WORLD METEOROLOGICAL ORGANIZATION

DATA BUOY COOPERATION PANEL

TWENTY-THIRD SESSION

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ENGLISH ONLY

NATIONAL REPORTS

(Submitted by the WMO & IOC Members & Member States participating in the DBCP)

Summary and purpose of document

This documents provides for the reports on national activities during the last intersessional period.

ACTION PROPOSED

The panel will be invited to comment, and particularly make decisions or recommendations, as appropriate on the following topics:

(a) Note and comment on the information contained in this document;

(b) Take into account the contents of the report when discussing relevant agenda items.

Appendices A-K: National reports from Australia, Canada, France, Germany, Japan, Kenya, Republic of Korea, New Zealand, Sweden, Thailand, USA.

Appendix A

Country: Australia

Year: 2007

CURRENT PROGRAMMES ***(for period 1 July 2006 – 30 June 2007)***

A **Agency or programme:** Bureau of Meteorology

Number and type of buoys:
(a) Deployed during the period: 16
15 SVP-B
1 SVP-BW
(b) Operational at 31 August: 26
(c) Reporting on GTS at 31 August: 26

Purpose of programme: To support the Bureau's operational forecasting and warning service.

Main deployment area: Southern and Indian Oceans in support of:
- International Buoy Programme for the Indian Ocean
- Southern Ocean Buoy Programme
- International Programme for Antarctic Buoys.

B **Agency or programme:** Barometer Upgrade Program

Number and type of buoys:
(a) Deployed during the period: 8
8 SVP-B (Bureau sponsored upgrades)
(b) Operational at 31 August: 9
(c) Reporting on GTS at 31 August: 9

Purpose of programme: To increase the number of pressure buoys in the Indian Ocean and to support the Bureau's operational forecasting and warning service.

Main deployment area: Southern and Indian Oceans in support of:
- International Buoy Programme for the Indian Ocean
- Southern Ocean Buoy Programme

C **Agency or programme:** Global Drifter Program

Number and type of buoys:
(a) Deployed during the period: 16
18 SVP
8 SVP-B
(b) Operational at 31 August: 20
(c) Reporting on GTS at 31 August: 20

Purpose of programme: To (1) support the Global Drifter Program through the IBPIO; (2) study the East Australia Current; and (3) to support the Bureau's operational forecasting and warning service.

Main deployment area: Southern and Indian Oceans in support of:
- International Buoy Programme for the Indian Ocean
- Southern Ocean Buoy Programme

PLANNED PROGRAMMES (for period 1 July 2007 – 30 June 2008)

A **Agency or programme:** Bureau of Meteorology

Number and type of buoys planned for deployment in next twelve months: 19

1 FGGE-W

16 SVP-B

2 SVP-BW

Purpose of programme: To support the Bureau's operational forecasting and warning service.

Main deployment area: Southern and Indian Oceans.

B **Agency or programme:** Barometer Upgrade Program

Number and type of buoys planned for deployment in next twelve months: 8

8 SVP-B (Bureau sponsored upgrades)

Purpose of programme: To increase the number of pressure buoys in the Indian Ocean and to support the Bureau's operational forecasting and warning service.

Main deployment area: Indian Ocean

C **Agency or programme:** Global Drifter Program

Number and type of buoys planned for deployment in next twelve months: 28

8 SVP

20 SVP-B

Purpose of programme: To (1) support the Global Drifter Program through the IBPIO; (2) study the East Australia Current; and (3) to support the Bureau's operational forecasting and warning service.

Main deployment area: Indian Ocean

TECHNICAL DEVELOPMENTS

Nil

PUBLICATIONS *(on programme plans, technical developments, QC reports, etc.)*

The 2007-2008 deployment plans for Bureau-owned buoys is published on the JCOMMOPS website:

http://www.jcommops.org/depl_opport/australia/20072008/programs/buoy0708plan.html

SPECIAL COMMENTS (if any)

Buoy lifetimes:

1. Average barometer lifetime on Technocean SVP-B buoys that failed in a given calendar year:

Year of failure	Bureau's Buoy Program		Barometer Upgrade Program		Global Drifter Program	
	Average life (Years)	Barometer failures during the year	Average life (Years)	Barometer failures during the year	Average life (Years)	Barometer failures during the year
2007 *	2.27	3	0.47	2	0.49	3
2006	1.21	7	0.06	1	0.5	7
2005	0.69	6	2.17	4	0.29	1
2004	0.69	5	1.54	13	-	-
2003	0.68	3	1.34	9	-	-
2002	-	-	1.21	13	-	-
2001	-	-	1.11	2	-	-

* as at 31 August

Barometer failure defined as: sensor failed; sensor unreliable; or buoy (and sensor) failed.

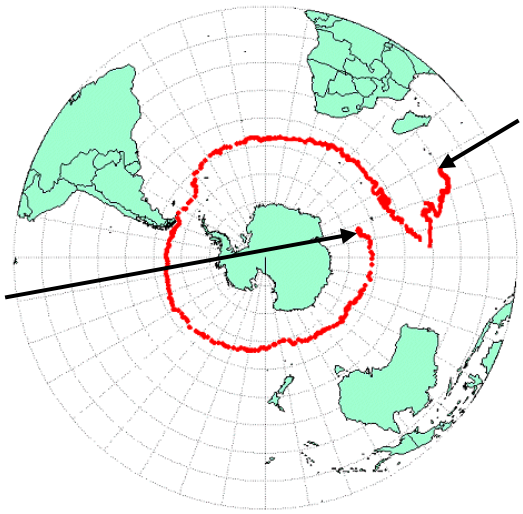
2. Breakdown of surviving barometers on (Technocean) SVP-B buoys (at 31 August 2006):

Buoy Program	Year deployed					
	2002	2003	2004	2005	2006	2007
Bureau of Meteorology	0	6	4	4	5	5
Barometer Upgrade	1	0	0	-	2	0
Global Drifter Program	-	-	-	3	3	1

3. Longest serving Bureau-owned drifting buoy.

Bureau-owned FGGE buoy, PTT 2939, WMO 56535.

Deployed 17 March 1997 near 55S 74E from R.S.V. Aurora Australis.



Beached 20 September 2002 on Rodriguez Is. (20S 63E).

Failed 17 May 2003, after reporting air pressure, pressure tendency, air temperature, and sea surface temperature reliably and accurately or 2252 days (74 months).

Appendix B

Country: Canada

Year: September 1, 2006 – August 31, 2007

Items A-E under section headers Current Programs and Planned Programs are the Meteorological Service of Canada regional breakdown of drifter buoys, moored buoys and Ice Beacons.
Item F covers the Canadian Ice Service
Item G covers Fisheries and Oceans Canada

CURRENT PROGRAMMES

A. Agency or programme: Moored & Drifter Buoys Pacific and Yukon – North East Pacific Ocean

Number and type of buoys:
(a) deployed during year:
# of drifting buoys without winds – 6

(b) operational at 31 August 2007:
# of moored 3-meter – 13
developmental (platform for testing new equipment etc.) 3-meter (AXYS) - 1
of moored 6 meter NOMADs -3
# of 3-meter watchkeepers – 0
# of drifting buoys without winds – 23
# of Canadian funded barometer upgrade drifters reporting – 5

(c) reporting on GTS at 31 August 2007:
# of moored buoys– total 16
# of drifting buoys – total 28 (needs MEDS confirmation) (includes 5 Canadian funded barometer upgraded units)

Purpose of programme: (a) operational:

Main deployment areas: North East Pacific Ocean

B. Agency or programme: Moored Buoys Ontario Region

Number and type of buoys:
(a) deployed during year: 13
# of moored 3-meter discus - 7
# of 1.75 meter Watchkeepers – 6

(b) operational at 31 August 2007: 13
# of moored 3-meter discus - 7
# of 1.75 meter Watchkeepers – 6

(c) reporting on GTS at 31 August 2007: 13
# of moored buoys– total 13

Purpose of programme: (a) operational

Main deployment areas: Great Lakes including Lake of the Woods, Lake St Clair, Lake Nipissing, and Lake Simcoe.

C. **Agency or programme**: Moored & Drifter buoys Atlantic and Quebec St. Lawrence & North Western Atlantic

Number and type of buoys:

(a) deployed during year:
# of moored 3-meter – 1 (seasonal)
# of 1.7-meter watchkeepers - 1

(b) operational at 31 August 2006:
# of moored 3-meter – 2
# of moored 6-meter NOMADs - 8
# of drifting buoys without winds – 3
With winds – 3

(c) reporting on GTS at 31 August:
# of moored buoys– total 10
# of drifting buoys – total 6

Purpose of programme: (a) operational

Main deployment areas: St. Lawrence River and North West Atlantic Ocean

D. **Agency or programme:** Moored Buoy Programme - Prairie and Northern Region

Number and type of buoys:

(a) deployed during year:
2 moored buoys (45141 (3 metre Discus) and 45150 (Watchkeeper)) deployed in Great Slave Lake July 2007 (seasonal: deployed July, retrieved late September)
3 moored buoys (all Watchkeeper) deployed in Lake Winnipeg May/June 2007 (seasonal: deployed May or June, retrieved late September or October)
1 moored buoy (Watchkeeper) deployed south-western Hudson Bay August 2007 (seasonal: deployed July or August, retrieved late September or early October)

(b) operational at 31 August:
5 inland lakes moored buoys
1 Hudson Bay moored buoy

(c) reporting on GTS at 31 August:
5 inland lakes moored buoys
1 Hudson Bay moored buoy

Purpose of programme:

(a) operational: Marine (forecast) support for Lake Winnipeg, Great Slave Lake, and southwestern Hudson Bay

(b) met/ocean research: Fisheries & Oceans Canada piggybacked instrumentation on the three Lake Winnipeg moored buoys in support of study of deteriorating condition of Lake Winnipeg. Fisheries and Oceans also installed instrumentation on Hudson Bay buoy in support of an IPY project.

