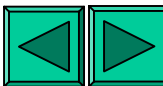


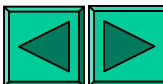
All You Wanted To Know About Drifters

Training CD



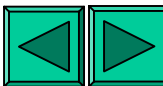
Contents

- [Global Drifter Program Overview](#)
- [What Is A Drifter?](#)
- [Things You Need To Know Before Deploying A Drifter](#)
- [How To Deploy A Drifter?](#)
- [Deployment Instructions \(English, French, Korean and Portuguese\)](#)
- [Other Types of Deployments](#)
- [How To Obtain Deployment Information On The Web](#)
- [Some Drifter Facts](#)
- [Partners](#)
- [Quality Control Procedures, Practical Implementation At The DAC](#)
- [Importance Of Metadata](#)
- [Delayed Mode Quality Control Procedures](#)
- [Web Access To Data and Products](#)
- [GTS Distribution](#)
- [Contacts](#)

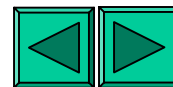
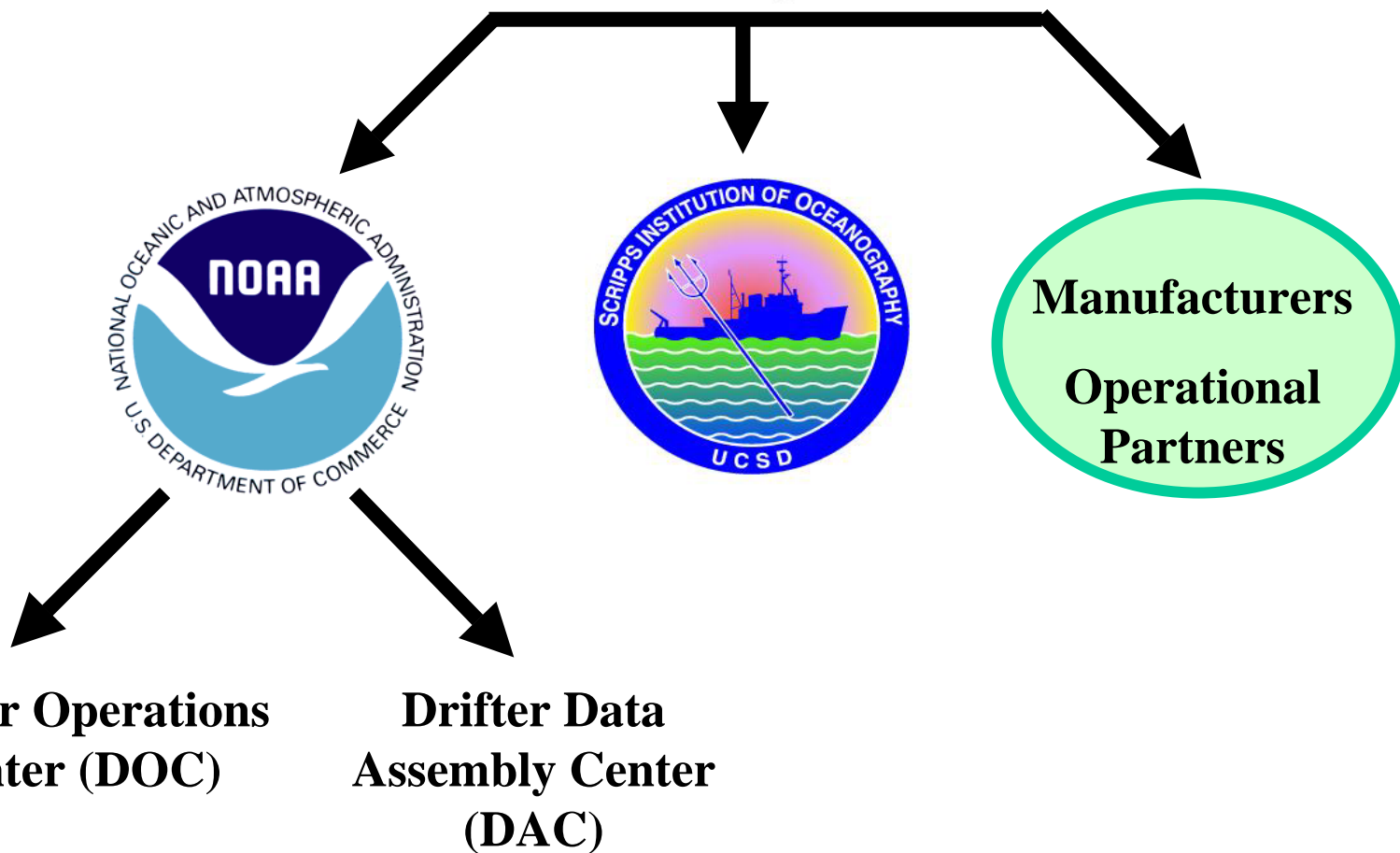
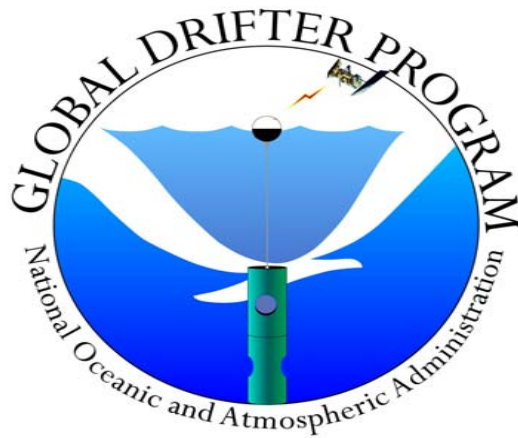


Global Drifter Program

The Global Drifter Program (GDP) is the principle component of the Global Surface Drifting Buoy Array, a branch of the National Oceanographic and Atmospheric Administration (NOAA) Global Ocean Observing System (GOOS) and a scientific project of the Data Buoy Cooperation Panel (DBCP)



Components of the Global Drifter Program



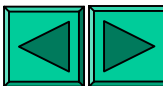
Drifter Operations Center

Objectives:

To maintain a global 5x5 array of Argos tracked Lagrangian Drifters to meet the need for accurate and global in-situ observation of SST and surface circulation.

These data support:

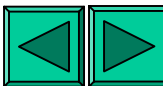
- **Short term climate prediction**
- **Satellite observation calibration**
- **Climate research and monitoring**



Drifter Data Assembly Center

Objectives:

The goal of the Drifter Data Assembly Center is to assemble and provide uniform *quality controlled* data of *research quality* for sea surface temperature and surface velocity measurements.



The DOC and The DAC Work Together But ...They Have Different Tasks

DOC



Takes care of logistics, from the request of the Argos IDS, to the deployment of the buoy

- Develops & coordinates drifter deployment plans
- Finds ships for deployments
- Distributes IDS to manufacturers
- Maintains Metadata

Shaun Dolk

DAC



- Maintains a database with drifter data from deployment until buoy stops transmitting, and QC data**
- Decodes raw data & applies calibrations
 - Quality controls and interpolates data
 - Makes data available through web and distributes for archiving
 - Disseminate buoys going on/off GTS

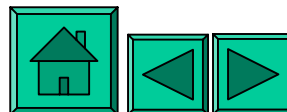
Mayra Pazos,

Jessica Redman and Erik Valdes

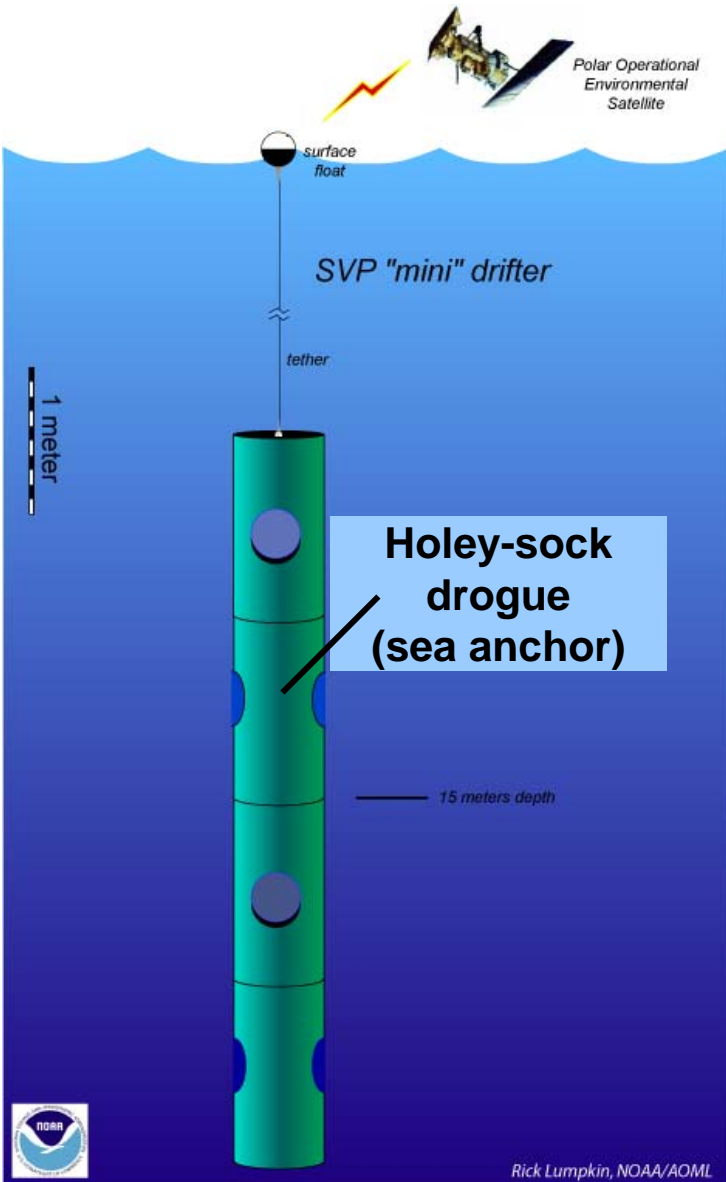
What Is A Drifter?



The modern drifter is a high-tech version of the "message in a bottle". It consists of a surface buoy and a subsurface drogue (sea anchor), attached by a long, thin tether. The buoy measures temperature and other properties, and has a transmitter to send the data to passing satellites. The drogue dominates the total area of the instrument and is centered at a depth of 15 meters beneath the sea surface.



Basic SVP Drifter



Spherical plastic float

Poly Urethane impregnated wire

Holey Sock drogue centered at 15-m depth

D-cells batteries inside the float

Sensors:

Drogue: Observes the submersion rate of the float. Float stays on the surface if drogue is lost.

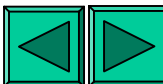
SST: To measure Sea Surface Temperature

Voltage: Indicates batteries' life

Cost: ~\$1800

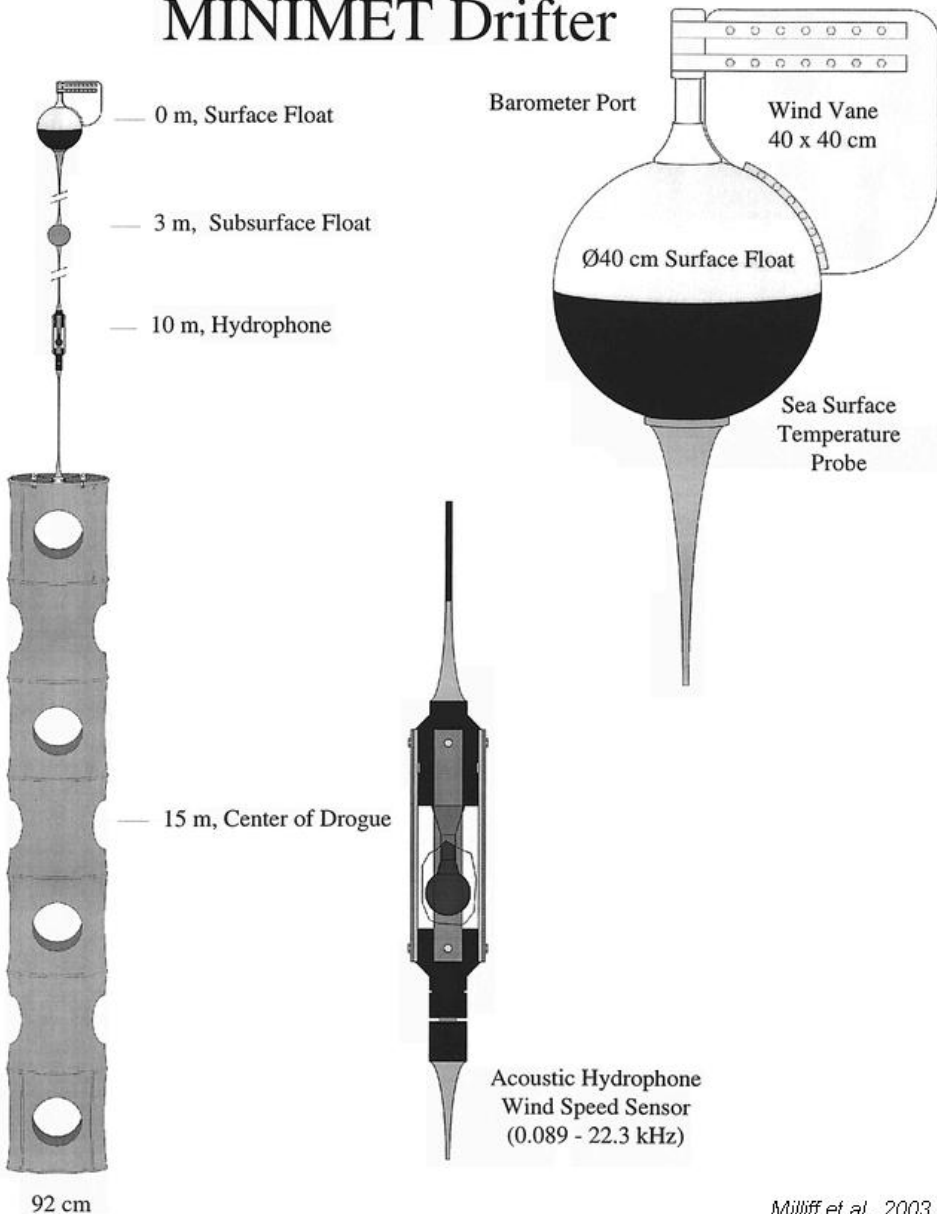
Other Sensors that can be added:

Barometric pressure, wind, salinity, etc



SVP + Barometer + Wind

MINIMET Drifter



Milliff et al., 2003

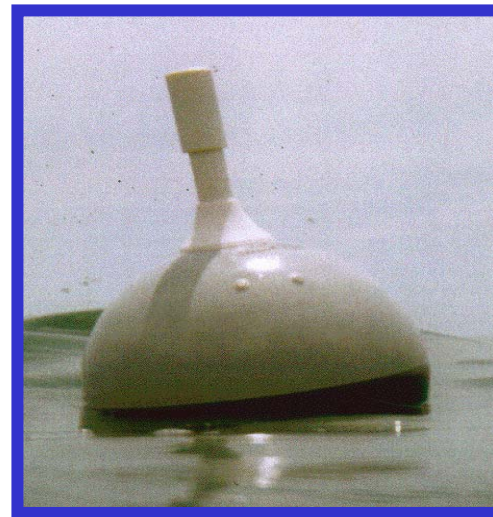
Barometer to measure air pressure.

