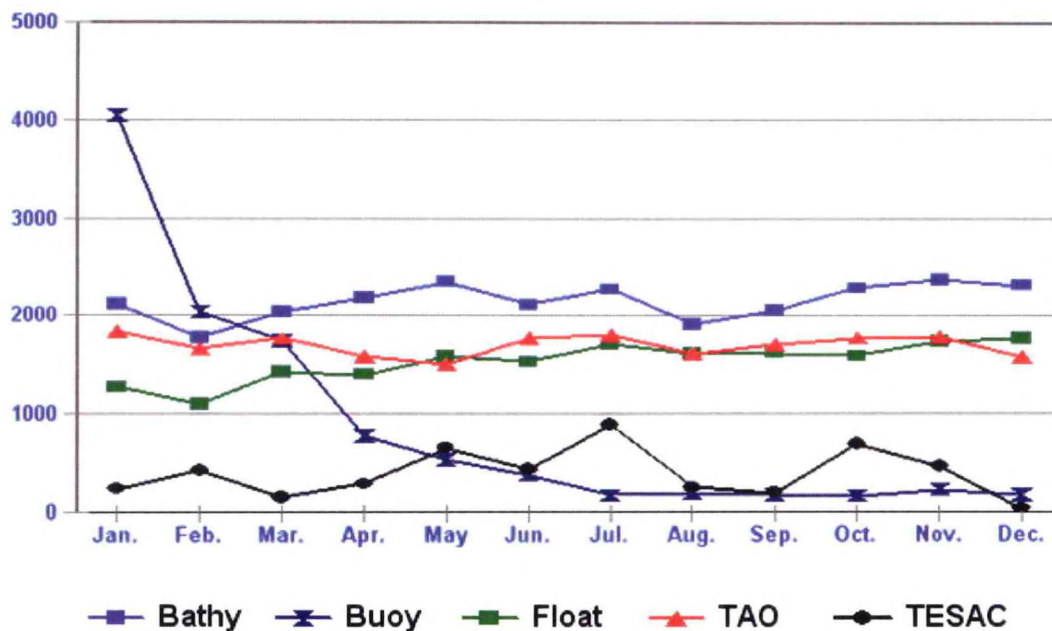
For this report, only SEAS is identified as a program. Nations listed represent the GTS insertion point, not necessarily any program associated with those nations.

2002 Summary of Subsurface Data

| Data | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Total |
|--------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|----------------|
| Bathy | 2,118 | 1,761 | 2,034 | 2,179 | 2,346 | 2,110 | 2,270 | 1,911 | 2,050 | 2,288 | 2,377 | 2,317 | 25,761 |
| Buoy | 4,053 | 2,035 | 1,735 | 778 | 534 | 380 | 177 | 197 | 185 | 175 | 239 | 180 | 10,668 |
| Float | 1,263 | 1,089 | 1,410 | 1,388 | 1,568 | 1,519 | 1,695 | 1,602 | 1,610 | 1,586 | 1,731 | 1,764 | 18,225 |
| TAO | 1,829 | 1,653 | 1,759 | 1,569 | 1,489 | 1,767 | 1,800 | 1,602 | 1,697 | 1,772 | 1,786 | 1,574 | 20,297 |
| TESAC | 238 | 419 | 154 | 286 | 654 | 440 | 890 | 257 | 202 | 693 | 473 | 44 | 4,750 |
| TRITON* | 6,877 | 6,389 | 6,237 | 7,009 | 7,034 | 7,017 | 7,944 | 8,877 | 8,940 | 8,697 | 7,746 | 7,408 | 90,175 |
| Total | 16,378 | 13,346 | 13,329 | 13,209 | 13,625 | 13,233 | 14,776 | 14,446 | 14,684 | 15,211 | 14,352 | 13,287 | 169,876 |

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

*Triton observations excluded from graph due to scaling.



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.