Main deployment areas: Great Slave Lake (seasonal)
Lake Winnipeg (seasonal)
Hudson Bay near Churchill (seasonal)

E. **Agency or programme:** On-ice Drifting Buoy Programme - Prairie and Northern Region

Number and type of buoys:

(a) deployed during year: 7 MSC funded drifting buoys (ICEX) deployed on ice 5/6 August by U.S. Naval Meteorology and Oceanography Command.

(b) operational at 31 August: 11 Arctic Basin on-ice drifting buoys

(c) reporting on GTS at 31 August: 11 Arctic Basin on-ice drifting buoys

Purpose of programme: (a) operational: Participation in the International Arctic Buoy Programme

Main deployment areas: Arctic Basin

F. Agency or programme: Canadian Ice Service

Number and type of buoys:
(a) deployed during past year: 5 Calibs + 2 Calibs to be deployed in Nares Strait soon (Aug 2007)

(b) Operational at 31 August: 2 + 2 if Nares Strait buoys are deployed as planned.

(c) Reporting on GTS at 31 August: 2+ (2 more likely)

Purpose of programme: (a) Operational: Follow leading edge of old ice, validate ice drift model.

(b) Met/ocean research: Understanding how old ice decays (partnership with Michelle Johnston CHC). Provide atmospheric pressure data in data sparse region.

Main deployment areas: Eastern Arctic (Nares Strait, Crozier Strait) plus one on Ayles Island fragment (north of Ellesmere Island)

G. Agency or programme: Fisheries & Oceans Canada- Bedford Institute of Oceanography

Number and type of buoys:
(a) deployed during year:
- 1 directional wave rider (Apr-Nov 2006, Lunenburg Bay, NS)
- 1 directional wave rider (Feb-Apr 2007, Lunenburg Bay, NS)
- 1 directional wave rider (Apr-Nov 2007, Lunenburg Bay, NS
- 1 Carioca (CO2) May – Nov 2007, Halifax Harbour, NS
- 1 SeaHorse May – Sept 2006, Halifax Harbour, NS
- 1 SeaHorse Sept – Nov 2006, Halifax Harbour, NS
- 1 SeaHorse May – July 2007, Halifax Harbour, NS
- 6 ARGOS surface drifters with GPS, PEI Mar/07 until the ice melts and beacons are lost

(b) Argos operational at 31 August: None
(c) Argos reporting on GTS at 31 August: None

Subsurface moorings:

- 4 Instrumented moorings “The Gully” Scotian Shelf Apr/06-Aug/07
- 2 Instrumented moorings Laurentian Channel May/06 – May/07
- 6 Instrumented moorings Orphan Basin May/06 – May/07

- 1 Instrumented mooring Labrador Sea May/06 – May/07
- 8 Instrumented moorings Davis Strait July/06 – July/07
- 2 Instrumented moorings Makkovik Bank Nov/06 - July/07
- 1 Instrumented mooring Halifax Harbour May - Oct/06
- 1 Instrumented mooring Halifax Harbour Apr – Oct/07
- 7 Instrumented moorings Barrow Strait Aug/07 – Aug/08
- 2 Instrumented moorings Scotian Slope Oct/06 – Oct/07

Purpose of programme: (a) met/ocean research:

- Surface drifters were deployed in Northumberland Strait to measure surface currents for a study on the dispersion of invasive species.
- Data from a directional wave rider buoy will provide input to high resolution coupled atmosphere-ocean-wave model to predict the impact of climate change on the frequency and intensity of storms, which can affect activities in the Atlantic Canada offshore. Wave data available in real time and displayed on a website.
- Halifax Harbour Site: Main monitoring site for the AZMP surveys. Measuring primary production of Biological processes. Moorings give a continuous record of some biological, physical, and chemical variables. Close proximity to BIO enables a high rate of in situ sampling.
- Other mooring sites are involved with climate studies, oil industry research, mixing of water layers, convection, and many other Oceanographic area of study.

Main deployment areas: Northumberland Strait (PEI), Lunenburg Bay, Mouth of Halifax Harbour, Scotian Slope, Labrador Sea, Orphan Basin, “The Gully”

PLANNED PROGRAMMES

A. Agency or programme: Moored & Drifter Buoys Pacific and Yukon – North East Pacific ocean

Number and type of buoys planned for deployment in next 12 months:

Purpose of programme:
(a) operational:
# of drifting buoys without winds – 13 (7 of these are already on ships of opportunity awaiting arrival at deployment zone)
Canadian funded barometer upgrades in support of GDP – 10 (stored at Stennis Space Centre)
of moored 3-meter – 13
Developmental 3-meter (AXYS) - 1
of moored 6 meter NOMADs -3

Main deployment areas: Drifting buoys will be deployed in the North East Pacific Ocean between 160 & 170 degrees west and 41 to 55 degrees north.

B. Agency or programme: Moored buoys Ontario Region

Number and type of buoys planned for deployment in next 12 months: 13

Purpose of programme:
(a) operational:
# of moored 3-meter – 7

# of 1.75 meter Watchkeepers – 6

C. Agency or programme: Atlantic and Quebec St. Lawrence & North Western Atlantic

Number and type of buoys planned for deployment in next 12 months:
# of drifting buoys without winds - 3
# of moored watchkeeper – 1 (Bay of Fundy)

Purpose of programme: (a) operational

Main deployment areas: Drifting buoys will be deployed east of Newfoundland between 50 & 60 degrees west and 41 to 52 degrees north. Co-ordinated ESURFMAR

D. Agency or programme: Moored Buoy Programme - Prairie and Northern Region

Number and type of buoys planned for deployment in next 12 months:

Purpose of programme:
(a) operational: Re-deployment of 6 seasonal moored buoys

(b) met/ocean research: Lake Winnipeg buoys and Hudson Bay buoy will continue to carry instrumentation for Fisheries and Oceans Canada

Main deployment areas:
- Great Slave Lake (seasonal)
- Lake Winnipeg (seasonal)
- Hudson Bay near Churchill (seasonal)

E. Agency or programme: On-ice Drifting Buoy Programme - Prairie and Northern Region

Number and type of buoys planned for deployment in next 12 months: 2

Purpose of programme: (a) operational

Main deployment areas: - Arctic Basin

F. Agency or programme: Canadian Ice Service

Number and type of buoys planned for deployment in next 12 months: Up to 6 Calibs including 3 for IPY study of M'Clure Strait fracturing, 2 for Nares Strait and possibly 1 more for iceberg tracking.

Purpose of programme:
(a) operational: Follow leading edge of old ice, sea ice model validation as well as tracking iceberg for iceberg model validation.

(b) met/ocean research: Understanding how old ice decays (partnership with Michelle Johnston CHC).

Main deployment areas: Eastern Arctic (Nares Strait), Western Arctic (M'Clure Strait), and East Coast (iceberg).

G. Agency or programme: Fisheries & Oceans Canada- Bedford Institute of Oceanography.

Number and type of buoys planned for deployment in next 12 months:

- 1 directional wave rider (Apr-Nov, Lunenburg Bay, NS)
- ARGOS surface drifters (SLDMB), Scotian Shelf
- ARGOS ice drifters with GPS, PEI
- Iridium beacons with GPS, PEI
- Continue moorings at Halifax Harbour, Labrador Sea, Scotian Slope, Davis Strait, Barrow Strait and Orphan Basin

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TECHNICAL DEVELOPMENTS

(a) Buoy design:

-Foam Buoy hull – Manufacturer: The Gilman Corporation

Material Ionomer foam

Size 3.3-meter diameter

Superstructure Fabricated by Canadian Coast Guard machine shop, Victoria based on existing 3-meter aluminium buoy design and size. The buoy has been modified by cutting a hole in the hull so that sensors can be mounted to sample current flow, purity of water etc. In addition, standard sensors such as temperature, wind speed and direction, humidity, wave etc have been installed.

-Compact Air Launch Ice Beacon being tested for IABP

(b) Instrumentation:

Vaisala Sonic Anemometers are being tested this season on Ontario Region buoys: Port Colborne 3M Buoy 45142 and Western Lake Ontario 3M Buoy 45139 with good results to date.

Ice Beacons: Ambient air temperature (not transmitted on GTS); some beacons are equipped with a pressure sensor.
Some beacons are equipped with Lithium battery pack.

(c) Others: An All Chain bridle being tested on North Georgian Bay Buoy 45137 to replace steel-legged tripods used on 3M buoys. This will increase safety and ease of handling for Coast Guard personnel during deployments and retrievals. These also may be utilized in employing larger buoys such as the 3M in smaller lakes where towing buoys during operations is conducted.

(d) All the 1.75M Watchkeepers have on board new MLED120 LED navigation lights.. The 3-Metre navigation lights are to be replaced in the future as well.

PUBLICATIONS *(on programme plans, technical developments, QC reports, etc.)*

- Monthly moored and drifting buoy status reports at http://thetis.pyr.ec.gc.ca/a-buoyestat.phtml
- Buoy data available at http://www.weatheroffice.ec.gc.ca/marine/index_e.html
- PowerPoint presentation of past and future deployments by Canadian Ice Services was made at the17th meeting of the International Arctic Buoy Program in Suitland Maryland on May 24th 2007.
- Drifting ice buoy statistics and annual Meteorological Service of Canada Participant Report for IABP available on IABP web site http://iabp.apl.washington.edu as part of annual IABP meeting report.

SPECIAL COMMENTS (if any)

Meteorological Service of Canada

(a) Quality of buoy data: Moored & Drifter – Excellent
(b) Communications: 91% of moored buoy data delivered to users
GOES - Primary Communications,
Service ARGOS - Backup Communications

(c) Buoy lifetimes: Moored buoys – 4 years at which time they are refurbished (weld/leak tests, sandblasting, painting etc.)

Drifting buoys – 16 months – 2 years

(d) Others:

Canadian Ice Services

(a) Quality of buoy data: Excellent, although one beacon got trapped in fast ice and did not provide expected meaningful drift data. The 2 beacons, which died already, provided valuable drift track information in Baffin Bay, one beacon deployed in Nares Strait died off Cape Freels (Nfld) after a trek of over 1700 nautical miles!