Wind Direction is measured by a vane on the surface float

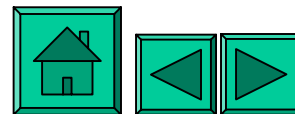
Wind speed by a subsurface hydrophone.

Cost: ~\$3000.00

We offer option to upgrade!



**SVP with
Barometer**



Drifter Packaging

**Deployment
Instructions**

**Hulls covered
with cardboard**

**Uncovered
Hulls**

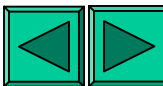
**Plastic
wrap**



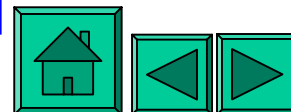
Pull-Pin Activation Magnet



- Some drifters have a pull-pin magnet to activate the buoy.
- Without removal of the magnet, the buoy remains “off”.
- Some drifters have the magnet attached with water-soluble tape, that don't require removal prior to deployment.



Drifter Ready To Be Deployed

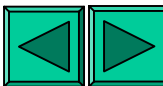


How To Deploy A Drifter

1- Remove **ONLY** plastic shrink wrap



Some drifters have cardboard around the float. **DO NOT** remove the cardboard surrounding the surface float.



How To Deploy A Drifter (Cont.)

DANGER!

2- **DO NOT** remove the paper tape securing the tether and drogue

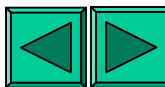
DANGER!



Paper tape

Paper tape

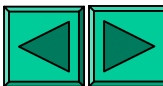
If you do, the drogue and/or tether can unfurl during deployment and cause injury!!!



How To Deploy A Drifter (Cont.)

3- Record the five digit ID number of the drifter. This number can be found on the shipping container, the plastic shrink wrap or the protective cardboard box. It is also inscribed on the surface float.

ID
number
on the
surface
float



How To Deploy A Drifter (Cont.)

4- If testing the buoy is desired prior to deployment, the magnet can be removed from the drifter by separating it from the surface float. This action will start the Argos transmitter for testing, reattaching the magnet in the same position, will turn off the transmitter.



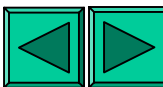
magnet



Remove magnet through hole in the box.

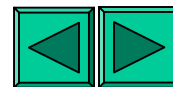
Test if transmitting.

Hole in box to remove magnet



Some drifters don't have a safety pin magnet to be removed, instead they have the magnet attached with soluble tape that will dissolve once the drifter is in the water.

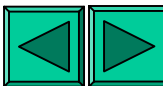
****Read instructions carefully to know if you need to pull the magnet manually or not.****



How To Deploy A Drifter (Cont.)

5- Throw the drifter from the stern, lowest possible deck (preferably less than 10 meters including heave) into the sea. The ship may be traveling between 2-25 knots. The tether and drogue are secured with paper tape that will dissolve in the water.

Throw buoy from stern,
lowest possible deck.



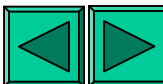
**Tether and drogue
secured with paper tape
that will dissolve in water**



**Drogue starts sinking
minutes after deployment**



**Drogue stretches
vertically, when
tape dissolves**



How To Deploy A Drifter (Cont.)

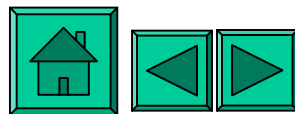
6- Record the five(5) digit Buoy ID, Date of Deployment, Time (GMT) of Deployment, Longitude and Latitude of deployment and send this information to the Global Drifter Program.

Contact Persons:

Shaun.Dolk@noaa.gov

and

Mayra.Pazos@noaa.gov



Instructions Included With Each Drifter

DEPLOYMENT INSTRUCTIONS

Read Carefully

(Page 1)

FOLD

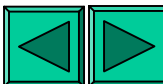
1. Remove plastic wrap



2. **DO NOT REMOVE** paper tape, cardboard, or anything **BUT** plastic.



3. Throw buoy in water.



Deployment Instructions (Page 2)

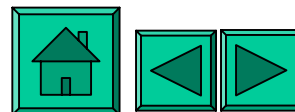
- 1) Remove the buoys from the shipping container. **REMOVE ONLY** the plastic shrink-wrap.
- 2) **DO NOT REMOVE** paper tape securing the drogue and tether. **DO NOT REMOVE** cardboard surrounding the float.

DANGER: **DO NOT REMOVE** the paper tape securing the tether and drogue. If you do, the drogue and/or tether can unfurl during deployment and cause injury!!!

- 3) Record the five digit ID number of the drifter. This number can be found on the shipping container, the plastic shrink-wrap or the protective cardboard box. It is also inscribed on the surface float.
- 4) If testing the buoy is desired prior to deployment, the magnet can be removed from the buoy by separating it from the float through a hole in the box surrounding the float. This action will start the ARGOS transmitter for testing. Re-attaching the magnet in the same position will turn off the transmitter and reset the program starting point. The transmitter will restart on its original program when the magnet is again removed.
- 5) Throw the buoy from the stern, lowest possible deck (preferably less than 10 meters including heave), into the sea. The ship may be traveling between 2 - 25 knots. The tether and drogue are secured with paper tape that will dissolve in the water.
- 6) Record the date, time (GMT) and location of deployment as well as the five digit ID, and send this information to the Global Drifter Program.

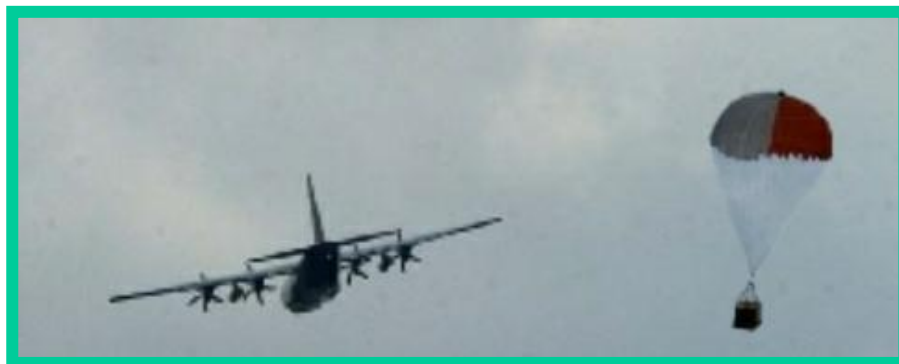
Thank you very much for your help!

CONTACT PERSON

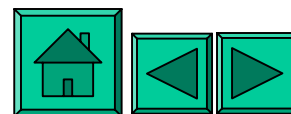


Drifters Are Deployed From:

- Cruise ships
- Cargo ships
- Research Vessels
- Aircrafts



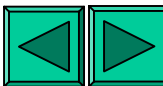
Assistance from national and international Governmental Agencies



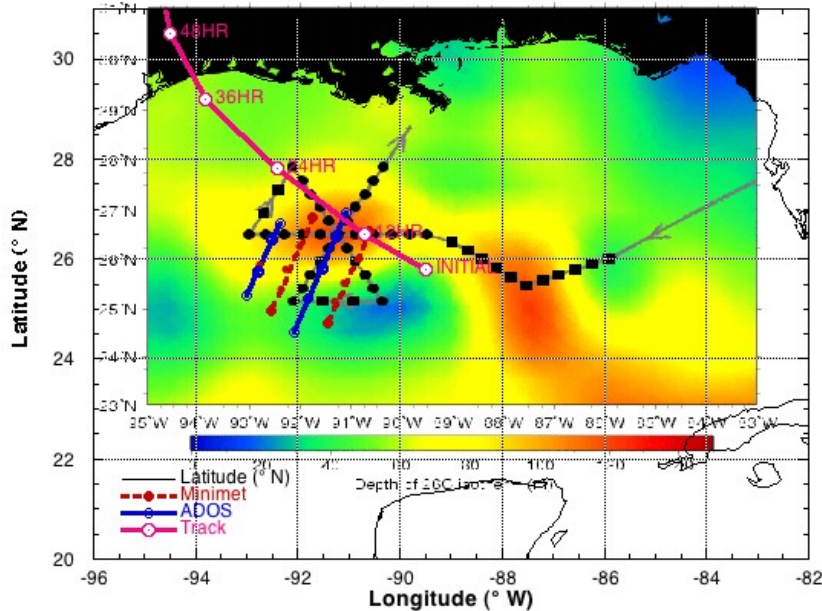
Drifters Deployed By Aircrafts



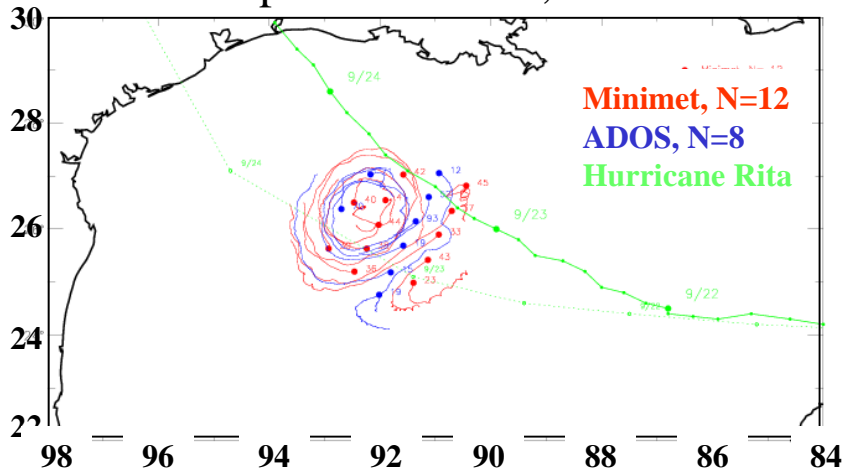
- **Drifters are also deployed by aircraft to help seed those regions that otherwise it would be hard to reach.**
- **Every year during the hurricane season in the Atlantic Ocean (June 1 – November 30) NOAA/AOML has coordinated Deployments with NAVOCEANO in the past, and also with the National Hurricane Center in Miami, Florida, to deploy drifters in front of hurricanes using the hurricane hunter planes from the air force to provide forecasters and researchers with surface meteorological data to help in the prediction and forecast of hurricanes.**
- **These drifters besides measuring SST, also measure:**
 - Barometric pressure**
 - Wind speed and wind direction**



Drifters in front of Hurricane Rita Sep 21, 2005



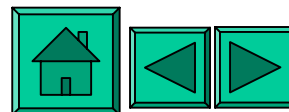
September 21-28, 2005



A total of 20 drifters were deployed in front of the cat 5 hurricane Rita. All drifters survived and sent good data.

Air pressure, SST, wind direction and wind speed were reported and transmitted onto the GTS. The 8 ADOS drifters were also equipped with 100m thermister chains and measured temperature to 100m depth.

These data provided an excellent data set for improvements of wind speed algorithms from hydrophone observations. SST was measured at much higher resolution than many satellite products and helped calibrate these products.