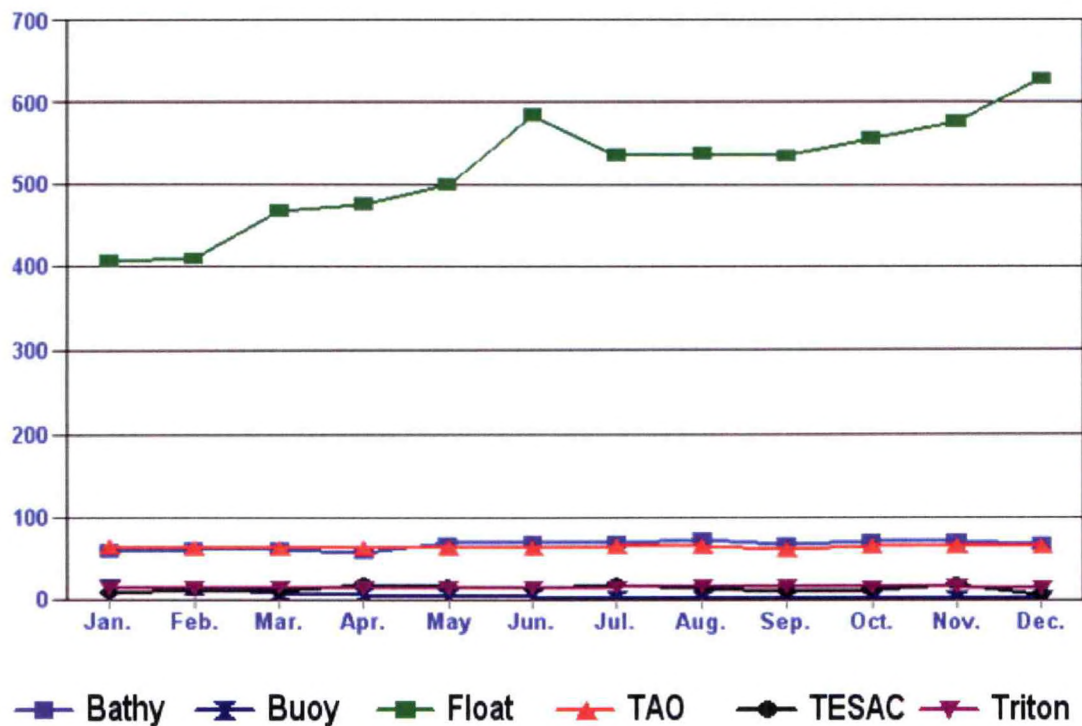
BUOY format is the most comprehensive format decoded. It permits an extensive list of atmospheric variables as well as oceanographic information. The oceanographic variables include depth/temperature/salinity as well as surface temperature and drift. TAO observations are received in BUOY format.

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

2002 Summary of the Number of Platforms Contributing Data

| Data | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|--------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| BATHY | 59 | 61 | 61 | 58 | 69 | 70 | 70 | 73 | 67 | 72 | 71 | 68 |
| BUOY | 17 | 14 | 9 | 7 | 5 | 5 | 3 | 2 | 3 | 3 | 2 | 2 |
| FLOAT | 406 | 409 | 467 | 475 | 499 | 586 | 536 | 538 | 535 | 556 | 577 | 629 |
| TAO | 65 | 63 | 64 | 64 | 64 | 64 | 65 | 65 | 61 | 65 | 65 | 65 |
| TESAC | 9 | 13 | 11 | 19 | 17 | 15 | 18 | 14 | 10 | 13 | 18 | 6 |
| Triton | 14 | 14 | 16 | 14 | 14 | 15 | 16 | 17 | 17 | 16 | 17 | 14 |
| TOTAL | 570 | 574 | 628 | 637 | 668 | 755 | 708 | 709 | 693 | 725 | 750 | 784 |