(b) Communications: good.

(c) Buoy lifetimes: Up to 1 year for Lithium battery.
Up to 11 months (and still ticking) using alkaline battery!!
Only 2 weeks for one beacon deployed in Crozier Strait iearlyJuly.

Fisheries & Oceans Canada- Bedford Institute of Oceanography.

(a) Quality of buoy data: drift location data are good but short time series.
Wave rider data is good, seasonal May-Nov.

(b) Communications: good, drifters use Service ARGOS and have GPS
DWR, good, uses Service ARGOS and radio link to shore station for real time wave data access through a website. Communications lost June 2006, awaiting redeployment early September 2006. (Damaged by fishing boat)

(c) Buoy lifetimes: drifters are expendable, < 2 months battery life, retrieved if nearshore.

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Appendix C

Country: FRANCE

Year: **1 September 2006 - 31 August 2007**

This report concerns surface buoys only. Programmes using profilers (ARGO floats) are not described here.

PROGRAMMES

A. METEO-FRANCE

Number and type of buoys :

(a) 5 drifting buoys owned by Meteo-France were deployed in last 12 months:

-3 SVP-B barometer drifters (Iridium);
-1 SVP-BS drifter (salinity measurements)
-1 SVP-BTC drifters with 60 m long thermistor chain

In addition, Meteo-France operates 4 moored buoy stations (plus two others in co-operation with UKMO), four omni-directional waveriders and two automated stations put aboard aid-to-navigation buoys;

(b) 16 buoys were operational at 31 August 2007
(c) 16 buoys were reporting on GTS at 31 August 2007.

NB: The operational drifting buoys for the North Atlantic and the Mediterranean Sea are funded by E-SURFMAR (95 deployments in last 12 months, 95 operational and reporting on GTS at 31 August 2007).

Purposes of programme :

(a) Operational : to provide Weather Forecast Centres with oceanographic and meteorological observations in real time (EUCOS/E-SURFMAR, French West Indies, IBPIO programme...) ;
(b) Research : to provide scientists with in-situ observations close to the air-sea interface ;
(c) Technical : to improve present materials (tests of new buoys, new sensors: compasses, barometers, conductivity probes, radiation sensors, sonic anemometer…). To validate wind, bathythermal and salinity measurements.

Main deployment areas :
North Atlantic (Off France, Spain, and Portugal - West Indies).
Western Mediterranean Sea.
Indian Ocean.

Plans for the next 12 months :

- Meteo-France will continue to operate drifting buoys in the Atlantic and Indian oceans through its contribution to the DBCP regional action groups (E-SURFMAR and IBPIO). The co-operation with the Global Drifter Centre of NOAA will be pursued.
- Meteo-France will continue to operate four ocean weather stations (two in West Indies and two in the Mediterranean Sea). The co-operation with the UK Meteorological Office to maintain the Brittany and Gascogne moored buoys will continue. The four-waverider stations located in West Indies and the two automated stations put aboard aid-to-navigation buoys will be maintained.

Other Meteo-France activities in the frame of the DBCP are described further (see paragraphs

on technical developments and special comments).

B. INSU

B1. LOCEAN (CARIOCA programme)

Number and type of buoys :

(a) 1 CARIOCA II buoy deployed in the Southern Atlantic Ocean in January 2006, operational during 15 months, reporting on GTS until May 2007;

(b) 2 CARIOCA II buoys deployed in the Southern Atlantic Ocean in November 2006, one is still operational, and reporting on GTS at 31 August 2007; one was operational during 7 months until mid July 2007;

(c) 2 CARIOCA II buoys deployed in the Southern Atlantic Ocean in January 2007, both are still operational and reporting on GTS at 31 August 2007.

Purposes of programmes:

(a) Research: to understand, quantify, and monitor the CO2 fluxes exchanged at the air-sea interface

(b) Technical: to develop a buoy able to measure CO_2 concentrations at the ocean-atmosphere interface and to measure the distribution of carbon compounds at the ocean surface. Such buoys will be used in the frame ofGOOS.

Web site : *http://www.lodyc.jussieu.fr/carioca/home.html*

Deployment areas: Southern Ocean.

Plans : two new buoys will be deployed in the next 12 months in the Southern Ocean (Atlantic sector).

B2. LOCEAN (salinity drifters)

Number and type of buoys :

(a) 4 surface drifters deployed in Bay of Biscay (June 2006), and on moorings near Banyuls (December 2006, August 2007), the DYFAMED site (November 2006) and the Catalonian Islas de Medes site (July 2007)

(b) 1 SIO/Pacific gyre salinity drifter moored at the Catalonian Islas de Medes site (July 2007)

(the SIO Pacific gyre and the Banyuls surface drifters are still active) (August 22)

Purposes of programmes :

(a) Research : to understand, quantify and monitor the variability of near-surface salinity

(b) Technical : to develop drifters able to measure surface salinity over a multi-month mission with little drifts

Web site : *http://www.lodyc.jussieu.fr/carioca/home.html*

Plans for the next 12 months : Deployments of drifters (Surface, SIO/Pacific gyre, and MetOcean salinity drifters) in the Bay of Biscay and the western tropical Atlantic. Continuation of moored tests near Banyuls.

B3. COM (EGYPT programme)

Number and type of buoys:

(a) 17 SVP drifters have been deployed in April 2006 during the EGYPT-1 cruise off Libya and Egypt. Some of these buoys are still reporting, but most are on coasts.

Purposes of programmes :
(a) Research: Understand the variability of the flow through the straight of Sicily and study the path of the Atlantic Water (surface circulation) and its variability in the south-eastern basin of the Mediterranean Sea (see *www.ifremer.fr/lobtln*)

Deployment areas: Eastern basin of the Mediterranean Sea.

N.B.: the EGYPT surface buoy part of the program has a joint Italian counterpart: EGITTO, from OGS/SIRE, P.M. Poulain, (see *http://poseidon.ogs.trieste.it/sire/drifter/egitto_data.html)*

Plans for the next 12 months: 5 EGYPT drifters will be deployed in late 2007

C. CETMEF (Centre d' Etudes Techniques Maritimes Et Fluviales)

C1. Wave measurement network

Number and type of buoys :
(a) CETMEF operates a network of 9 scalar buoys and 8 directional buoys (DATAWELL). In addition, CETMEF implemented wave measurement systems on two Aid-to-Navigation moored buoys. CETMEF also manages the real-time data for three directional buoys owned by three French universities (Bordeaux, Pau and Banyuls)

(b) 15 buoys were operational at 31 August
(c) 7 were reporting on GTS at 31 August.

Purpose of programme :
(a) Operational: to centralize the French wave data and maintain a long term wave measurement network along the coast of the French mother and overseas territories .

Deployment area: French coasts and La Reunion Island.

Plans for the next 12 months: The network will be maintained. CETMEF plans to complete it with two directional buoys. Real time data are available on the Internet at *http://www.cetmef.equipement.gouv.fr/donnees/candhis/* and on the GTS thanks to Meteo-France.

C2. MAREL network

Number and type of buoys :
(a) CETMEF operates a network of two MAREL buoys. In addition, CETMEF operates one estuary station at Honfleur.
(b) Zero buoys were operational at 31 August
(c) None was reporting on GTS at 31 August.

Purposes of programme: To provide coastal environmental data in order to study and monitor the direct or indirect effects of human activities on marine environment

Web site : *http://www.ifremer.fr/difMarelSeine/*

Deployment area: Bay of Seine

Plans for the next 12 months: CETMEF will stop the exploitation of MAREL Network in next 12 months.

D. **IRD** - French participation to PIRATA and to AMMA-EGEE programmes – (in cooperation with Meteo-France) and TAV-CLIVAR programmes (international collaborations)

A) PIRATA:

Number and type of buoys :
IRD operates a network of 5 Atlas buoys, maintained yearly, in the tropical Atlantic in co-operation with NOAA/PMEL.

All the buoys have been replaced (redeployed) in May-July 2006 during the EGEE 3 / PIRATA FR15 cruise, onboard the R/V ATALANTE, and also thanks to the contribution of German METEOR and US RON BROWN vessel cruises for one site.

An additional buoy has been deployed off Congo (6°S-8°E) in the framework of the PIRATA South-Eastern Extension supported by South Africa and the BCLME program.

Thus, 6 Atlas buoys were reporting on GTS from June 27, 2006 in the central and eastern tropical Atlantic.

The deployment of a CO2 sensor associated to the ATLAS buoy at 10°W-6°S has been ensured during the EGEE 3 / PIRATA FR15 cruise.

One current meter mooring (ADCP) is maintained at 23°W-Equator by IRD for around five years (with periods of interruption). This mooring has been replaced and a second current meter mooring (ADCP) funded by IRD has been deployed at 10°W-Equator by The German METEOR vessel in June 2006. This mooring will be replaced in April 2008.

An additional current meter mooring (ADCP) has been deployed at 10°W-Equator for IRD (as part of EGEE/AMMA and TACE programs) by the German METEOR vessel in June 2006. This mooring will be replaced during the PIRATA-FR18 cruise in fall 2008.

In 2007, the Atlas buoy located at 8E-6S has been retrieved (after a 1-year test period) and the 5 other ones replaced during the PIRATA FR-16 and EGEE5/PIRATA-FR17 cruises, in May-July 2007, onboard the R/V ANTEA. All the buoys perfectly worked during this full year, i.e. from June 2006 to June 2007.

Purposes of programme: The PIRATA programme is an extension of the TAO array in the Tropical Atlantic. Contributions are from Brazil, France and USA.

(a) Operational: to provide oceanographic and meteorological observations in real time to Weather Forecast Centres as well as to ocean global circulation modes (e.g. MERCATOR);
(b) Research : to describe and understand the evolution of SST, upper ocean thermal structure and air-sea fluxes of momentum, heat, and fresh water in the Tropical Atlantic.

Web site : *http://www.brest.ird.fr/pirata/piratafr.html*

Deployment area: Tropical Atlantic Ocean, ATLAS buoys located at: along the equator at 23°W,

10°W and 0°E, and at 10°W- 6°S, 10°W- 10°S and 8°E- 6°S (funded byBCLME).