Deployment Information On The Web

www.aoml.noaa.gov/phod/dac



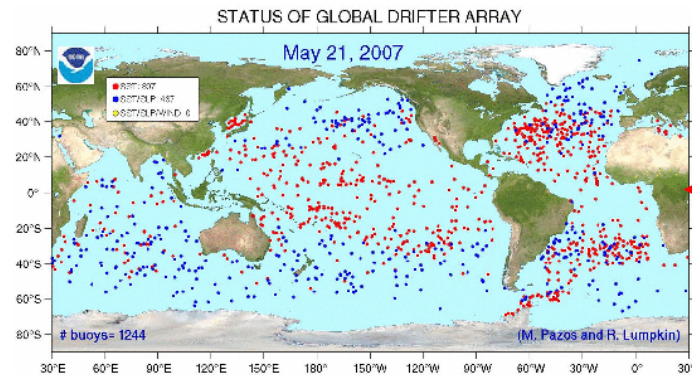
The Global Drifter Program Satellite-tracked surface drifting buoys

NOAA Home AOML Home PhOD Home GOOS Center **Global Drifter Program**

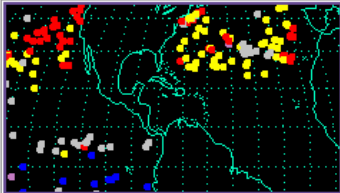
- GOOS Center
- ARGO Center
- Global Drifter Program
- High Density XBT Lines
- Low Density XBT Lines
- Global Drifter Program**
- Information
- Data and Products
- Operations
- Contact
- Contact Information

The Global Drifter Program

Satellite-tracked surface drifting buoy observations of currents, sea surface temperature, atmospheric pressure, and wind speed and direction. [More information ...](#)



Click to see the current status of the array

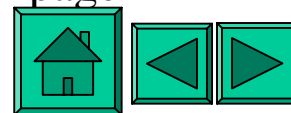


The Drifter Data Assembly Center
Processing, Analysis, and Distribution
Data Products Available



The Drifter Operations Center
World Wide Drifter Deployments

Enter DOC page



Global Drifter Program

Information

Data and Products

Operations

Operations

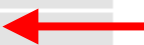
Deployments by year

Drifter deployment log

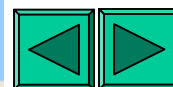
Deployment instructions

Deployment log form

Sample Drifter Deployment Log



ID	WMO#	Dep date	Lat	Long	Ship	Manufacturer	Type	Prgm
62878	13920	2007 05 19 20 26.0N 025 00.4W	20 26.0N	025 00.4W	RONALD BROWN	!Pacific Gy	SVP3	6129
71112	13634	2007 05 19 20 29.6N 023 04.0W	20 29.6N	023 04.0W	RONALD BROWN	!Metocean	SVP3	6129
71171	0	2007 05 19 00 00.1N 086 12.4W	00 00.1N	086 12.4W	JOSEPHINE MAERSK	!Metocean	SVP3	6129
62892	13607	2007 05 15 14 00.3N 023 00.0W	14 00.3N	023 00.0W	RONALD BROWN	!Pacific Gy	SVP3	6129
62875	13633	2007 05 14 11 28.7N 023 00.0W	14 11 28.7N	023 00.0W	RONALD BROWN	!Pacific Gy	SVP3	6129
63269	0	2007 05 14 09 16.0S 006 22.8E	14 09 16.0S	006 22.8E	ATLANTIC ACTION	?Clearwater	SVP3	7325
63915	71697	2007 05 14 60 02 S 063 20.1W	14 60 02 S	063 20.1W	LM GOULD	!Technocean	SVPBD2	7325
63920	33654	2007 05 14 59 00.2S 063 48.0W	14 59 00.2S	063 48.0W	LM GOULD	!Technocean	SVPBD2	7325
72184	13636	2007 05 14 11 28.7N 023 00.0W	14 11 28.7N	023 00.0W	RONALD BROWN	!Pacific Gy	SVPBD2	6129
36164	17656	2007 05 13 37 07 S 012 03.1W	13 37 07 S	012 03.1W	Tristan	!Technocean	SVPBD2	9325
54355	15603	2007 05 13 05 00 S 004 33.3E	13 05 00 S	004 33.3E	ATLANTIC ACTION	!Clearwater	SVP3	9325
59838	43538	2007 05 13 29 34.5N 128 28.1W	13 29 34.5N	128 28.1W	EXPLORER	!Pacific Gy	SVP3	8325
59863	43539	2007 05 13 29 58.6N 127 00.0W	13 29 58.6N	127 00.0W	EXPLORER	!Pacific Gy	SVP3	8325
59892	51630	2007 05 13 29 09.1N 130 00.0W	13 29 09.1N	130 00.0W	EXPLORER	!Pacific Gy	SVP3	8325
62884	13921	2007 05 13 10 00 N 023 00.0W	13 10 00 N	023 00.0W	RONALD BROWN	!Pacific Gy	SVP3	6129
62249	15601	2007 05 12 01 00 S 002 52.0E	12 01 00 S	002 52.0E	ATLANTIC ACTION	!Clearwater	SVP3	6129
62885	13922	2007 05 12 06 00 N 023 00.0W	12 06 00 N	023 00.0W	RONALD BROWN	!Pacific Gy	SVP3	6129
62891	13924	2007 05 12 08 00.4N 022 59.0W	12 08 00.4N	022 59.0W	RONALD BROWN	!Pacific Gy	SVP3	6129
62895	13926	2007 05 12 07 05.4N 023 00.0W	12 07 05.4N	023 00.0W	RONALD BROWN	!Pacific Gy	SVP3	6129
62901	13929	2007 05 12 08 00.4N 022 59.0W	12 08 00.4N	022 59.0W	RONALD BROWN	!Pacific Gy	SVP3	6129
62882	13925	2007 05 11 04 03.5N 022 59.0W	11 04 03.5N	022 59.0W	RONALD BROWN	!Pacific Gy	SVP3	6129
71170	0	2007 05 11 03 00 N 001 10.5E	11 03 00 N	001 10.5E	ATLANTIC ACTION	!Metocean	SVP3	6129



Some Drifter's Facts

Drifters average life: **~450 days**

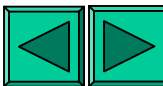
Longest Lived: **10 years, 4 months, 21 days**

Drogue average life: **~300 days**

Longest Drogue on : **5 years, 6 months, 21 days**
(and still on)

Average failure on deployment: **~3%**

Death Reasons: **Run aground, picked up by fishermen,
stop transmitting**

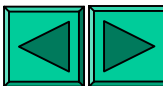
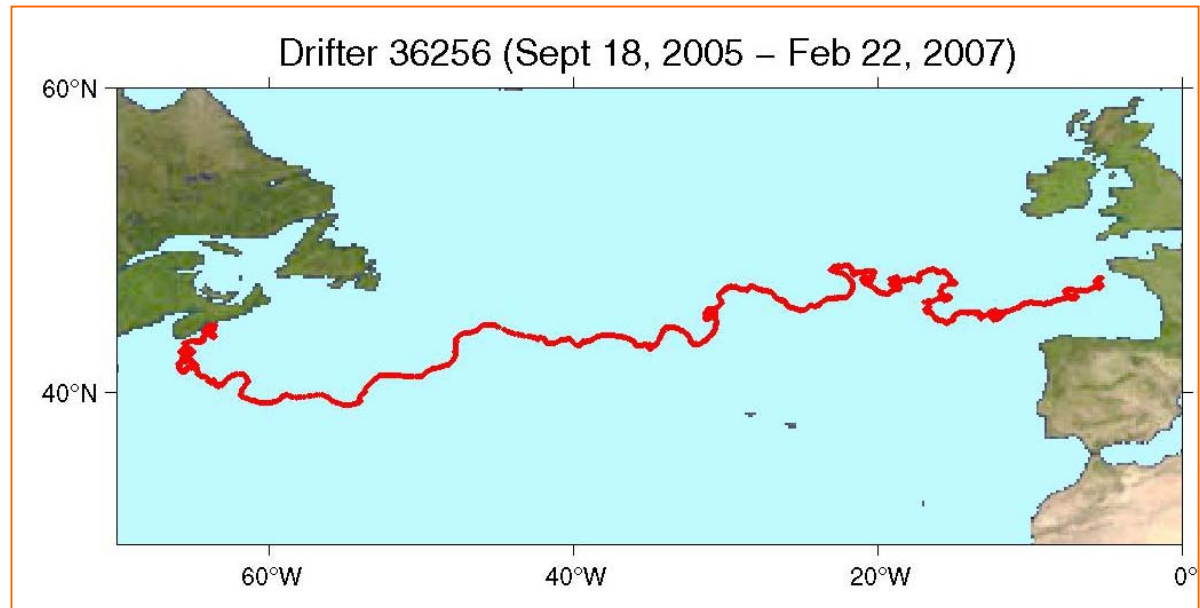


Global Drifter # 1250

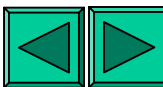
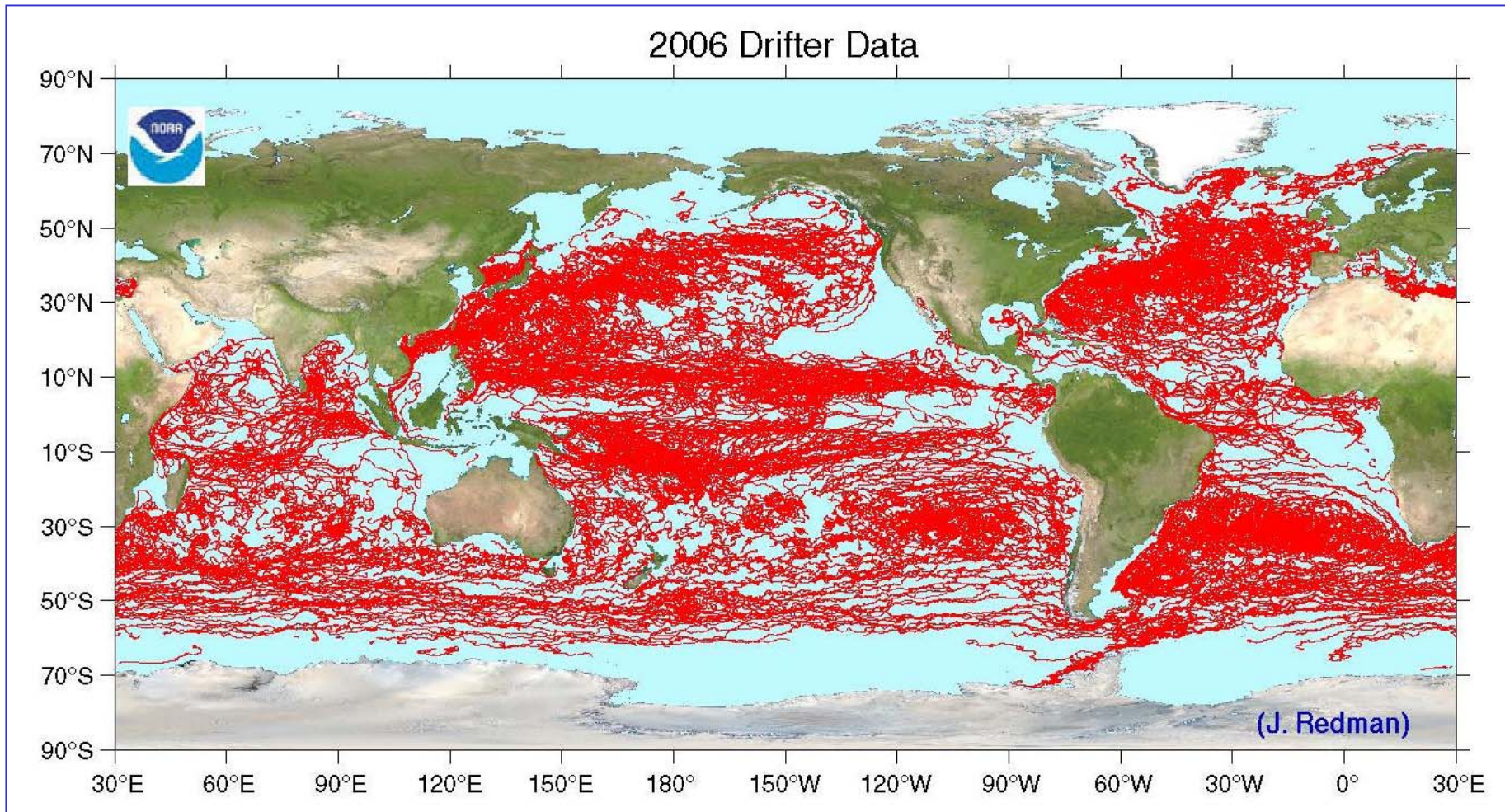
Scientific design of the global drifting network called for 1250 buoys to be deployed and maintained worldwide to ensure total coverage of the global ocean and to calibrate the satellites.

Retrieved after crossing North Atlantic, off the coast of Brest, France

Traveled for 521 days, with drogue on to the end, and transmitting good SST, and barometric pressure. All data went out on the GTS.



Tracks of Drifters During 2006



Our appreciation to the following Operational Partners for their contributions to GDP activities

Ships of Opportunity program

International Ice Patrol

Institut de Recherche pour le Développement;

Météo-France (France)

New Zealand Met. Service

Australian Bureau of Meteorology

Fundação Universidade Federal do Rio Grande; Instituto

Nacional de Meteorologia; Centro de Hydrografia de Marinha; INPE (Nacional Space Institute);

Brazilian Navy (Brazil)

Fisheries Research Institute; Servicio de Hidrografía

Naval (Argentina)

Instituto Canario de Ciencias Marinas; Universidad de

Las Palmas de Gran Canaria (Spain)

Instituto Nazionale di Oceanografia e di Geofisica

Sperimentale (Italy)

Marine Fisheries Research Division – Ghana

Fisheries Department – Tristan Da Cunha

National Institute of Oceanography; National Institute of

Ocean Technology (India)

Centro de Investigacion Cientifica y de Educacion Superior de Ensenada (Mexico)

Ministry of Maritime Affairs and Fisheries

NORI, NFRDI (Korea)

United Kingdom Met Office

Environment Canada

University of Cape Town; South African Weather Service (South Africa)

Scripps Institution of Oceanography

Woods Hole Oceanographic Institution

United States Air Force

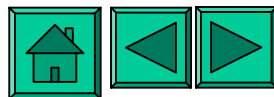
Oregon State University

Marine Resources Research Institute

US Naval Oceanographic Office

United States Coast Guard

Raytheon Polar Services ... and many others



Quality Control

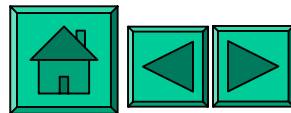
Practical implementation at the
Drifter Data Assembly Center

Importance of
Metadata

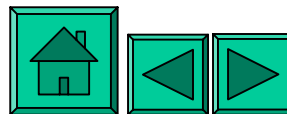
Delayed Mode
Quality Control
Procedures

Web Access to
Data and
Products

GTS
Distribution



Importance of Metadata



Importance of Metadata

METADATA= DOCUMENTATION

Metadata describes the characteristics of the data. The drifter metadata describes:

Argos ID number

GDC unique ID

WMO number

Program number

Contact Information

Deployment time, latitude and longitude

Manufacturer

Buoy type

Drogue type, length, and brief description of its characteristics

Sensors transfer functions

Track inventory of drifters, both in storage and in transit

Metadata helps share reliable information, and maintain homogeneity of the database

Without METADATA no data set is complete



Sample Specification Sheet

Manufacturers are required to send DAC specification sheets

Argos ID(s) 70850-70857

Manufacturer

Technocean

Sensor array

SVPB Battery voltage, drogue sensor,
SST, barometer

Surface float description

41 cm. diameter, ABS plastic surface float.