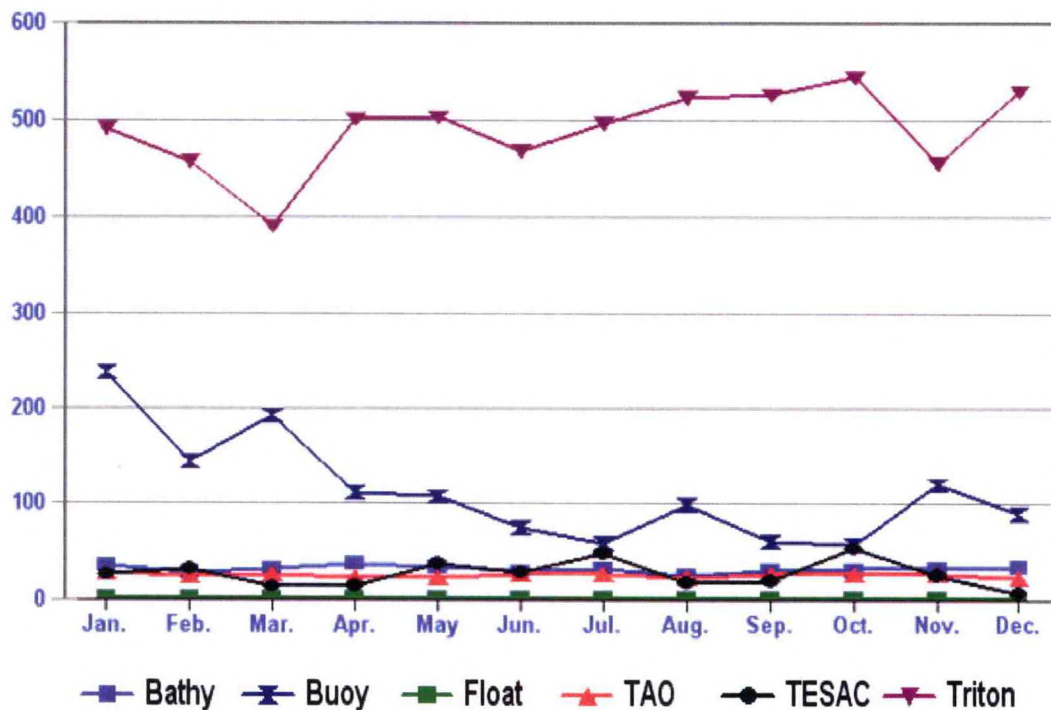
Below is a graphical presentation of data shown in the table above.