D) AMMA-EGEE and TAV-CLIVAR:

During the PIRATA FR16 cruise (May 2007), two ARGO profilers have been deployed for IFM-GEOMAR, as part of TACE.

During the EGEE 6 and PLUMAND cruises (September-October 2007), four current meters moorings have been deployed in the Gulf of Guinea at 10°W (0°75'S and 0°75'N) and 0°E (0°N and 1°S), as part of TACE (PI: Bill Johns, RSMAS/Miami, USA).

Plans for the next 12 months :

- The field operations as part of EGEE/AMMA are closed (they were carried out from 2005 to 2007, with 6 dedicated cruises).
- IRD will continue in 2008 to maintain the five PIRATA ATLAS buoys located in the Gulf of Guinea, in fall 2008 during a PIRATA cruise.
- The current meter mooring at 10°W-0°N will be replaced during this cruise. –
- The current meter mooring at 23°W-0°N will be replaced in spring 2008 during an IFM-GEOMAR cruise.
- The ATLAS buoy located at 23°W-Equator could be serviced by US-NOAA during their cruise dedicated to the servicing of the new North-Eastern PIRATA extension.
- ARGO profilers and SVP drifters could be also deployed.

E. IUEM (European Institute for Marine Studies, UBO)

Number and type of buoys :

(a) The MAREL-Iroise project results from a IUEM-IFREMER-INSU collaboration ; the buoy is operational since July 2000; a PCO2 sensor adapted from the CARIOCA system is implemented on the buoy since March 2003

(b) The buoy is stopped for maintenance from June to August 2007 and is temporarily replaced by an Ifremer SWING buoy.

(c) It was not reporting on GTS at 31 August.

Purposes of programme: The main aim of the IUEM observatory is to describe and understand the relative impact of climatic and anthropogenic strains on the coastal ecosystem "Bay of Brest-Iroise Sea"

Web site : *http://www.ifremer.fr/mareliroise*

Deployment area: French coast

Plans for the next 12 months: IUEM will continue to maintain the MAREL Iroise buoy.

F. SHOM (Hydrographic and Oceanographic Service of the Navy)

Number and type of buoys :

(a) 62 drifting buoys owned by SHOM were deployed in last 12 months :

- 10 Davis Drifter (lagrangian drifters for measuring water currents within one meter of water surface);
- 22 WOCE (World Ocean Circulation Experiment) buoys drogued at 15m;
- 25 WOCE (World Ocean Circulation Experiment) buoys drogued at 75m;
- 2 Surdrift buoys (home made lagrangian drifters drogued at 200m);
- 3 CMOD : Compact Meteorological and Oceanographic Drifter with 10

thermistors on 100m cable;
1 moored directional waverider buoy (WMO number 62064) in the Bay of Biscay

(b) 40 buoys were operational at 31 August
(c) None was reporting on GTS at 31 August.

Purposes of program:
(a) to get oceanic data (current and temperature in depth) that could be introduced in real time into prediction models.
(b) to validate directional and spectral information from numerical wave models.

Deployment area: North Atlantic

Plans for the next 12 months :
- 40 surface lagrangian drifters will be deployed in the next 12 months.
- A second moored directional waverider buoy will be deployed in the Bay of Biscay.
- Maintenance of buoy 62064 with data to be transmitted on GTS via CETMEF.

G. IFREMER

Number and type of buoys :
(a) IFREMER operates two MAREL buoys.
(b) the buoys were operational at 31 August
(c) None was reporting on GTS at 31 August.

Purposes of programme: To provide coastal environmental data in order to study and monitor the direct or indirect effects of human activities on marine environment ;

Web site : http://www.ifremer.fr/difMarelCarnot/,

Deployment area: Boulogne sur Mer
Estuary of Vilaine

Plans for the next 12 months: IFREMER will continue to maintain the Boulogne's marine station and the buoy in the estuary of Vilaine. End of 2007 IFREMER will deploy a new MAREL boy in the bay of Vilaine next to the island Dumet to monitor at the surface and the bottom the main physico-chemical parameters.

TECHNICAL DEVELOPMENTS

Instrumentation

(i) Meteo-France continues to participate in the evaluation of SVP pressure drifters. In parallel to the use of drifters, Meteo-France continuously surveys the performances of air pressure measurement for almost of the drifters of that kind deployed over the World Ocean.

(ii) The evaluation of SVP-B drifters fitted with a conductivity sensor is going on (co-operation between Meteo-France and LOCEAN).

(iii) Meteo-France is participating in the evaluation of drifters fitted with thermistor string SVP-BTC.

(iv) Evaluation of Iridium SBD transmission for operational purposes partly seenas a contribution to the DBCP Iridium Pilot Project.

(v) In the framework of IPY, the evaluation of different kinds of drifters report air pressure in the Arctic Ocean through an EUCOS/ESURFMAR funding. Nine buoys were deployed: 2 ICEXAir (2006), 2 SVP-B (Iridium 2007), 2 SVP-B (Argos 2007), 3 ICEB (2007).

PUBLICATIONS (programme plans, technical developments, QC reports, data studies...)

-Ardhuin, F., T. H. C. Herbers, G. Ph. van Vledder, K. P. Watts, R. Jensen et H. Graber, Slanting fetch and swell effects on wind wave growth, *J. Phys. Oceanogr.*, 37 (4) , 908—931.

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- Marin, F., G.Caniaux, B.Bourlès, H.Giordani, Y.Gouriou and E. Key, why were sea surface temperature so different in the eastern equatorial Atlantic in June 2005 and 2006, submitted in *Geophys. Res. Lett.*, 2007.

- Parker, D.J., T.Lebel, B. Bourlès, Overview of the AMMA observing campaigns, *CLIVAR Exchanges Letters, Vol. 12, n°2, 4-6,* April 2007.

- Reverdin, G., P.Blouch, J.Boutin, P.P.Niiler, J.Rolland, W.Scuba, A.Lorenco, A.F.Rios, *Journal of Atmospheric and Oceanic Technology, Vol 24 N°9, 1643-1654,*September 2007.

- Météo-France - Centre de Météorologie Marine, Monthly statistics on buoys data transmitted on GTS in BUOY and SHIP codes (Air pressure, SST, wind speed and direction, air temperature).

- Météo-France – Centre de Météorologie Marine, E-SURFMAR Data Buoys Monthly report.

SPECIAL COMMENTS

(a) Buoy QC

(i) The Centre de Meteorologie Marine of Meteo-France continues to operate quality control procedures on drifting buoys data. Warning messages are sent to the *buoy-qir@vedur.is* mailing list of Internet when a problem appears (e.g. bad location detected) or when a modification seems needed (i.e. to recalibrate or to remove a sensor from GTS) via JCOMMOPS interface. Statistics on comparisons with analysis fields are set up for each buoy.

(ii) Buoy data QC tools developed by Meteo-France are available on the Internet (*http://www.meteo.shom.fr/qctools*) to help buoy operators to check their buoys : monthly statistics carried out by 5 meteorological centres for individual buoys ; plots of data and differences with model outputs , blacklists of buoys reporting dubious air pressure values or being perhaps ashore can be seen.

(b) Buoy data

(i) The Centre de Meteorologie Marine of Meteo-France reports the wave data collected by CETMEF in real time onto the GTS.

(ii) Since the 1st of January 2002, Meteo-France has been providing the Coriolis Data Centre with surface current data computed thanks to SVP drifter tracks. CORIOLIS contributes to the French operational oceanographic project with in-situ data. Buoy positions, get from the GTS, are interpolated every 3 hours. Surface current data are computed over 6 hours, on a weekly basis. Data are flagged with drogue presence indexes. Wind speed and wind stress data from ECMWF analysis model coupled with sampled surface current data has been provided too from mid-2004.

(c) Other activities

(i) For the twelfth consecutive year, Meteo-France funded 10 barometers to be added to SVP drifters deployed in the Tropical Indian Ocean, each year in November.Sixteen other upgrades were funded in 2007. These drifters are devoted to theSouthern Ocean, south of 40°S in the Indian Ocean, as a principle. These actions will be renewed in 2008.

(ii) IRD, also contributes to the deployment of SVP buoys in the equatorial Atlantic during the PIRATA servicing cruises and also in the framework of the CORIOLIS programme.

Appendix D

Country: Germany

Year: 2007 **01.09.2006-31.08.2007**

CURRENT PROGRAMMES

AGENCY OR PROGRAMME: Alfred Wegener Institute, Marine Mammal Tracking (MMT), Marine Mammal Exploration of the Oceans Pole to Pole (MEOP) IPY 153

Number and type of buoys:	(a)	deployed during year: 6
	(b)	operational at 31 August: 6
	(c)	reporting on GTS at 31 August: 0
Purpose of programme:	(a)	operational: up to 10 pa.
	(b)	met/ocean research: up to 10 pa.
	(c)	developmental: none

Main deployment areas: Southern Ocean – Indian Sector

AGENCY OR PROGRAMME: 919, Alfred Wegener Institute, Bremerhaven

Number and type of buoys:	(a)	deployed during year: 7 sea ice buoys
	(b)	operational at 31 August: 4
	(c)	reporting on GTS at 31 August: 4
Purpose of programme:	(a)	operational:
	(b)	met/ocean research: 7
	(c)	developmental:

Main deployment areas: Arctic Ocean, Bellingshausen/Amundsen Sea

AGENCY OR PROGRAMME: ***Alfred Wegener Institute Bremerhaven, German ARGO***

Number and type of buoys:	(a)	deployed during year: 14 Argo floats (8 NEMO, 6 Apex)	
	(b)	operational at 31 August: 43 Argo floats (20 NEMO, 23 Apex)	
	(c)	reporting on GTS at 31 August: all	
Purpose of programme:	(a)	operational:	X
	(b)	met/ocean research:	X
	(c)	developmental:	X

Main deployment areas: Weddell Sea, Antarctic Coastal Current

AGENCY OR PROGRAMME: University of Hamburg, Institute of Marine Research

Number and type of buoys:
(a) 11 APEX floats deployed during 2007
(b) operational at 31 August: 26
(c) reporting on GTS at 31 August: 26

Purpose of programme:
(a) operational:
(b) met/ocean research: yes
(c) developmental:

Main deployment areas: Nordic Seas

AGENCY OR PROGRAMME: ***IFM-GEOMAR Kiel, German ARGO***

Number and type of buoys:
(a) deployed during year: 2 APEX

(b) operational at 31 August:
34 - APEX
2 - NEMO
1 - PROVOR CTS3

(c) reporting on GTS at 31 August:
3 APEX Trop. Atl.