Tether description

- a) 0.32 cm OD polypropylene-impregnated wire rope between surface float and drogue.
- b) Tether attachment to 2.0 cm steel ring at base of surface float; marine epoxy filled cavity surrounding ring for restraint.
- c) 5 cm dia. by 32 cm long polyurethane strain relief molded below surface float. Attachment point of tether to drogue hub covered by 5 cm dia. by 32 cm long polyurethane strain relief.

Drogue description

a) Holey sock made from Cordura nylon cloth; diameter 61 cms, length 610 cms. construction consists of 5 cylindrical sections, each 122 cms long. Two 30 cm dia. holes cut opposite each other in each section. Axis joining holes is rotated by 90° between successive sections. Drogue is centered at 15 m.

Drogue depth

15 m at center

Drogue length

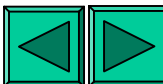
6.1 meters

Message Length

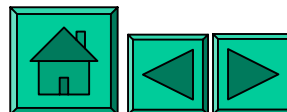
56 bits

Message format

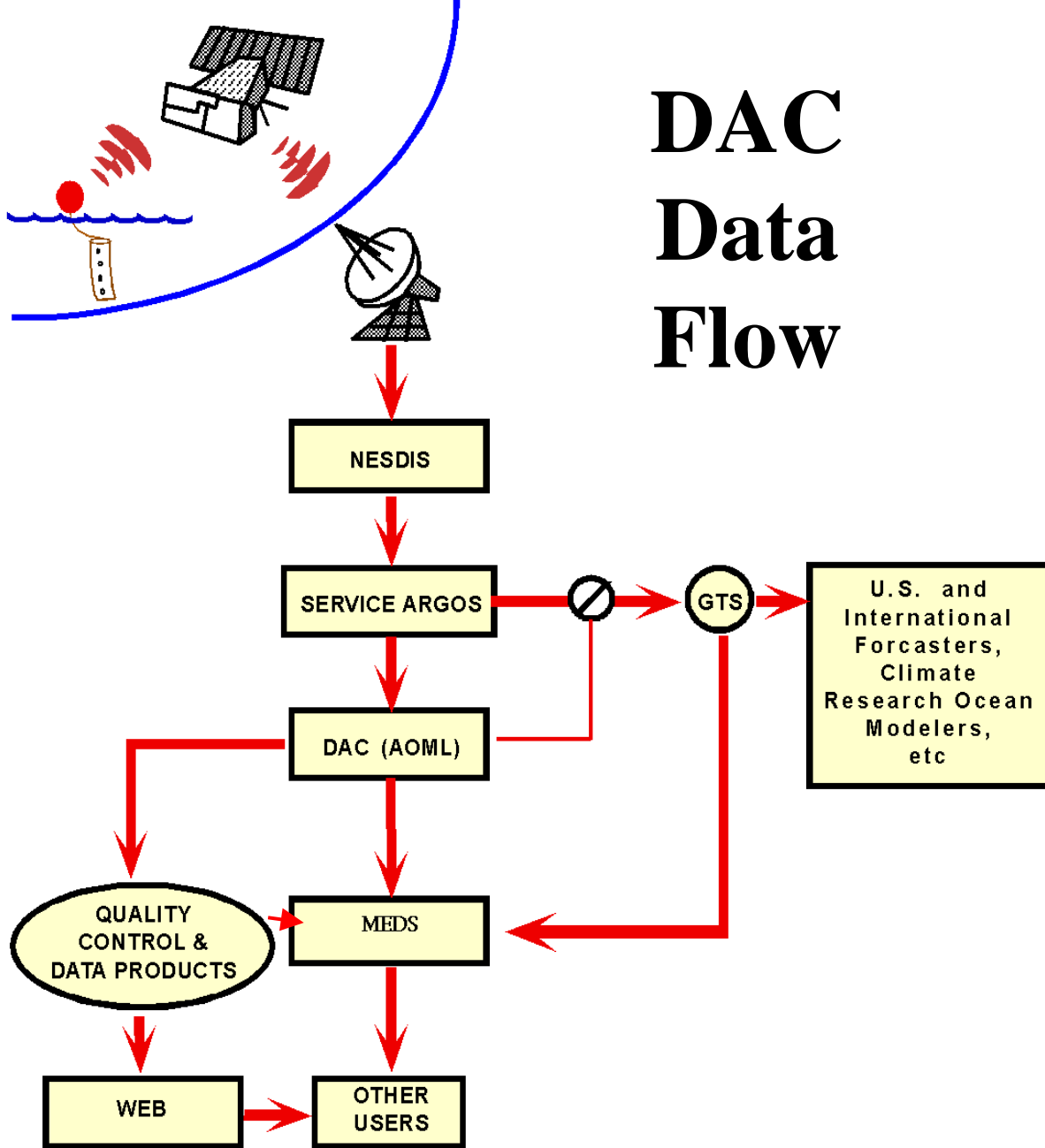
- 8 bits Checksum
- 4 bits Rank
- 6 bits Age
- 11 bits Barometric pressure
- 9 bits Sea surface temperature
- 9 bits Air pressure tendency
- 6 bits Submergence count
- 3 bits Battery voltage



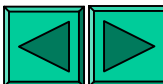
Delayed Mode Quality Control Procedures



DAC Data Flow



SCHMATIC OF THE DATA FLOW ASSOCIATED WITH THE DAC



Drifter Database Information Files

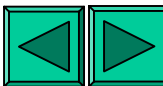
- **Relational database using flat files linked by ARGOS ids**
- **Data starts in February 1979 and continues to present**
- **All buoys are standard WOCE/SVP drogued at 15 meters**

DIRECTORY FILE
(information
about ea. Drifter)

CALIBRATION FILE
(coefficients to calibrate
each sensor)

GROUND FILE
(holds time interval
not to be interpolated)

**TEMPERATURE
FILE**
(holds last day SST is good)



Drifter Database Data Files

Data from Argos

Apply calibrations and split
into individual files by ID

B-files
B00000.DAT
(raw data for ea. buoy)

Edit **P**osition and **S**ST
Split into **P** and **S** files

P-files
P00000.DAT
(Edited Position)

S-files
S00000.DAT
(Edited SST)

K-files
K00000.DAT
(Interpolated - Kriging)

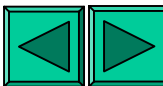
Reside in AOML
database, available
through the **WEB**



Quality Control Steps

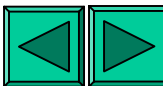
- **Drifter data is downloaded from Argos daily and also received at AOML once a month on CDs**
- **Convert raw data into engineering units and add to individual B-file by ID**
- **Determine deployment time and position of first good transmission from the water**
- **Run programs that identify buoys that are dead:**
 - a) Transmit from the same location after a successful deployment (grounded)**
 - b) Do not have any new data after last update (quit)**

Such dates and positions are entered into the
DIRECTORY file



Quality Control Steps (Continuation)

- Software are run to check bad locations from ARGOS raw data based on speed between consecutive locations, bad points are deleted (P-files)
- Deviant SST values are removed by applying a temperature change criterion relative to the recent temperatures measured by the buoy (S-files)
- SST's from each drifter are compared with Reynold's climatology to determine temperature sensor failure, last good day is entered into the TMPFL file. SST after this date will be discarded
- We decode, archive and handle GTS data transmissions and deletions of other sensor data like pressure and wind, but NO quality control is applied to them



Quality Control Steps (Continuation)

- **Buoys that possibly lost their drogues are identified.**
Drogue lost date is determined and entered in the DIRECTORY file
- **All active buoys are processed and interpolated to 6 hour intervals, using the Kriging method**

P (position edited) file + S (SST edited) file = K (interpolated) file

Refer to paper by Hansen and Poulain for details on the Editing and Kriging procedures:

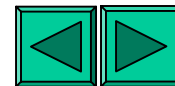
Hansen, D.V. and P.-Marie Poulain, 1996. Quality Control and Interpolations of WOCE/TOGA Drifter Data. J. Atmos. Oceanic Tec., 13, 900-909

- ***Kriged drifter data can be accessed through the WEB***

WWW.AOML.NOAA.GOV/PHOD/DAC/DACDATA.HTML

> Interpolated database

- **Database is updated every 2-3 months and sent to MEDS for distribution and archival**



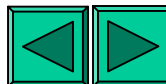
Sample Directory file

<http://www.aoml.noaa.gov/phod/dac/dacdata.html>

> Details of all drifters in database

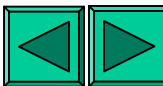
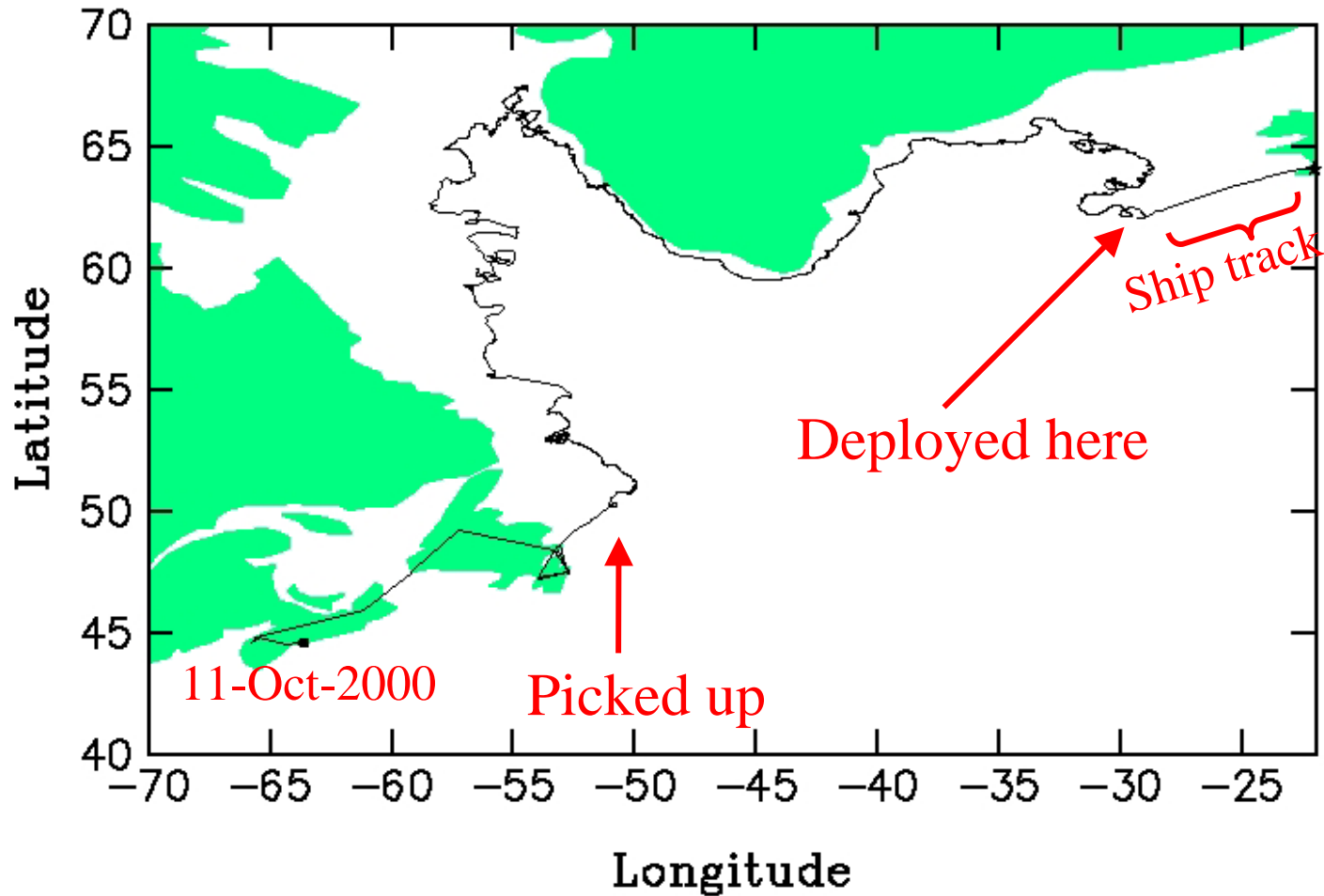
LIST AND DETAILS OF ALL BUOYS IN DATABASE AS OF OCTOBER 2006

ID	WMO	EXP	DEP. DATE	DEP. LAT	DEP. LON	END. DATE	DROG OFF DATE	DEATH CODES	MANUF.	TYPE
62228	32545	6129	12- 25- 2006	27.20	280.83	12- 31- 2006	12- 25- 2006	3	Clearwater	SVP
62274	33663	6129	10- 27- 2006	-38.48	307.48	10- 31- 2006	0- 0- 0	0	Clearwater	SVP
63115	32921	7325	10- 25- 2006	-23.00	285.92	10- 31- 2006	0- 0- 0	0	Clearwater	SVP
63116	32922	7325	10- 25- 2006	-25.00	286.40	10- 31- 2006	0- 0- 0	0	Clearwater	SVP
62208	53593	9325	10- 24- 2006	2.98	92.66	11- 30- 2006	0- 0- 0	0	Clearwater	SVP
63058	51811	7325	10- 24- 2006	0.03	189.90	10- 31- 2006	0- 0- 0	0	Clearwater	SVP
63122	32919	7325	10- 24- 2006	-19.68	285.19	10- 31- 2006	0- 0- 0	0	Clearwater	SVP
63123	32920	7325	10- 24- 2006	-21.00	285.48	10- 31- 2006	0- 0- 0	0	Clearwater	SVP
63249	51848	7325	10- 24- 2006	2.08	189.99	10- 31- 2006	0- 0- 0	0	Clearwater	SVP
62210	53592	9325	10- 23- 2006	0.00	94.53	12- 1- 2006	0- 0- 0	0	Clearwater	SVP
63065	51830	7325	10- 23- 2006	-2.15	190.05	10- 31- 2006	0- 0- 0	0	Clearwater	SVP
62206	53591	9325	10- 22- 2006	-3.01	96.41	12- 1- 2006	0- 0- 0	0	Clearwater	SVP
63062	51810	7325	10- 22- 2006	-4.95	189.99	10- 31- 2006	0- 0- 0	0	Clearwater	SVP
63113	32623	7325	10- 22- 2006	-19.70	282.99	10- 31- 2006	0- 0- 0	0	Clearwater	SVP
70249	0	1627	10- 22- 2006	37.44	11.31	10- 31- 2006	0- 0- 0	0	Clearwater	SVPB
63111	32622	7325	10- 21- 2006	-19.72	280.99	10- 31- 2006	0- 0- 0	0	Clearwater	SVP