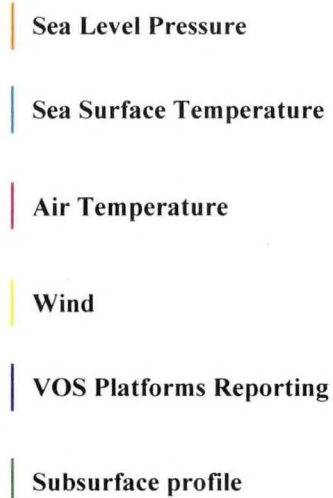
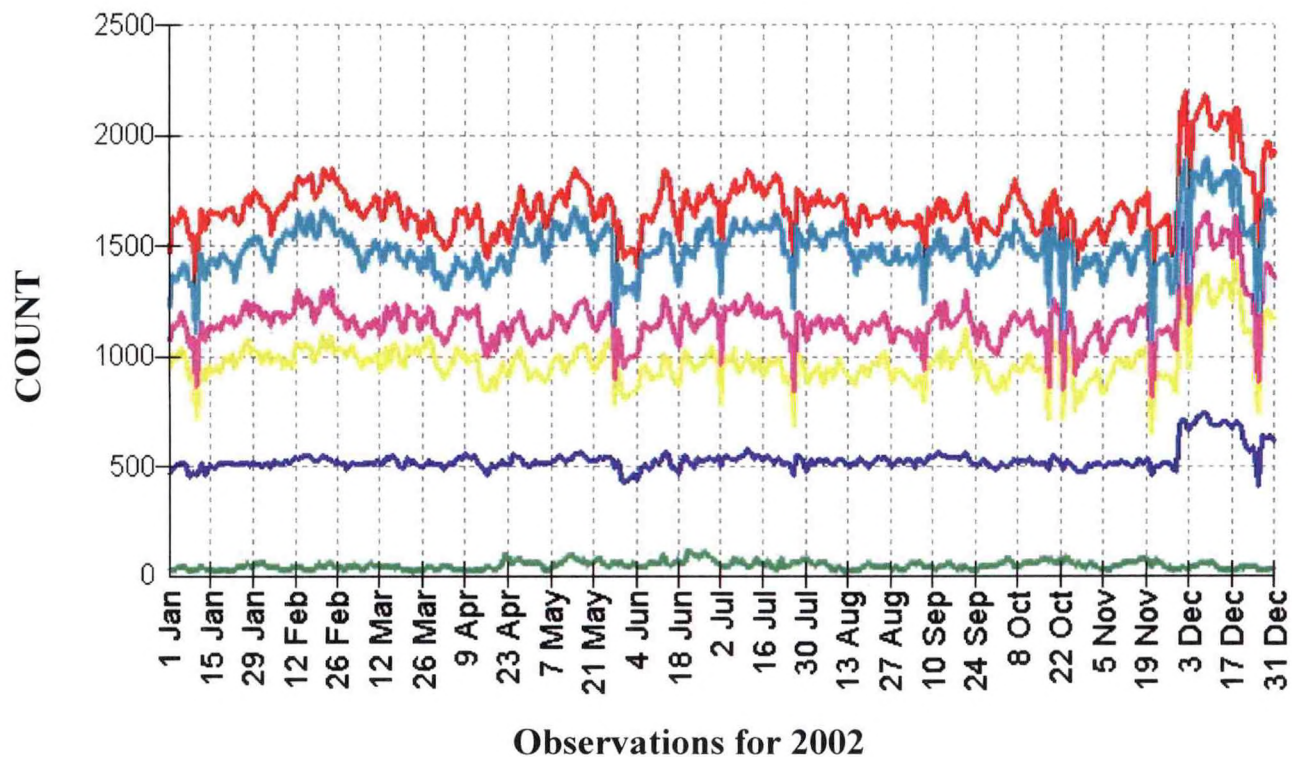
2002 Average Number of Observations per Platform

| Data | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Annual Avg. |
|---------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|-------------|
| Bathy | 35.90 | 28.87 | 33.34 | 37.57 | 34.00 | 30.14 | 32.43 | 26.18 | 30.60 | 31.78 | 33.48 | 34.07 | 32.36 |
| Buoy | 238.41 | 145.36 | 192.78 | 111.14 | 106.80 | 76.00 | 59.00 | 98.50 | 61.67 | 58.33 | 119.50 | 90.00 | 113.12 |
| Float | 3.11 | 2.66 | 3.02 | 2.92 | 3.14 | 2.59 | 3.16 | 2.98 | 3.01 | 2.85 | 3.00 | 2.80 | 2.94 |
| TAO | 28.14 | 26.24 | 27.48 | 24.52 | 23.27 | 27.61 | 27.69 | 24.65 | 27.82 | 27.26 | 27.48 | 24.22 | 26.36 |
| TESAC | 26.44 | 32.23 | 14.00 | 15.05 | 38.47 | 29.33 | 49.44 | 18.36 | 20.20 | 53.31 | 26.28 | 7.33 | 27.54 |
| Triton | 491.21 | 456.36 | 389.81 | 500.64 | 502.43 | 467.80 | 496.50 | 522.18 | 525.88 | 543.56 | 455.65 | 529.14 | 490.10 |

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



2002 Ship Observations



Legend values are decoded from various GTS formatted messages by the GOOS decoders.