Purpose of programme:
(a) operational: x
ARGO- Met Ocean Research (Semi Operational)

(b) met/ocean research: x (all above)
(c) developmental:

Main deployment areas: Tropical Atlantic, North Atlantic

AGENCY OR PROGRAMME: Research and Technology Centre West coast, Buesum / Ocean Monitoring Project Group, Kiel

Number and type of buoys:
(a) deployed during year:
3 ODAS buoys (C, T, turbidity, currents, wave by ADCP below buoy)

(b) operational at 31 August:
(c) reporting on GTS at 31 August:

Purpose of programme:
(a)operational
(b)met/ocean research
(b) developmental: X

Main deployment areas: German North Sea Coast

AGENCY OR PROGRAMME: Bundesamt für Seeschifffahrt und Hydrographie, Hamburg, German ARGO

Number and type of buoys:
(a) deployed during year: 12

	(b)	operational at 31 August:	52
	(c)	reporting on GTS at 31 August:	all
Purpose of programme:	(a)	operational:	x
	(b)	met/ocean research:	x
	(c)	developmental:	

Main deployment areas: North Atlantic

AGENCY OR PROGRAMME: Meteorological Institute, University of Hamburg, GERMANY

Number and type of buoys:	(a)	deployed during year:	52
	(b)	operational at 31 August:	10
	(c)	reporting on GTS at 31 August:	-
Purpose of programme:	(a)	operational:	-
	(b)	met/ocean research:	52
	(c)	developmental:	-

Main deployment areas: Central Arctic Ocean and Fram Strait

PLANNED PROGRAMMES

AGENCY OR PROGRAMME: ***Alfred Wegener Institute, Marine Mammal Tracking (MMT), Marine Mammal Exploration of the Oceans Pole to Pole (MEOP) IPY 153***

Number and type of buoys planned for deployment in the next 12 months: 10

Purpose of programme:	(a)	operational:	5
	(b)	met/ocean research:	5
	(c)	developmental:	none

Main deployment areas: Southern Ocean – Indian Sector

AGENCY OR PROGRAMME ***919, Alfred Wegener Institute, Bremerhaven***

Number and type of buoys planned for deployment in the next 12 months: 1 Iceberg drifter, 26 ARGOS drifters

Purpose of programme:	(a)	operational:	X
	(b)	met/ocean research:	
	(c)	developmental:	

Main deployment areas: Arctic Ocean, Bellingshausen/Amundsen Sea, Fram Strait

AGENCY OR PROGRAMME: ***Alfred Wegener Institute Bremerhaven, German ARGO***

Number and type of buoys planned for deployment in the next 12 months: 20 Argo floats (18 NEMO, 2 Apex)

Purpose of programme:			
	(a)	operational:	X
	(b)	met/ocean research:	X
	(c)	developmental:	

Main deployment areas: Weddell Sea

AGENCY OR PROGRAMME: ***University of Hamburg, Institute of Marine Research***

Number and type of buoys planned for deployment in the next 12 months:

Purpose of programme:			
	(a)	operational:	yes
	(b)	met/ocean research:	yes
	(c)	developmental:	

Main deployment areas: Nordic Seas

E. *AGENCY OR PROGRAMME* ***IFM-GEOMAR Kiel, German ARGO***

Number and type of buoys planned for deployment in the next 12 months: 8

Purpose of programme:

(a) operational:

(b) met/ocean research:
4 PROVOR CTS3 in Trop.Atl.
2 PROVCARBON in Trop. Atl.
2 BIONEMO in Trop. Atl.

(c) developmental:

Main deployment areas: all Tropical Atlantic

F. *AGENCY OR PROGRAMME:* ***Research and Technology Centre West coast, Buesum / Ocean Monitoring Project Group, Kiel***

Ongoing measurements with the 3 buoys mentioned above

Purpose of programme:

(a) operational:
(b)met/ocean research:
(c)developmental: X

Main deployment areas:

G. *AGENCY OR PROGRAMME:* ***Bundesamt für Seeschifffahrt und Hydographie, Hamburg,***
German Argo

Number and type of buoys planned for deployment in the next 12 months: 52

Purpose of programme:			
	(a)	operational:	x
	(b)	met/ocean research:	
	(c)	developmental:	

Main deployment areas: North Atlantic

H. AGENCY OR PROGRAMME: Meteorological Institute, University of Hamburg, Germany

Number and type of buoys planned for deployment in the next 12 months:

Purpose of programme:	(a)	operational:	none
	(b)	met/ocean research:	16
	(c)	developmental:	none

Main deployment areas: Central Arctic Ocean

TECHNICAL DEVELOPMENTS

A. (a) Buoy design: --
(b) Instrumentation: --
(c) Others: --

PUBLICATIONS (on programme plans, technical developments, QC reports, etc.)

http://classic.ipy.org/development/eoi/proposal-details.php?id=153

B. (a) Buoy design
(b) Instrumentation:
(c) Others:

PUBLICATIONS (on programme plans, technical developments, QC reports, etc.)

C. (a) Buoy design
(b) Instrumentation:
(c) Others:
Ice sensing algorithm to make floats ice compatible

PUBLICATIONS (on programme plans, technical developments, QC reports, etc.)
A Profiling Float's Sense of Ice, O. Klatt, O. Boebel, and E. Fahrbach, Journal of Atmospheric and Oceanic Technology, 1301 – 1308, July 2007,

D. (a) Buoy design APEX
(b) Instrumentation: CTD O2
(c) Others:

PUBLICATIONS (on programme plans, technical developments, QC reports, etc.)

MERSEA Annual Reports

E. (a) Buoy design

(b) Instrumentation:
(c) Others:

PUBLICATIONS (on programme plans, technical developments, QC reports, etc.)

F. (a) Buoy design: Mooring design for shallow water application with cable connected bottom mounted ADCP
(b) Instrumentation: GPRS telemetry unit and software
(c) Others:

PUBLICATIONS (on programme plans, technical developments, QC reports, etc.)

G. (a) Buoy design APEX, NEMO
(b) Instrumentation: standard SBE CTD
(c) Others:

PUBLICATIONS (on programme plans, technical developments, QC reports, etc.)

H. (a) Buoy design: -
(b) Instrumentation: -
(c) Others: -

PUBLICATIONS (on programme plans, technical developments, QC reports, etc.)

Not yet.

SPECICAL COMMENTS (if any)

A. (a) Quality of buoy data:
(b) Communications:
(c) Buoy lifetimes:
(d) Others:

B. (a) Quality of buoy data:
(b) Communications:
(c) Buoy lifetimes: Buoy lifetimes are often limited by ice melt and ice deformation.
(d) Others:

C. (a) Quality of buoy data:
(b) Communications:
(c) Buoy lifetimes:
(d) Others:

Due to the sea-ice conditions, we are not able to identify the number of operational floats at 31 August. Hence, here we quote the number at 31 March.

D. (a) Quality of buoy data: good
(b) Communications: no problems
(c) Buoy lifetimes: 2 – 4 years
(d) Others:

E. (a) Quality of buoy data:
(b) Communications:
(c) Buoy lifetimes:
(d) Others:

F. (a) Quality of buoy data:
(b) Communications:
(c) Buoy lifetimes:
(d) Others:

G. (a) Quality of buoy data: good
(b) Communications: ARGOS
(c) Buoy lifetimes: 6 years and longer
(d) Others:

H. (a) **Quality of buoy data**: Sensor data (air pressure, temperature) transmitted via the ARGOS system revealed numerous spikes, whereas position data showed no problems. Data from 13 water buoys deployed on February in the open part of the Fram Strait showed a poor quality, which may be the consequence of very bad weather conditions (especially icing-up conditions) in that area during winter.

(a) **Communications:** no problems

(b) **Buoy lifetimes:** Maximum 1 Year. Because ice buoys are used, the lifetime of the buoys is strongly determined by the ice conditions.

(c) **Others:** The main objectives of the buoy programme are:
* Synoptic observations of the Arctic Ocean Sea-Ice Pack
* Synoptic observations of atmospheric key processes occurring in the Arctic Ocean
* Synoptic observations of the Arctic Ocean circulation and key processes
* Integration and assimilation of observations with large-scale models

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Appendix E

Country: JAPAN

Year: 2007

CURRENT PROGRAMMES

A. Japan Meteorological Agency (JMA)

Number and type of buoys:
(a) deployed during year:
(Type 1) 19 drifting buoys with air pressure, SST, wave height and wave period sensors
(Type 2) 15 profiling floats
(b) operational at 31 August:
(Type 1) 8
(Type 2) 22
(c) reporting on GTS at 31 August:
(Type 1) 8
(Type 2) 22

Purpose of programme:
(Type 1) operational: weather and sea condition monitoring
(Type 2) operational: ocean state and climate monitoring
Main deployment areas: seas around Japan

B. Meteorological Research Institute, JMA

Number and type of buoys:
(a) deployed during year: None
(b) operational at 31 August: 6 profiling floats
(c) reporting on GTS at 31 August: 6

Purpose of programme: oceanographic research (sub arctic intermediate circulation)
Main deployment areas: Oyashio-Kuroshio mixed water region (seas east of Japan)

C. Japan Coast Guard

Number and type of buoys
(a) deployed during year: 3 surface drifters with SST sensor
(b) operational at 31 August: 3
(c) reporting on GTS at 31 August: 3
Purpose of programme: operational
Main deployment areas: the Antarctic Ocean