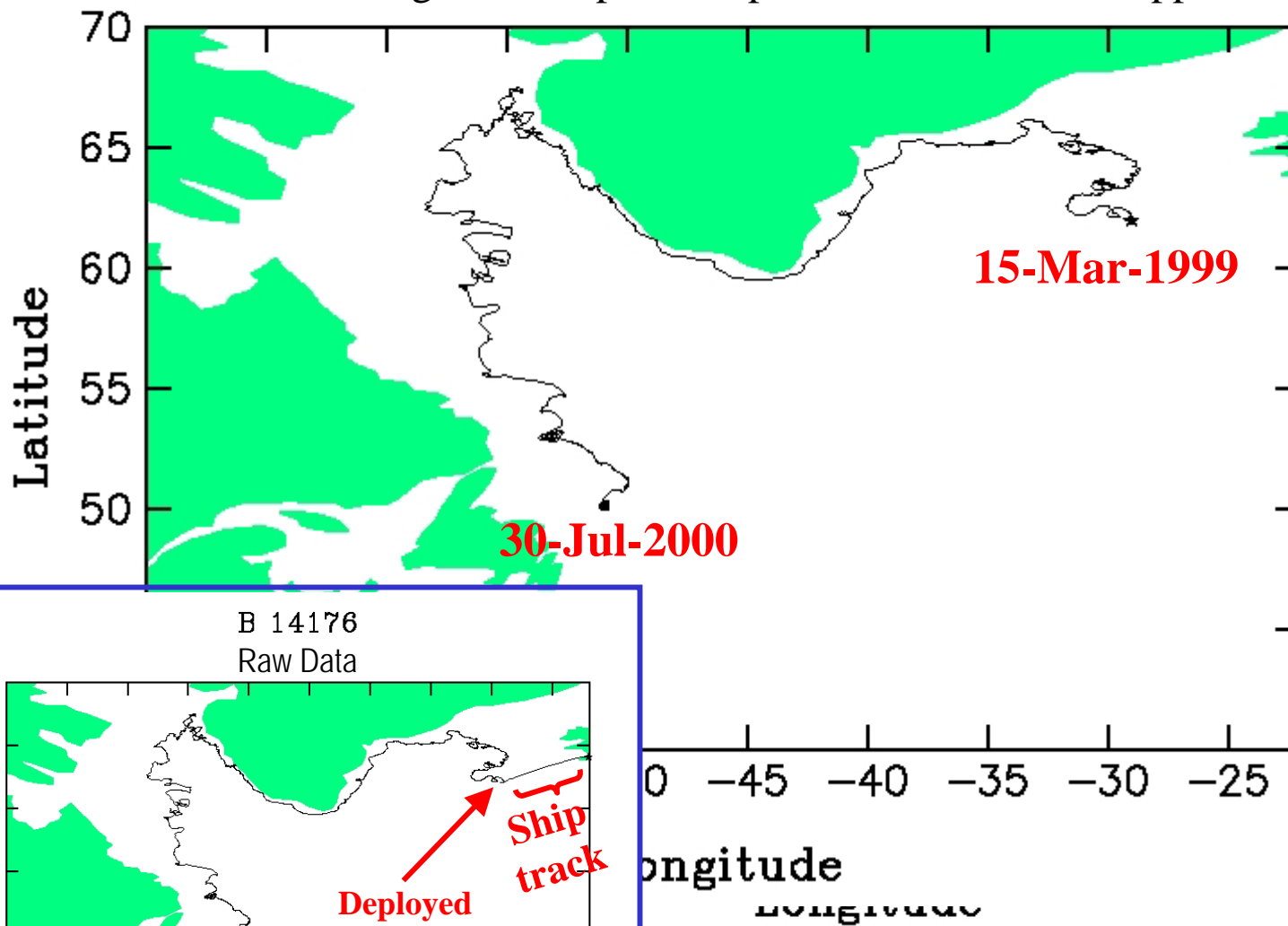
QC Examples

Drifter 14176 raw file

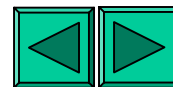
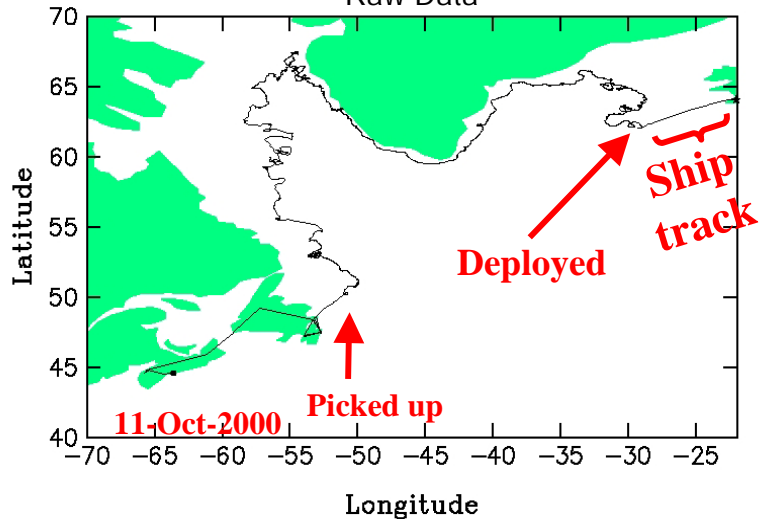


Drifter 14176 Cleaned and Interpolated File

After editing and interpolation procedures have been applied

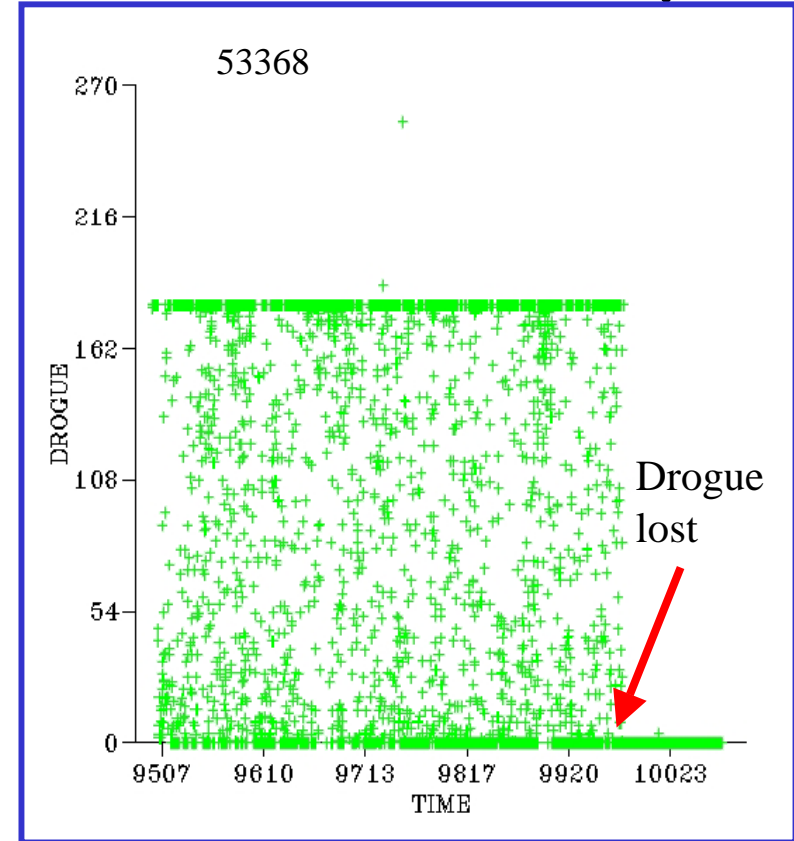
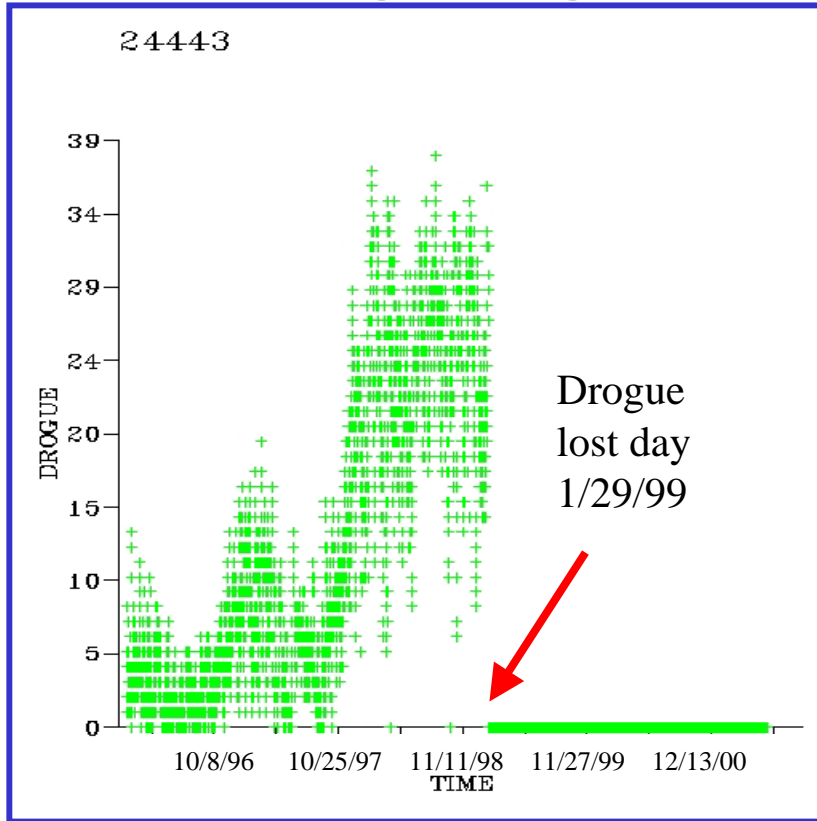


B 14176
Raw Data

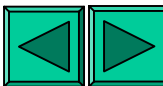


QC Examples

Determining drogue off time... NOT an easy task



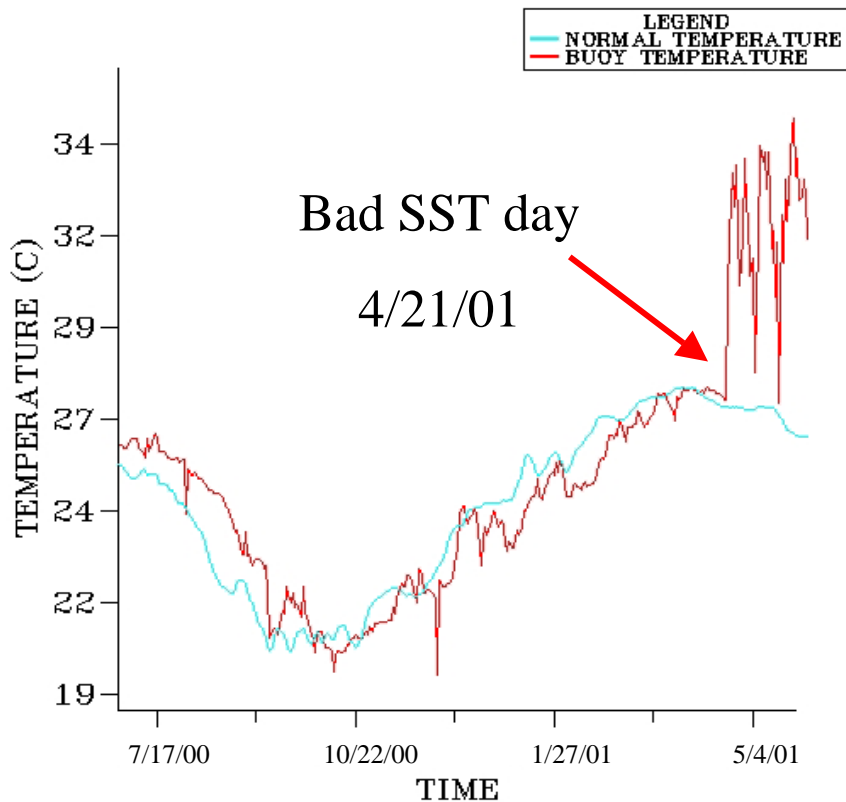
Typical submergence record for Technocean
“drogue loss”
(sharp drop to zero when drifter is picked up).



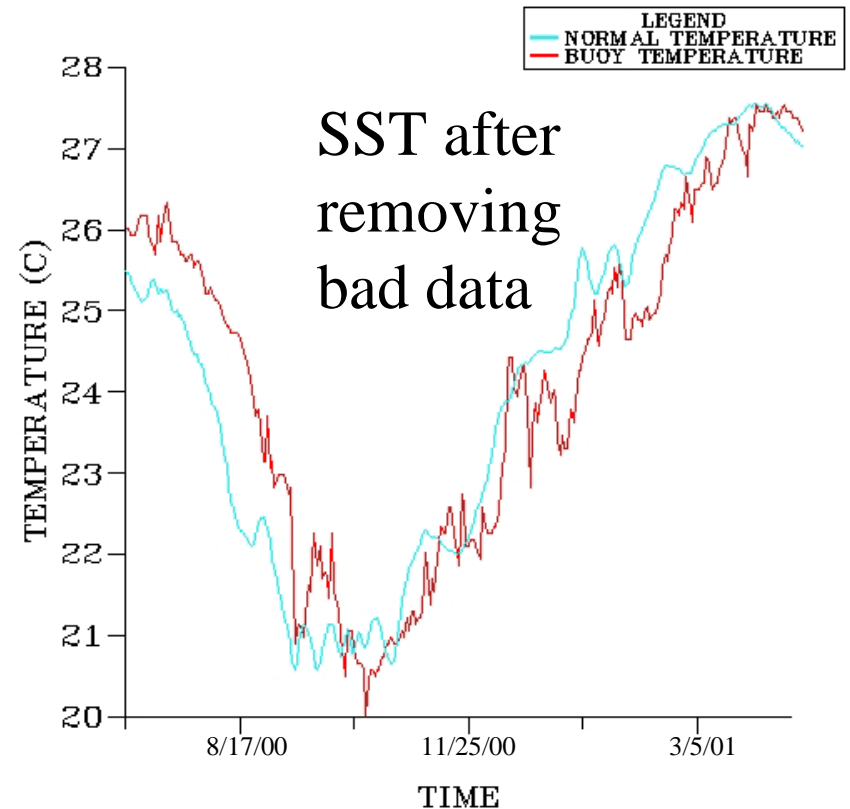
QC Examples

Compare SST with Reynold's Climatology

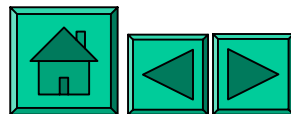
BUOY 18689



BUOY 18689

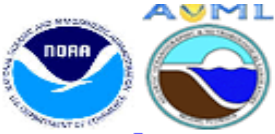


Web Access to Data and Products



Accessing Data and Products

www.aoml.noaa.gov/phod/dac



The Global Drifter Program

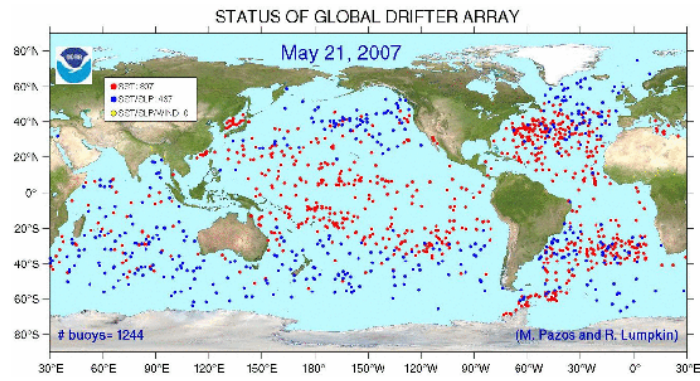
Satellite-tracked surface drifting buoys

NOAA Home AOML Home PhOD Home GOOS Center **Global Drifter Program**

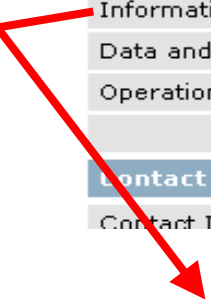
- GOOS Center
- ARGO Center
- Global Drifter Program
- High Density XBT Lines
- Low Density XBT Lines
- Global Drifter Program
- Information
- Data and Products
- Operations
- Contact
- Contact Information

The Global Drifter Program

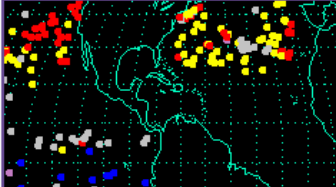
Satellite-tracked surface drifting buoy observations of currents, sea surface temperature, atmospheric p... information ...



Click to see the status of the array



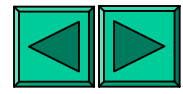
- Information**
- What's a drifter?
- Track a particular drifter
- GDP Objectives
- Science: goals and programs
- Latest maps
- Bibliography
- Drifter Links
- Contact
- Contact Information



The Drifter Data Assembly Center
Processing, Analysis, and Distribution
Data Products Available



The Drifter Operations Center
World Wide Drifter Deployments



Accessing Data and Products

www.aoml.noaa.gov/phod/dac



The Global Drifter Program

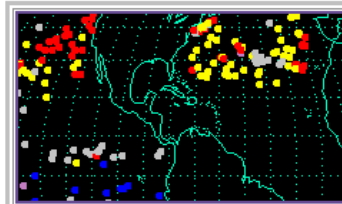
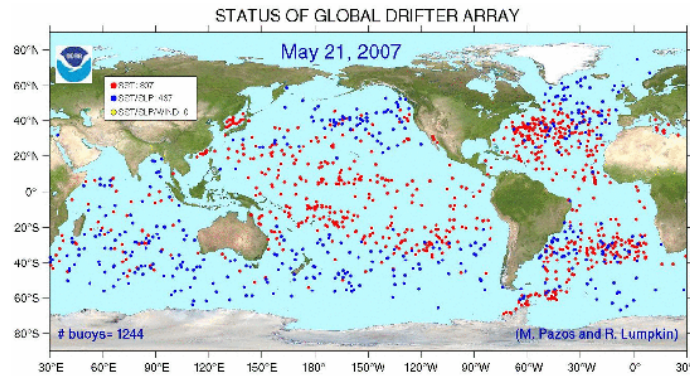
Satellite-tracked surface drifting buoys

NOAA Home AOML Home PhOD Home GOOS Center **Global Drifter Program**

- GOOS Center
- ARGO Center
- Global Drifter Program
- High Density XBT Lines
- Low Density XBT Lines
- Global Drifter Program**
- Information
- Data and Products
- Operations
- Contact
- Contact Information

The Global Drifter Program

Satellite-tracked surface drifting buoy observations of currents, sea surface temperature, atmospheric p...
information ...



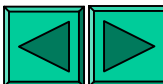
The Drifter Data Assembly Center
Processing, Analysis, and Distribution
Data Products Available



Enter
DAC
page



The Drifter Operations Center
World Wide Drifter
Deployments



How To Access Drifter Data

<http://www.aoml.noaa.gov/phod/dac/dacdata.html>

Near real time (graph) from GTS

(Optional) for one WMO#



- NOAA Home AOML Home PhOD
- Global Drifter Program**
- Information
- Data and Products
- Operations
- Data**
- Interpolated Database
- GTS Database
- Altimeter & GTS Near Real Time
- Details of all drifters in DAC database
- MEDS Archives
- Products**
- Population (Maps and Reports)
- Mean Velocity Estimates
- Animations
- Monthly SST and Current Anomalies Map
- Hurricane Array
- Contact**
- Contact Information

Choose Data Set: **GTS Buoy** | GTS B | PlatformID: <<Back

APR-20-2007 to MAY-20-2007

Lon: -40.39 -18.22 Final Date: 20 May 2007
Lat: 29.88 10.44 Initial Date: 20 Apr 2007

Graphics:

Select area on any of the two maps

- Map
- Lat-Time
- Lon-Time
- Depth-Time

- XBT AOML
- GTS Buoy**
- GTS XBT
- GTS CTD
- Hurricane Buoy

Select region

- Graphics
- Graphics**
- Data
- GIF
- PDF



Results

Select results to save data

Choose Data Set: **GTS Buoys** (WMO Code ZZZY) PlatformID:

APR 20 2007 to MAY 20 2007

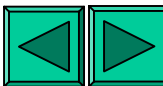
Legend: 20-MAY-2007, 15-MAY-2007, 10-MAY-2007, 05-MAY-2007, 30-APR-2007, 25-APR-2007, 20-APR-2007, Date

Lon: -18.00 -18.00 Final Date: 20 May 2007
Lat: 16.93 16.93 Initial Date: 20 Apr 2007

Select area on any of the two maps

Data


Map Lat-Time
 Lon-Time Depth-Time



How To Access Drifter Data

Near real time (data) from GTS

<http://www.aoml.noaa.gov/phod/dac/dacdata.html>



NOAA Home AOML Home PhOD

Global Drifter Program

Information

Data and Products

Operations

Data

Interpolated Database

GTS Database

Altimeter & GTS Near Real Time

Details of all drifters in DAC database

MEDS Archives

Products

Population (Maps and Reports)

Mean Velocity Estimates

Animations

Monthly SST and Current Anomalies Map

Hurricane Array

Contact

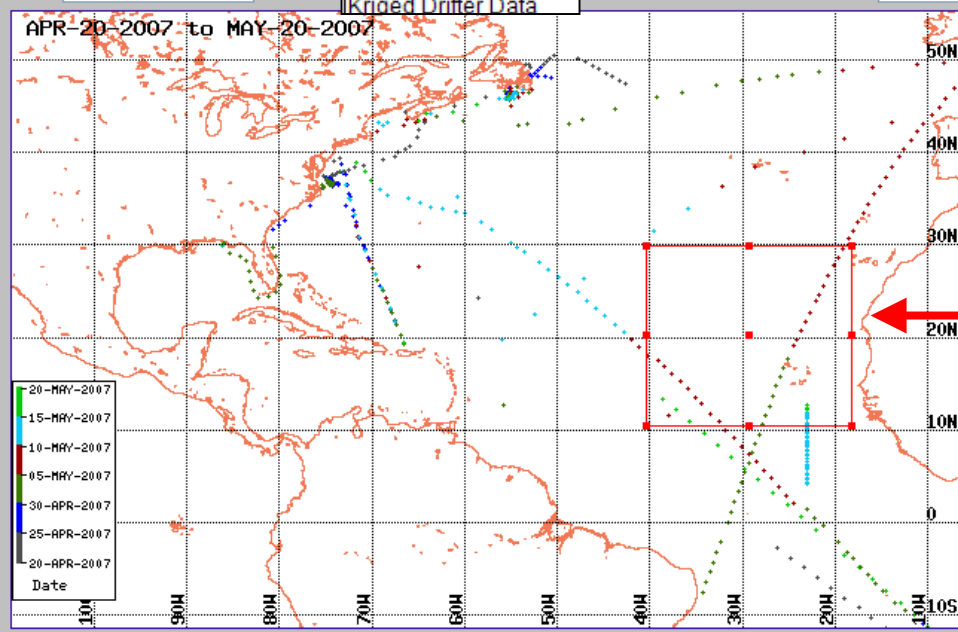
Contact Information

(Optional) for one WMO#

Choose Data Set: **GTS Buoy** | GTS B | PlatformID: <<Back

Select region

APR-20-2007 to MAY-20-2007



Graphics

Data

GIF

PDF

Lon: -40.39 -18.22 Final Date: 20 May 2007


Lat: 29.88 10.44 Initial Date: 20 Apr 2007

Data

Map Lat-Time

Lon-Time Depth-Time

Select area on any of the two maps



Results

GOOS XBT & GTS Interface by Joaquin A. Trinanes - Mozilla Firefox

File Edit View History Bookmarks Tools Help

http://www.aoml.noaa.gov/cgi-bin/trinanes/datosbt.cgi?latN=29.87&latS=10.48&lonW=-44.12&lonE=-14.82&year=2007&month=4&day=:

Getting Started Latest Headlines

XBT & GTS Data

GOOS Home | [CoastWatch](#) | [Car/GoM Home](#) | [Disclaimer](#) | [Help](#)

[Ret](#) **Retrieve Buoy ASCII Data**

Retrieve Buoy Data in ASCII format. You will find the meaning of each item in the file header.

Please, address your questions or comments to [Joaquin A. Trinanes](#)

[Back to main page](#) [USDOC](#) | [NOAA](#) | [AOML](#)

Save file

Mozilla Firefox

File Edit View History Bookmarks Tools Help

http://www.aoml.noaa.gov/phod/trinanes/tmp/dxibt1179676272.dat

Getting Started Latest Headlines

Lat	Lon	ID	Date	WaterTemp	WindDir (/10)	WindSpeed (m/s)	Pressure (mBar)
23.07	-43.03	13635	2007-05-20	05:40	24.7	-NaN	-NaN
23.08	-43.03	13635	2007-05-20	06:31	24.7	-NaN	-NaN
23.08	-43.03	13635	2007-05-20	07:25	24.7	-NaN	-NaN
23.07	-43.04	13635	2007-05-20	07:36	24.7	-NaN	-NaN
23.07	-43.04	13635	2007-05-20	07:46	24.7	-NaN	-NaN
23.07	-43.06	13635	2007-05-20	09:19	24.7	-NaN	-NaN
23.07	-43.05	13635	2007-05-20	09:35	24.7	-NaN	-NaN
11.47	-22.98	13636	2007-05-14	21:20	25.1	-NaN	1013.4
11.46	-22.99	13636	2007-05-14	22:30	-NaN	-NaN	-NaN
11.46	-22.99	13636	2007-05-14	23:20	25.0	-NaN	1014.2
11.46	-22.99	13636	2007-05-15	02:30	25.2	-NaN	1013.4
11.46	-22.99	13636	2007-05-15	03:20	25.2	-NaN	1012.8
11.44	-22.98	13636	2007-05-15	04:20	25.2	-NaN	1012.7
11.44	-22.98	13636	2007-05-15	04:30	25.2	-NaN	1012.7
11.44	-22.98	13636	2007-05-15	05:20	25.2	-NaN	1012.7
11.44	-22.98	13636	2007-05-15	05:30	25.2	-NaN	1012.7
11.44	-22.98	13636	2007-05-15	06:20	25.2	-NaN	1012.9