D. Japan Agency for Marine-Earth Science and Technology

Number and type of buoys:
(a) deployed during year:
(Type 1) 1 meteorological and oceanographic drifter (POPS)
(Type 2) 17 meteorological and subsurface oceanographic surface moorings (TRITON buoys)
(Type 3) 83 profiling floats
(b) operational at 31 August:
(Type 1) 1
(Type 2) 17

(Type 3) 352
(c) reporting on GTS at 31 August
(Type 1) 1
(Type 2) 14
(Type 3) 352
Purpose of programme:
(Type 1) meteorological and oceanographic research
(Type 2) meteorological and oceanographic research and ENSO monitoring
(Type 3) oceanographic research (Argo project)
Main deployment areas:
(Type 1) the Arctic Ocean
(Type 2) the western tropical Pacific and the eastern Indian Ocean
(Type 3) the North Pacific, the South Pacific, the South Indian, the Southern and the Arctic Oceans

E. Tohoku University

Number and type of buoys:
(a) deployed during year: None
(b) operational at 31 August: 3 profiling floats
(c) reporting on GTS at 31 August: 3
Purpose of programme: oceanographic research
Main deployment areas: the North Pacific
("boundary area between subtropical and sub arctic regions" , "western subtropical region" & "central subtropical region")

F. National Institute of Polar Research

Number and type of buoys:
(a) deployed during year: None
(b) operational at 31 August: 4 profiling floats (APEX)
(c) reporting on GTS at 31 August: None
Purpose of programme: oceanographic research
Main deployment areas: the Indian sector of the Southern Ocean

G. Tohoku National Fisheries Research Institute, Fisheries Research Agency

Number and type of buoys:
(a) deployed during year:
(Type 1) 0 profiling floats
(Type 2) 6 subsurface current meter moorings
b) operational at 31 August:
(Type 1) 1
(Type 2) 3
(c) reporting on GTS at 31 August:
(Type 1) 1
(Type 2) 0
Purpose of programme:
(Type 1) oceanographic research (sub arctic intermediate circulation)
(Type 2) oceanographic research (western boundary current transport)
Main deployment areas:
(Type 1) Oyashio-Kuroshio mixed water region (the western North Pacific)
(Type 2) Oyashio region

(the western boundary current of sub arctic North Pacific)

H. Hokkaido National Fisheries Research Institute, Fisheries Research Agency

Number and type of buoys:
(a) deployed during year: 0 profiling floats
(b) operational at 31 August: 5
(c) reporting on GTS at 31 August: 5
Purpose of programme: oceanographic research (sub arctic intermediate circulation)
Main deployment areas: Oyashio-Kuroshio mixed water region (the western North Pacific)

PLANNED PROGRAMMES

A. Japan Meteorological Agency

Number and type of buoys planned for deployment in next 12 months:
(Type 1) 22 drifting buoys with air pressure, SST, wave height and wave period sensors
(Type 2) 15 profiling floats
Purpose of programme:
(Type 1) operational: weather and sea condition monitoring
(Type 2) operational: ocean state and climate monitoring
Main deployment areas: seas around Japan

C. Japan Coast Guard

Number and type of buoys planned for deployment in next 12 months:
3 surface drifters with SST sensor
Purpose of programme: operational
Main deployment areas: the Antarctic Ocean

D. Japan Agency for Marine-Earth Science and Technology

Number and type of buoys planned for deployment in next 12 months:
(Type 1) 2 meteorological and oceanographic drifters (POPS)
(Type 2) 17 meteorological and subsurface oceanographic surface moorings (15 TRITON buoys and 2 m-TRITON buoys)
(Type 3) 67 profiling floats
Purpose of programme:
(Type 1) meteorological and oceanographic research
(Type 2) meteorological and oceanographic research and ENSO monitoring
(Type 3) oceanographic research (Argo project)
Main deployment areas:
(Type 1) the Arctic Ocean
(Type 2) the western tropical Pacific (15 TRITON buoys) and the eastern Indian Ocean (2 m-TRITON buoys)
(Type 3) the North Pacific, the South Pacific, the Indian and the Southern Oceans

E. Tohoku University

Number and type of buoys planned for deployment in next 12 months: 8 profiling floats
Purpose of programme: oceanographic research
Main deployment areas: the North Pacific

("boundary area between subtropical and sub arctic regions" , "western subtropical region" & "central subtropical region")

F. National Institute of Polar Research

Number and type of buoys planned for deployment in next 12 months: 1 profiling float
Purpose of programme: oceanographic research
Main deployment areas: the Indian sector of the Southern Ocean

G. Tohoku National Fisheries Research Institute, Fisheries Research Agency

Number and type of buoys planned for deployment in next 12 months:
(Type 1) 4 profiling float
(Type 2) 4 subsurface current meter moorings
Purpose of programme:
(Type 1) oceanographic research (sub arctic intermediate circulation)
(Type 2) oceanographic research (western boundary current transport and mode water formation)
Main deployment areas:
(Type 1) Subtropical region
(subtropical North Pacific)
(Type 2) Oyashio region and sub arctic region
(the western boundary current of sub arctic North Pacific)

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Appendix F

Country: Kenya (Kenya Meteorological Department)

Year: 2007

CURRENT PROGRAMMES

A. Agency or programme: Global Drifter Centre, NOAA-USA Programme

Number and type of buoys: 5 SVP

(a) Deployed during year: 2005
(b) Operational at 31 August: 3
(c) Reporting on GTS at 31 August: 3

Purpose of programme:

(a) **Operational:** Data used to improve data coverage over the Western Indian Ocean for operational and marine forecasts.

(b) **Met/Ocean Research**: Oceanographic research and climate change studies.

(c) **Developmental:** Long-term climate monitoring and research programmes like climate variability, predictability, and climate change studies.

Main deployment areas: Western Indian Ocean

B. Agency or programme: Global Drifter Centre, NOAA-USA programme

Number and type of buoys: 20 SVP and SVP-B mini-drogues

(a) Deployed during year: 2006
(b) Operational at 31 August: 10
(c) Reporting on GTS at 31 August: 6

Purpose of programme:

(a) **operational:** Data collected used to improve data coverage over Western Indian Ocean for operational and marine forecasts.
(b) **Met/Ocean research**: Oceanographic research and climate change studies.
(c) **Developmental:** Long-term climate monitoring and research programmes like climate variability, predictability, and climate change studies.

Main deployment areas: Western Indian Ocean

c. Agency or programme: Global Drifter Centre, NOAA-USA programme

Number and type of buoys: 20 SVP and SVP-B mini-drogues

(a) Deployed during year: 2007

(b) Operational at 31 August: Deployed between 13 and 14 August.
(c) Reporting on GTS at 31 August: Not sure, as to the date of this, report.

Purpose of programme:
(a) **Operational:** Data used to improve data coverage over Western Indian Ocean for operational and marine forecasts.
(b) **Met/Ocean Research**: Oceanographic research and climate change studies.
(c) **Developmental:** Long-term climate monitoring and research programmes like climate variability, predictability, and climate change studies.

Main deployment areas: Western Indian Ocean

PLANNED PROGRAMMES

A. Agency or programme:

Number and type of buoys planned for deployment in next 12 months:

Purpose of programme:

Main deployment areas:

B. Agency or programme:
(as above, repeat as often as necessary)

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TECHNICAL DEVELOPMENTS

(a) **Buoy design**:

(b) **Instrumentation**: T

(c) Others:

PUBLICATIONS *(on programme plans, technical developments, QC reports, etc.)*

None

SPECIAL COMMENTS (if any)

(a) Quality of buoy data:

(b) Communications: Data received at the Kenya Meteorological Department through the Global Telecommunication System (GTS).

(c) Buoy lifetimes: It varies from four months to about three years

(d) Others:

Appendix H

Country: Republic of Korea

Year: 2007

CURRENT PROGRAMMES

A. Agency or programme: Korea Meteorological Administration

Number and type of buoys:
(a) deployed during year: 1 moored buoy (replacement)
(b) operational at 31 August: 5 moored buoys
(c) reporting on GTS at 31 August: 5 moored buoys

Purpose of programme:
(a) operational: 5
(b) met/ocean research:
(c) developmental:

Main deployment areas: regional sea around the Korea Peninsula

B. Agency or programme: Meteorological Research Institute (2397)/ Korea Meteorological Administration

Number and type of buoys:
(a) deployed during year: 15 Argo floaters
(b) operational at 31 August: 43 Argo floaters (15 floats will be added later on)
(c) reporting on GTS at 31 August: 43 Argo floaters (15 floats will be added later on)

Purpose of programme:
(a) operational:
(b) met/ocean research: 43
(c) developmental:

Main deployment areas: the East Sea(Japan Sea) and the West Pacific

C. Agency or programme: Korea Ocean Research & Development Institute (2096)

Number and type of buoys:
(a) deployed during year: 13 Argo floaters (1 float in March 2007, and 12 floats in sSeptember)
(b) operational at 31 August: 57 Argo floaters (12 floats will be added later on)
(c) reporting on GTS at 31 August: 57 Argo floaters (12 floats will be added later on)

Purpose of programme:
(a) operational:
(b) met/ocean research: 57
(c) developmental:

Main deployment areas: the East Sea(Japan Sea) and the Antarctic Sea

D. Agency or programme: National Oceanographic Research Institute/ Ministry of Maritime Affairs & Fisheries

Number and type of buoys:
(a) deployed during year: 1 moored buoy

(b) operational at 31 August: 2 moored buoys
(c) reporting on GTS at 31 August:

Purpose of programme: (a) operational: 3
(b) met/ocean research:
(c) developmental:

Main deployment areas: around the southern sea of the Korea Peninsula

PLANNED PROGRAMMES

A. Agency or programme: Korea Meteorological Administration

Number and type of buoys planned for deployment in next 12 months: 2 moored buoys

Purpose of programme: (a) operational: 2
(b) met/ocean research:
(c) developmental:

Main deployment areas: the East Sea, the East China Sea(the northern area)