How To Access Drifter Data

Interpolated Historical Metadata

<http://www.aoml.noaa.gov/phod/dac/dacdata.html>

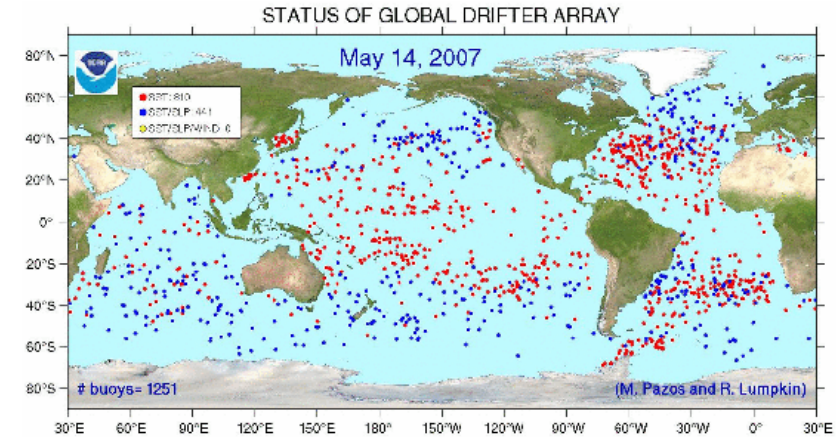


- NOAA Home AOML Home PhOD
- Global Drifter Program
- Information
- Data and Products
- Operations
- Data
- Interpolated Database
- GTS Database
- Altimeter & GTS Near Real Time
- Details of all drifters in DAC database
- MEDS Archives
- Products
- Population (Maps and Reports)
- Mean Velocity Estimates
- Animations
- Monthly SST and Current Anomalies Map
- Hurricane Array
- Contact
- Contact Information

- NOAA Home AOML Home AOML/E
- Information
 - Metadata
 - Interpolated Data
- Data Selection
 - Metadata
 - All data
 - Subset
 - Interpolated data
 - All data
 - One drifter
 - Subset
- Additional Resources
 - Global Drifter Program
 - MEDS
 - NODC - GTSPP
- Contact
 - Contact Information
- NOAA Home AOML Home Disclai

Data Availability

Latitude: [81 N, -73S]
Longitude: [-180 W, 180E]
Observation dates: 1979/02/15 to 2007/03/01



Check Box for Drogue On only data:

From Date
2006/11/01
(yyyy/mm/dd)

To Date
2006/12/31
(yyyy/mm/dd)

Northern Edge

81

Western Edge

-180

Eastern Edge

180

Southern Edge

-73

Enter your E-mail address

mayra.pazos@noaa.gov

Submit!

How To Access Drifter Data

Interpolated Historical Data

<http://www.aoml.noaa.gov/phod/dac/dacdata.html>

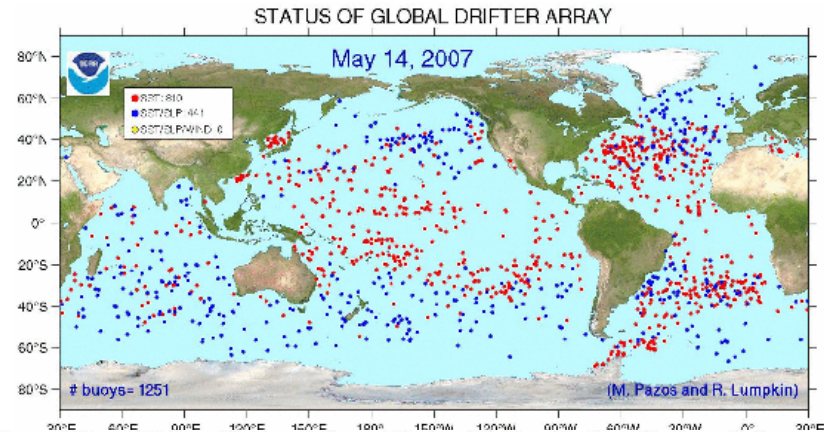


- NOAA Home AOML Home PhOD
- Global Drifter Program**
- Information
- Data and Products
- Operations
- Data**
- Interpolated Database
- GTS Database
- Altimeter & GTS Near Real Time
- Details of all drifters in DAC database
- MEDS Archives
- Products**
- Population (Maps and Reports)
- Mean Velocity Estimates
- Animations
- Monthly SST and Current Anomalies Map
- Hurricane Array
- Contact**
- Contact Information

- NOAA Home AOML Home AOML/E
- Information**
- Metadata
- Interpolated Data
- Data Selection**
- Metadata
- All data
- Subset
- Interpolated data
- All data
- One drifter
- Subset
- Additional Resources**
- Global Drifter Program
- MEDS
- NODC - GTSP
- Contact**
- Contact Information
- NOAA Home AOML Home Disclai

Data Availability

Latitude: [81 N, -73S]
Longitude: [-180 W, 180E]
Observation dates: 1979/02/15 to 2007/03/01



Check Box for Drogue On only data:

From Date
2006/11/01
(yyyy/mm/dd)

To Date
2006/12/31
(yyyy/mm/dd)

Northern Edge
20

Western Edge -30 Eastern Edge -20

Southern Edge
15

Enter your E-mail address
mayra.pazos@noaa.gov

Submit!



E-mail Received To Retrieve Data

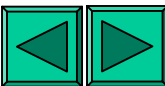
To download the data files(s) proceed as follows: By clicking on the following hyper-link(s)

ftp://ftp.aoml.noaa.gov/od/pub/envids/metadata_gld.20070521_101943.zip

ftp://ftp.aoml.noaa.gov/od/pub/envids/interpolated_gld.20070521_101943.zip

Or By using the following ftp instructions :

1. ftp ftp.aoml.noaa.gov
2. enter 'anonymous' for userid.
3. enter your 'email address' for password.
4. enter 'binary' to set the transfer type
5. enter 'cd /od/pub/envids'
6. enter 'get metadata_gld.20070521_101943.zip'
7. enter 'get interpolated_gld.20070521_101943.zip'
8. enter 'quit' to log off. NOTICE: files are removed 5 days after creation date.



How To Access Drifter Data

Details of all drifters in DAC database

<http://www.aoml.noaa.gov/phod/dac/dacdata.html>

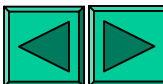


NOAA Home AOML Home PhOD

- Global Drifter Program
 - Information
 - Data and Products
 - Operations
- Data
 - Interpolated Database
 - GTS Database
 - Altimeter & GTS Near Real Time
 - Details of all drifters in DAC database
 - MEDS Archives
- Products
 - Population (Maps and Reports)
 - Mean Velocity Estimates
 - Animations
 - Monthly SST and Current Anomalies Map
 - Hurricane Array
- Contact
 - Contact Information

LIST AND DETAILS OF ALL BUOYS IN DATABASE AS OF OCTOBER 2006

ID	WMO	EXP	DEP. DATE	DEP. LAT	DEP. LON	END. DATE	DROG OFF DATE	DEATH CODES	MANUF.	TYPE
62228	32545	6129	12- 25- 2006	27.20	280.83	12- 31- 2006	12- 25- 2006	3	Clearwater	SVP
62274	33663	6129	10- 27- 2006	-38.48	307.48	10- 31- 2006	0- 0- 0	0	Clearwater	SVP
63115	32921	7325	10- 25- 2006	-23.00	285.92	10- 31- 2006	0- 0- 0	0	Clearwater	SVP
63116	32922	7325	10- 25- 2006	-25.00	286.40	10- 31- 2006	0- 0- 0	0	Clearwater	SVP
62208	53593	9325	10- 24- 2006	2.98	92.66	11- 30- 2006	0- 0- 0	0	Clearwater	SVP
63058	51811	7325	10- 24- 2006	0.03	189.90	10- 31- 2006	0- 0- 0	0	Clearwater	SVP
63122	32919	7325	10- 24- 2006	-19.68	285.19	10- 31- 2006	0- 0- 0	0	Clearwater	SVP
63123	32920	7325	10- 24- 2006	-21.00	285.48	10- 31- 2006	0- 0- 0	0	Clearwater	SVP
63249	51848	7325	10- 24- 2006	2.08	189.99	10- 31- 2006	0- 0- 0	0	Clearwater	SVP
62210	53592	9325	10- 23- 2006	0.00	94.53	12- 1- 2006	0- 0- 0	0	Clearwater	SVP
63065	51830	7325	10- 23- 2006	-2.15	190.05	10- 31- 2006	0- 0- 0	0	Clearwater	SVP
62206	53591	9325	10- 22- 2006	-3.01	96.41	12- 1- 2006	0- 0- 0	0	Clearwater	SVP
63062	51810	7325	10- 22- 2006	-4.95	189.99	10- 31- 2006	0- 0- 0	0	Clearwater	SVP
63113	32623	7325	10- 22- 2006	-19.70	282.99	10- 31- 2006	0- 0- 0	0	Clearwater	SVP
70249	0	1627	10- 22- 2006	37.44	11.31	10- 31- 2006	0- 0- 0	0	Clearwater	SVPB
63111	32622	7325	10- 21- 2006	-19.72	280.99	10- 31- 2006	0- 0- 0	0	Clearwater	SVP



How To Access Drifter Data

Using QC Tools to check sensors on GTS

<http://www.meteo.shom.fr/qctools>



Buoy QC Tools



Some tools are available here to make your work easier.
Please, take care of the results and check the information before taking any action.

[Buoy QC statistics](#)

Monthly statistics of comparisons gathered from different PMOCs. A link to the data you need.

[Data and QC plots](#)

Recent buoy data (past two weeks) and Meteo-France model outputs can be viewed and updated.

[Location on charts](#)

You wish to know whether your buoy is at its WMO id or its position and distance from the coast.

[Nearest other buoys](#)

The data of your buoy are doubtful or you want to check the data of the nearest buoys.

[List of buoys reporting dubious AP values](#)

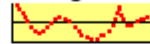
Automatically issued every day, a list of buoys reporting dubious AP values over the past two weeks and their positions.

[Drifting buoys ashore](#)

Automatically issued from GTS data, a list of buoys reporting a fixed position or a position that is not supposed to be fixed. "SST" values are generally no more reliable and can be biased due to a possible error in the sensor.



Buoy Data and QC plots



Buoy data received on GTS for the 2 or 3 past weeks can be viewed here.

Comparisons with model outputs can be seen too.

Just fill up the query and click on OK.

Please take care of the results when using the graphs to check your buoys.

The model outputs don't reflect necessarily the truth.

Buoy data can be significantly different from model outputs in sparse areas, coastal areas

(due to local effects), areas with strong gradient...

OR

WMO id:

16590

Parameter:

Atmospheric Pressure
Air Temperature
SST

Data Plot or QC plot

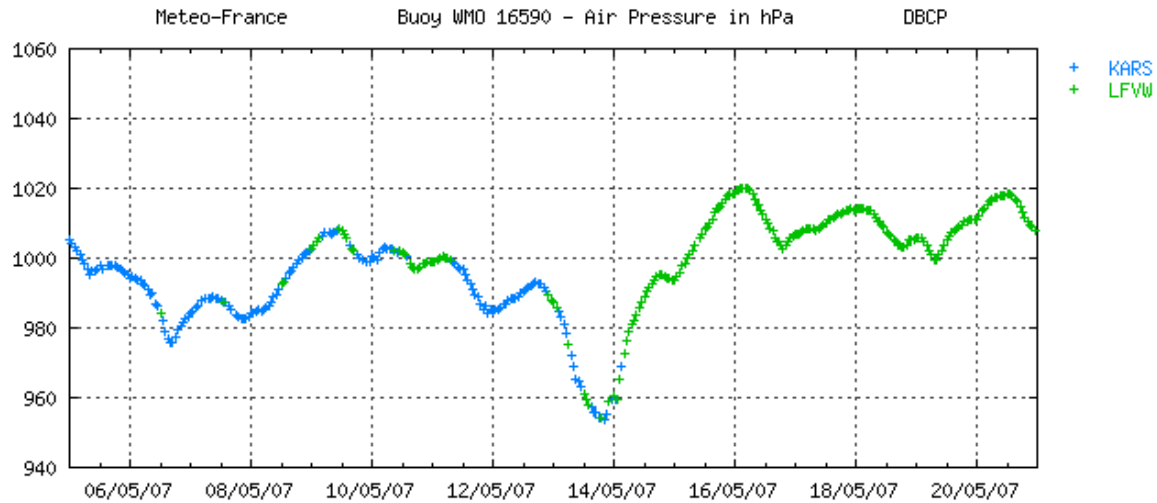
Select one

OK



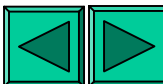
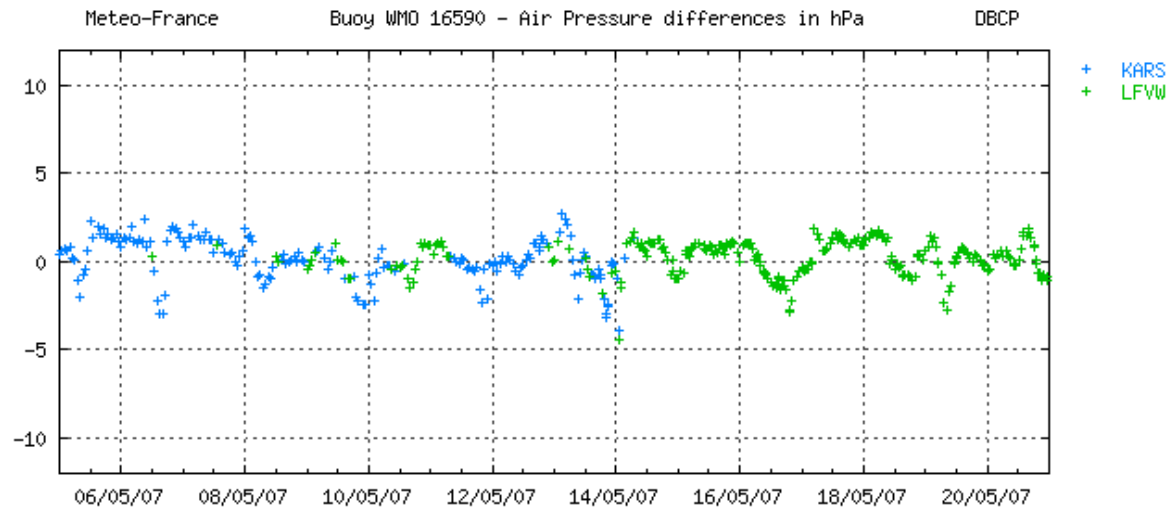
How To Access Drifter Data