B. Agency or programme: Meteorological Research Institute (2397)/ Korea Meteorological Administration

Number and type of buoys planned for deployment in next 12 months: 15 Argo floaters

Purpose of programme: (a) operational:
(b) met/ocean research: 15
(c) developmental:

Main deployment areas: the East Sea(Japan Sea) and the West Pacific

C. Agency or programme: Korea Ocean Research & Development Institute (2096)

Number and type of buoys planned for deployment in next 12 months: 12 Argo floaters

Purpose of programme: (a) operational:
(b) met/ocean research: 12
(c) developmental:

Main deployment areas: the East Sea(Japan Sea) and the Antarctic Sea

D. Agency or programme: National Oceanographic Research Institute/ Ministry of Maritime Affairs & Fisheries

Number and type of buoys planned for deployment in next 12 months: 1 moored buoy

Purpose of programme: (a) operational: 1
(b) met/ocean research:
(c) developmental:

Main deployment areas: the East Sea

Country: New Zealand

Year: 2007

CURRENT PROGRAMMES (for period 1 Oct 2006 – 18 September 2007)

A Agency or programme: Meteorological Service of NZ Ltd (MSNZ)

Number and type of buoys:
(a) Deployed during the year: **4**
4 SVP-B
(b) Operational at 31 August: **7**
(c) Reporting on GTS at 31 August: **7**

Purpose of programme: Real-time buoy data for MetService Weather Forecasting activities

Main deployment area: Tasman Sea

B Agency or programme: MSNZ Barometer Upgrade Programme for SOBP

Number and type of buoys:
(a) Deployed during the year: **9**
(b) Operational at 31 August: **9**
(c) Reporting on GTS at 31 August: **9**

Purpose of programme: To increase the number of pressure observations in the data-sparse Southern Ocean for MetServices Forecasting Operations and for ingest by global models.

Main deployment area: Southern Pacific Ocean.

C Agency or programme: Global Drifter Programme for SOBP

Number and type of buoys:
(a) Deployed during the year: **5**
15 SVP-B
(b) Operational at 31 August: **5**
(c) Reporting on GTS at 31 August: **5**

Purpose of programme: To provide deployment opportunities and logistical support to the GDP to increase the number of buoy observations in the Southern Ocean.

Main deployment area: Southern Pacific Ocean.

PLANNED PROGRAMMES (for period 1 Oct 2006 – 1 Oct 2007)

A **Agency or programme:** Meteorological Service of NZ Ltd (MSNZ)

Number and type of buoys planned for deployment in next twelve months: **8 SVPB**

Purpose of programme: Real-time buoy data for MetService Weather Forecasting activities

Main deployment area: Tasman Sea

B **Agency or programme:** MSNZ Barometer Upgrade Programme for SOBP

Number and type of buoys planned for deployment in next twelve months: **10 SVPB**

Purpose of programme: To increase the number of pressure observations in the data-sparse Southern Ocean for MetServices Forecasting Operations and for ingest by global models.

Main deployment area: Southern Pacific Ocean.

C **Agency or programme:** Global Drifter Programme for SOBP

Number and type of buoys planned for deployment in next twelve months: **10 SVPB**

Purpose of programme: To provide deployment opportunities and logistical support to the GDP to increase the number of buoy observations in the Southern Ocean.

Main deployment area: Southern Pacific Ocean.

TECHNICAL DEVELOPMENTS

(a) Buoy design:
(b) Instrumentation:
(c) Others:

(a) Quality of buoy data:
(b) Communications:
(c) Buoy Lifetimes:

The MetService Tasman Sea Buoy Network now consists entirely of SVPB type buoys.

Since 2002, thirteen MetService SVPB (Technocean) buoys have been deployed into the Tasman Sea network. As at 18 September 2007, five buoys have finished operating having achieved an average lifetimes of 19.6 months per buoy. The maximum lifetime achieved by one buoy was 37.0 months. Lifetime is counted for as long as good pressure data remains on GTS, or until battery or transmission failure. The remaining eight buoys are all still fully operational, with six buoys aged between 12 and 25 months, with the other two being newly deployed.

Since 2000, twenty-five of the GDC SVPB (Technocean) buoys deployed by MetService have failed after an average lifetime of 16.2 months each. The maximum lifetime achieved by one GDC buoy was 42.4 months and the shortest lifetime was 1.8 months when the barometer data was removed from GTS.

Of the MetService Barometer Upgrade buoys (Technocean) deployed since 2000, seventeen buoys have failed after achieving average lifetimes of 24.3 months each. The longest lifetime achieved by these Upgrades was 66.2 months and the shortest was 1.1 months due to unreliable barometer data.

(d) Others:

Appendix I

Country: Sweden

Year: 2007

Contact:
Thomas Hammarklint
Swedish Meteorological and Hydrological Institute (SMHI),
Folkborgsvägen 1, SE-60176 Norrköping, Sweden
Telephone: +46 11 4958000, Telefax: +46 11 4958001,
Email: Thomas.Hammarklint@smhi.se
Buoy info: http://www.smhi.se/cmp/jsp/polopoly.jsp?d=7816&l=en

CURRENT PROGRAMMES

A. SMHIs Ocean Buoy Network

Number and type of buoys: 5

(a) deployed during year:
Station names, positions, first deployment month, type of buoy and manufacturer:

Finngrundet (S.Bothnian)	60°54'N	18°37'E	200606	WaveRider	DataWell
Huvudskär Ost*	58°56'N	19°10'E	200105	SeaWatch	Oceanor
Södra Östersjön (S.Baltic)	55°55'N	18°47'E	200506	WaveRider	DataWell
Läsö Ost	57°13'N	11°34'E	200105	SeaWatch	Oceanor
Väderöarna	58°29'N	10°56'E	200503	WaveRider	DataWell

* owner of this buoy is the Swedish defence (operated in cooperation with SMHI)

(b) operational at 31 August:
All above

(c) reporting on GTS at 31 August:
None

Purpose of programme:

(a) operational:
Collection and creation of real-time data and long time-series.
Evaluation of forecasting data, models results etc

(b) met/ocean research
Assimilation and validation of our circulation and wave models.
Assessment of climate and other long-term indicators and scenarios.

(c) developmental:
Development of our operational models.

Main deployment areas: Bothnian Sea, Baltic Sea, Kattegat and Skagerrak

B. InterRegio-project FORUM-Skagerrak

Number and type of buoys: 1

(d) deployed during year:
Station name, position, first deployment month, type of buoy and manufacturer:

Måseskär	58°03'N	11°17'E	200612	SeaTramp	OceanOrigo

(e) operational at 31 August:
Final deployment is planned before 20th August 2007.

(f) reporting on GTS at 31 August:
No.

Purpose of programme:

(c) operational: Collection and creation of real-time data and long time-series. Evaluation of forecasting data, models results etc

(d) met/ocean research: Assimilation and validation of our circulation and wave models. Assessment of climate, other long-term indicators, and scenarios.

(c) developmental: Development of our operational models.

Main deployment areas: Skagerrak

PLANNED PROGRAMMES

None

TECHNICAL DEVELOPMENTS

(a) Buoy design: None for the moment

(b) Instrumentation: None for the moment

(c) Others:
-

PUBLICATIONS
Realtime monitoring of seas around Sweden:
http://www.smhi.se/hfa_coord/BOOS/Poster_SeaWatch_buoys.pdf

SPECIAL COMMENTS

(a) Quality of buoy data: Excellent as long as the buoys are deployed.

(b) Communications: Orbcomm satellite system.

(c) Buoy lifetimes: SeaWatch five years.
WaveRider ten years.

(d) Others:
-

Appendix J

Country: Thailand

Dr.Wattana Kanbua
Director of Marine Meteorological Center
Thai Meteorological Department

Introduction

The Indian Ocean Tsunami that occurred on 26 December 2004 was one of the greatest natural disasters in the world. The destructive occurred in many countries in Asia around the Indian Ocean and as far as the east coast of Africa. Total reported dead, among these countries were more than 200,000. In Thailand, total casualties in six provinces along the Andaman coast namely, Ranong, Phang-Nga, Phuket, Krabi, Trang, and Satun are approximately 5,395 with 8,457 injured and 2,932 still missing.

The earthquake occurred around 8 o'clock (Local time) on Sunday ,the first tsunami wave reached Thailand striking the Phuket Province for two hours. Wave period is found to vary from 5 to 15 minutes and wave heights vary from 3 to 10 metres. The highest and most destructive tsunami wave was inKhao Luk in Phang-Nga Province, Thailand.

Tsunami Warning Center

The tsunami on 26 December 2005 was one of the worst disasters ever to be seen in the Indian Ocean. At the time, not only, had we not experienced in such great magnitude, an earthquake as destructive as the tsunami before, and without any existing tsunami warning system in Thailand. The loss of lives and damage to houses, farmlands, fisheries, livestocks, businesses, and infrastructure including the environment were serious.

The Thai Government has realized how very important it is to establish an effective tsunamiwarning center. A national committee on the study of early warning system was set up immediately and chaired by Assistant Minister of the Office of Prime Minister. After that, the National Disaster Warning Center (NDWC) will function as a national central command center in early warning on severe disaster. The main activities are as follows: a) Early warning system arrangement and preparedness b) Issue of warning, rules and procedures c) administration of the center and d) security system arrangement.

The NDWC will receive data from the related government department such as the Meteorological Department, Department of Royal Thai Navy, Department of Disaster Prevention and Mitigation and other national agencies. When there are indications that a severe condition is expected, the NDWC will make a decision as to when the tsunami warning should be issued. In formulating, the decision, it will also benefit by receiving data from international agencies such as the Pacific Tsunami Warning Center, WMO, IOC, JMA, etc.

To disseminate the Tsunami Warning, the Warning Studio will operate by linking to TV (10 stations) radio (211 AM and 312 FM), amateur, local and cable radio stations, mobile telephones (20 Million sets) and to the 79 warning towers equipped with sirens set up along the west coastline at six provinces in southern Thailand.

Sea-level Stations

There are eight tidal gauge stations along the west coast in southern Thailand. These stations are located in six provinces, which were affected by severe impacts of tsunami. The tidal gauge stations at Ao Tub Lamu in Phang-Nga were destroyed by tsunami. The standard Analog type equipment used for all stations and the Hydrographic Department has the responsibility to manage the records. Two stations at Ko Taphao Noi in Phuket and Ko Tarutao in Satun

recorded the first wave trough at 10.10 and 10.55 (local time) and the first wave crest at 10.20 and 11.00 with a distance of about 185km between the two islands.

After the Tsunami on 26 December 2005, the Hydrographic Department set up a temporary digital tidal gauge station at Ko Maing about 70 km from the coast in order to observe the abnormal sea level. In case of tsunami reoccurence, this station could report to the NDWC fifteen minutes in advance by using the satellite link. By the end of 2005, the Hydrographic Department set up 9 digital tidal gauge stations in real time along the west coast and some islands in Andaman sea. Thai Meteorological Department got the budget to set up 9 digital tidal gauge stations and to integrate the system with the Hydrographic Department. Both systems will support the tsunami early warning in the near future. TMD has installed 9 tidal gauges along the west coast of southern Thailand.

Seismic Stations

Seismic monitoring in Thailand started when two WWSSN seismographs were established at Chiang Mai and Songkhla in 1963 and 1965. Since then the network has been improved and expanded by Thai Meteorological Department (TMD). At present, there are 14 analog seismic stations and 11 digital seismic stations. A project (2005 – 2006) to upgrade the seismic network with 15 digital stations has been set up for improving the seismic monitoring. Data transmission will utilize through intranet, telephones lines, and VSAT.

After the Tsunami on 26 December, TMD has the budget to upgrade and expand more seismic stations. In the next three years (2006-2008), 30 digital seismic stations will be added to the previous network, putting the national seismic network to 45 digital stations by the end of 2008. Software compatibility with the world network (IRIS, USGS) has been considered in this plan for linkage and data exchange internationally.

TMD is planning to develop seismic monitoring system, seismic data base, and telecommunication links (2005 – 2006). The project consists of the establishment of 8 short period and 7 broadband seismometers on real-time basis in order to estimate the location of earthquake immediately. TMD still has a project to upgrade automatic teleseismic network for Tsunami warning (2006-2008). This project was proposed after the occurrence of tsunami on 26 December 2004 in order to expand and upgrade the seismic network around the country especially to detect the earthquake in Andaman Sea and Northern Sumatra region. The project consists of 30 digital seismic stations along the west coast of southern Thailand.

Data Communication and Analysis

All monitoring equipment will require a satellite link to Thai Meteorological Department (TMD) in nearly real time for rapid processing and evaluation of records event. This system will be connected to a realiable broadcast system for all center concerned.

First, the preliminary determination of earthquake parameters must be done automatically; Software should be able to display necessary parameters on topographic and bathymetric maps and other features such as historical seismicity, focal mechanisms, active structures, Tsunami events, and other information to assist in judging the potential to generate Tsunami Datacommunication and exchange of information, national and international. The Global telecommunication system (GTS), hotline number, electronic mail, fax, voice message, SMS or MMS shall be considered to disseminate the tsunami warning.

DARTII buoy

Thailand’s tsunami early-warning system has taken a big step forward, when a high-tech monitoring buoy able to directly detect tsunami waves deployed about 1,100 kilometers off the Andaman Coast, it was located at latitude 9 □.N and longitude 89 □.E, during December 1-5, 2006, near the Andaman and Nicobar Islands.

The DARTII system, the first of its kind in the Andaman Sea, has been linked via satellite to the existing network of some 79 tsunami warning towers already built in the six tsunami-hit provinces. It has used US-made Deep Sea Tsunami Detection Equipment¬2 (DART-2) technologies. Similar technology has long been used as part of the US National Oceanic and Atmospheric Administration's (NOAA) Pacific Tsunami Warning Center.

The US Government donated the DARTII system as part of its two-year, US$16.6-million contribution of equipment and expertise, but the Thai government must pay an estimated 36 million baht in maintenance costs over the buoy's two-year life span when it is handed over to Thai Meteorological Department.

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Appendix K

Country: U.S.A.

Year: 2007

CURRENT PROGRAMMES

A. Agency or programme: National Oceanic and Atmospheric Administration (NOAA)/National Weather Service (NWS) /National Data Buoy Center (NDBC) Moored Buoys (Met/ocean)

Number and type of buoys:
(a) deployed during year: 3
(b) operational at 31 August: 101
(c) reporting on GTS at 31 August: 91

Purpose of programme:
(a) operational: □
(b) met/ocean research:
(c) developmental:

Main deployment areas: Atlantic and Pacific Oceans and coastal zone of U.S., including Bering Sea, Gulf of Mexico, and Great Lakes

PLANNED PROGRAMMES

A. Agency or programme: National Oceanic and Atmospheric Administration (NOAA)/National Weather Service (NWS) /National Data Buoy Center (NDBC) Moored Buoys (Met./ocean)

Number and type of buoys planned for deployment in next 12 months: 5

Purpose of programme:
(a) operational: □
(b) met/ocean research:
(c) developmental:

Main deployment areas: Primarily northern hemisphere

CURRENT PROGRAMMES

B. Agency or programme: NOAA/NWS/NDBC Deep-Ocean Assessment and Reporting of Tsunamis (DART) buoys

Number and type of buoys:
(a) deployed during year: 16
(b) operational at 31 August: 36
(c) reporting on GTS at 31 August: 34

Purpose of programme:
(a) operational: □
(b) met/ocean research:
(d) developmental:

Main deployment areas: Indian Ocean, Pacific, Atlantic, Gulf of Mexico

PLANNED PROGRAMMES

B. Agency or programme: NOAA/NWS/NDBC Deep-Ocean Assessment and Reporting of Tsunamis (DART) buoys

Number and type of buoys planned for deployment in next 12 months: 3

Purpose of programme: (a) operational: □
(b) met/ocean research:
(c) developmental:

Main deployment areas: Pacific, Atlantic, Gulf of Mexico, Indian Ocean

SPECIAL COMMENTS (if any)

(a) Quality of buoy data: Real-time automated quality control applied to all data prior to release of NDBC's data.

(b) Communications: NDBC communications via satellite. Scheduled hourly data transmission via GOES and Iridium from moored buoys. Non-scheduled data transmitted from drifters and floats, and moored buoy position fixing by POES and Service Argos.

(c) Buoy lifetimes: NDBC planned service intervals every 2 to 3 years; discrepancy response to repair failures as needed.

(d) Others:

CURRENT PROGRAMMES

C. Agency or programme: NOAA/Pacific Marine Environmental Laboratory (PMEL)/NDBC Tropical Atmosphere Ocean (TAO) Project

Number and type of buoys: (a) deployed during year: 55 surface toroids, 4 subsurface
(b) operational at 31 August: 51 surface, 4 subsurf.
(c) reporting on GTS at 31 August: 51 surface

Purpose of programme: (a) operational: □
(b) met/ocean research:
(c) developmental:

Main deployment areas: Tropical Pacific

PLANNED PROGRAMMES

C. Agency or programme: NOAA/Pacific Marine Environmental Laboratory (PMEL)/NDBC Tropical Atmosphere Ocean (TAO)

Number and type of buoys planned for deployment in next 12 months: 55 surface toroids, 4 subsurface

Purpose of programme: (a) operational: □
(b) met/ocean research:

(c) developmental:

Main deployment areas: Tropical Pacific

CURRENT PROGRAMMES

D. Agency or programme: NOAA/ Pacific Marine Environmental Laboratory (PMEL)/PIRATA

Number and type of buoys: (a) deployed during year: 17 surface toroids,
(b) operational at 31 August: 17
(c) reporting on GTS at 31 August: 17

Purpose of programme: (a) operational:
(b) met/ocean research: □
(c) developmental:

Main deployment areas: Tropical Atlantic

PLANNED PROGRAMMES

D. Agency or programme: NOAA/PMEL/PIRATA

Number and type of buoys planned for deployment in next 12 months: 17

Purpose of programme: (a) operational:
(b) met/ocean research: □
(c) developmental:

Main deployment areas: Tropical Atlantic

CURRENT PROGRAMMES

E. Agency or programme: NOAA/ Pacific Marine Environmental Laboratory (PMEL)PMEL/Indian Ocean

Number and type of buoys: (a) deployed during year: 8 surface toroids, 1 subsurface
(b) operational at 31 August: 5 surface, 1 subsurface
(c) reporting on GTS at 31 August: 5

Purpose of programme: (a) operational:
(b) met/ocean research: □
(c) developmental:

Main deployment areas: Indian Ocean

PLANNED PROGRAMMES

E. Agency or programme: NOAA/ Pacific Marine Environmental Laboratory (PMEL)PMEL/Indian Ocean

Number and type of buoys planned for deployment in next 12 months: 12 surface toroids, 10 subsurface

Purpose of programme: (a) operational:
(b) met/ocean research: □
(c) developmental:

Main deployment areas: Tropical Indian Ocean

SPECIAL COMMENTS (if any)

(a) Quality of buoy data: Monitored Daily
(b) Communications: Service Argos communications.
(c) Buoy lifetimes: 1 year
(d) Others:

CURRENT PROGRAMMES

F. Agency or programme: NOAA/AOML Global Ocean Observing System Center, Global Drifter Program

Number and type of buoys:
(a) deployed during year: 1003
(b) operational at 31 August: 1215
(c) reporting on GTS at 31 August: 1215

Purpose of programme:
(a) operational: 861
(b) met/ocean research: 142
(c) developmental: 0

Main deployment areas: Global, all Oceans

PLANNED PROGRAMMES

F. Agency or programme: NOAA/AOML Global Ocean Observing System Center, Global Drifter Program

Number and type of buoys planned for deployment in next 12 months: 1000

Purpose of programme:
(a) operational: 800
(b) met/ocean research: 200
(c) developmental:

Main deployment areas: Global, All Oceans

PUBLICATIONS *(on programme plans, technical developments, QC reports, etc.)*