Data Plot




or

QC Plot



How To Access Drifter Products

<http://www.aoml.noaa.gov/phod/dac/dacdata.html>



NOAA Home AOML Home PhOD

Global Drifter Program

Information
Data and Products
Operations

Data

Interpolated Database
GTS Database
Altimeter & GTS Near Real Time
Details of all drifters in DAC database
MEDS Archives

Products

Population (Maps and Reports)
Mean Velocity Estimates
Animations
Monthly SST and Current Anomalies Map
Hurricane Array

Contact

Contact Information

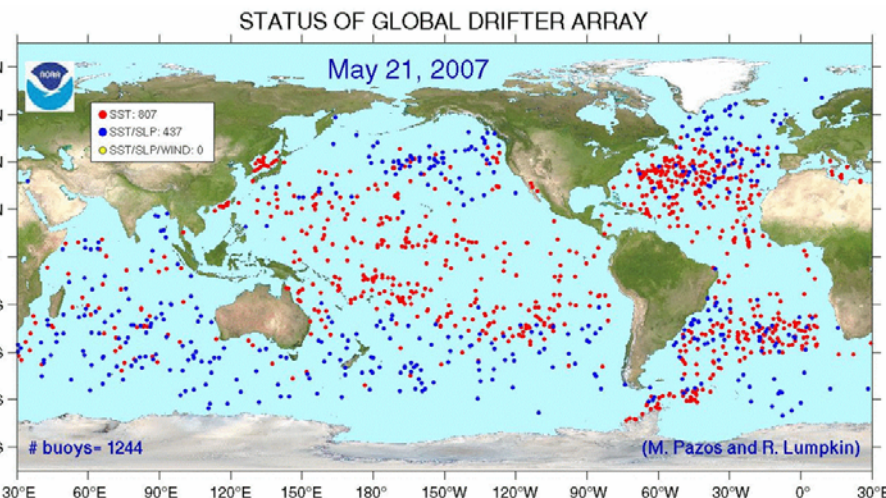
Global Drifter Population Maps

All Buoy's since April 1995
SST Anomalies since October 1995
90 Days Prediction since May 2005
Drogue Status since May 2005
Postscript files available for download since

May. 2007 All Buoy's

View GIF File

- All Buoy's
- SST Anomalies
- 90 Days Forecast
- Drogue Status
- Drifter Programs



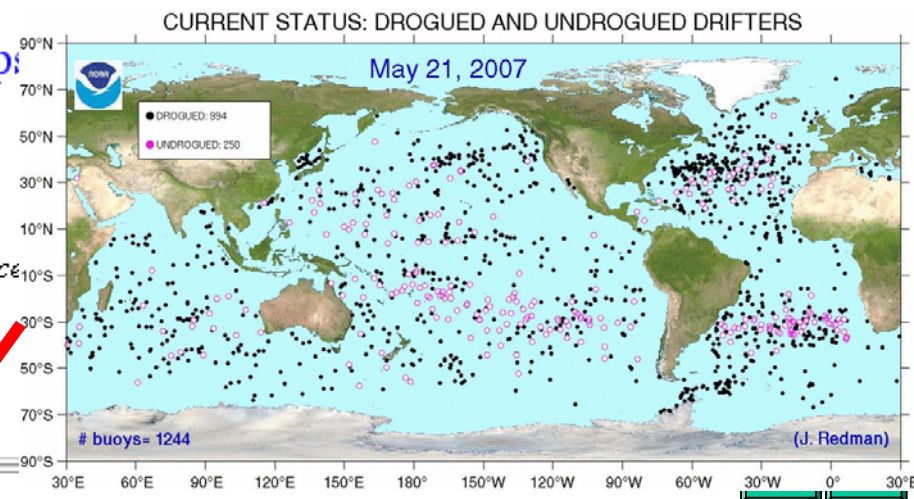
Global Drifter Population Maps

All Buoy's since April 1995
SST Anomalies since October 1995
90 Days Prediction since May 2005
Drogue Status since May 2005
Postscript files available for download since

May. 2007 Drogue Status

View GIF File

- All Buoy's
- SST Anomalies
- 90 Days Forecast
- Drogue Status
- Drifter Programs



How To Access Drifter Products



<http://www.aoml.noaa.gov/phod/dac/dacdata.html>

- NOAA Home
- AOML Home
- PhOD
- Global Drifter Program**
- Information
- Data and Products
- Operations
- Data
- Interpolated Database
- GTS Database
- Altimeter & GTS Near Real Time
- Details of all drifters in DAC database
- MEDS Archives
- Products**
- Population (Maps and Reports)
- Mean Velocity Estimates
- Animations
- Monthly SST and Current Anomalies Map
- Hurricane Array
- Contact
- Contact Information

Drifter Maps

Updated weekly

Trajectory since August 1995

Position and SST Anomalies since August

Postscript files available for download since August 1995

Tropical Atlantic Map new since June 1995

May 2007 South Atlantic

Trajectory

- Equatorial Pacific
- North Pacific
- South Pacific
- Indian
- North Atlantic
- South Atlantic**
- Tropical Atlantic

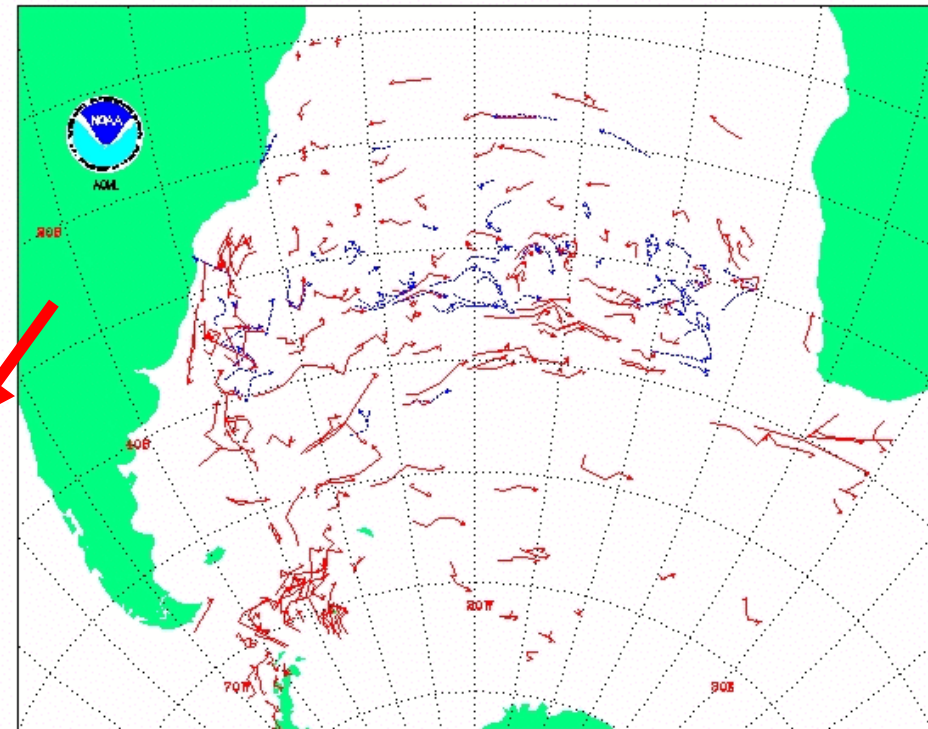
Drifter Reports

Mar. 2007 South Atlantic

DRIFTER DATA ASSEMBLY CENTER

APR 23-MAY 21 2007

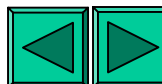
M. Pezos



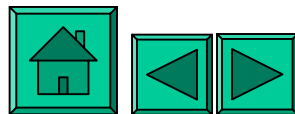
Mixed-layer drifting buoy displacements by one-week segments

— Drogued buoys

..... Buoys with drogue lost or unknown

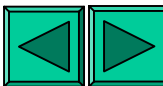


GTS Distribution



GTS Responsibilities

- **Insertion and deletion of buoy data onto the GTS**
- **Follow up and make sure data distributed through GTS goes out**
- **Monitor accuracy of data on the GTS and take off from GTS if sensor reports bad data**
- **Notify ARGOS after each database update of buoys that lost their drogues to be noted in the GTS message**



Contacts

Dr. Rick Lumpkin, Global Drifter Program Manager

e-mail: Rick.Lumpkin@noaa.gov

Mr. Shaun Dolk, Drifter Operation Center Manager

e-mail: Shaun.Dolk@noaa.gov

Mrs. Mayra Pazos, Drifter Data Assembly Center Manager

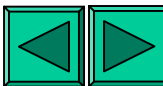
e-mail: Mayra.Pazos@noaa.gov

Ms. Jessica Redman, Drifter DAC, Research Assistant

e-mail: Jessica.Redman@noaa.gov

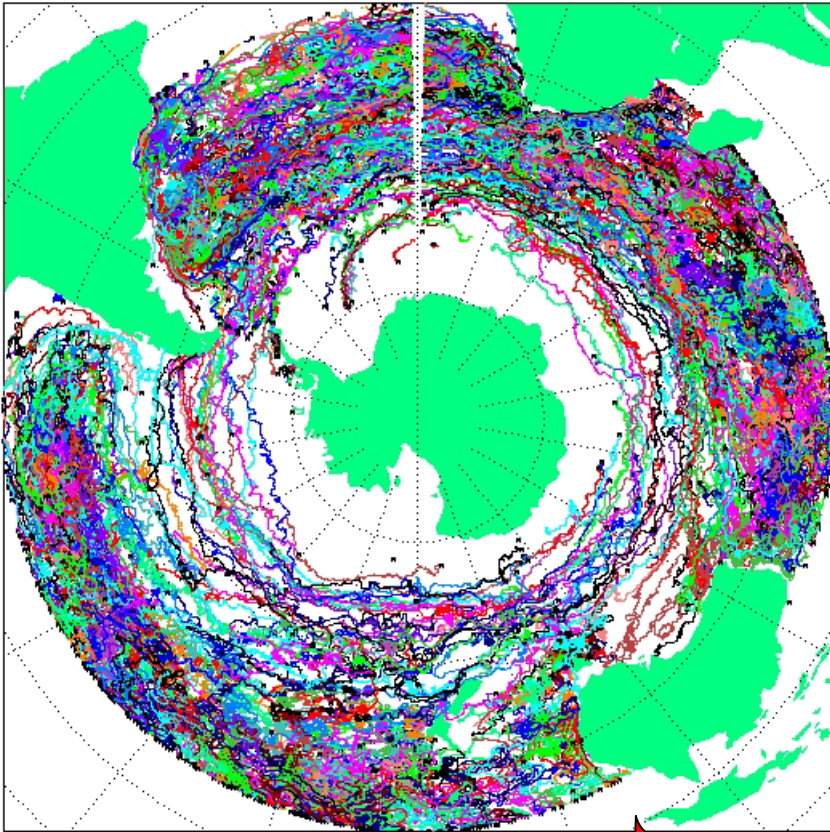
Mr. Erik Valdes, Drifter DAC, Research Assistant

e-mail: Erik.Valdes@noaa.gov

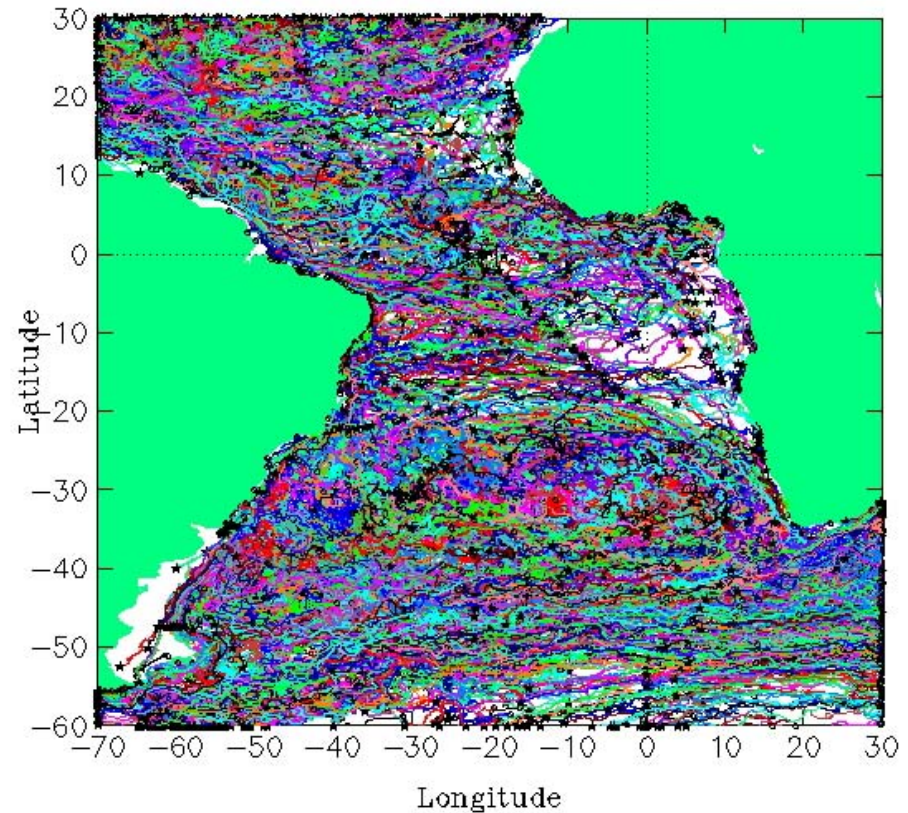


Drifter Tracks

BUOYS IN THE SOUTHERN OCEANS SINCE 1979



Drifter Data Through December 2006



Thank You!

