

**INTERGOVERNMENTAL OCEANOGRAPHIC
COMMISSION (OF UNESCO)**

DATA BUOY COOPERATION PANEL

TWENTY-FOURTH SESSION

CAPE TOWN, SOUTH AFRICA

13-16 OCTOBER 2008

WORLD METEOROLOGICAL ORGANIZATION

DBCP-XXIV/Doc. 16 REV. 2
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ITEM: 16

ENGLISH ONLY

NATIONAL REPORTS

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

Summary and Purpose of the Document

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

ACTION PROPOSED

The Panel will review the information contained in this report and comment and make decisions or recommendations as appropriate. See part A for the details of recommended actions.

Appendices: National reports for:
(A) Australia;
(B) Brazil;
(C) Canada;
(D) Ecuador;
(E) France;
(F) Germany;
(G) India;
(H) Ireland;
(I) Japan;
(J) Kenya;
(K) New Zealand;
(L) Republic of Korea;
(M) Malaysia;
(N) Portugal;
(O) South Africa;
(P) Sweden;
(Q) United Kingdom; and
(R) United States of America.

Country: Australia

Year: 2008

CURRENT PROGRAMMES

(for period 1 July 2007 – 30 June 2008)

A	Agency or programme:	Australian Bureau of Meteorology	
	Number and type of buoys:	(a) Deployed during the year:	19
		1 FGGE-W	
		16 SVP-B	
		2 SVP-BW	
		(b) Operational at 31 August:	25
		(c) Reporting on GTS at 31 August:	25
	Purpose of programme:	To support the Bureau's operational forecasting and warning service.	
	Main deployment area:	Southern and Indian Oceans, also contributing to: - 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 year:	8
		8 SVP-B (Bureau-sponsored upgrades)	
		(b) Operational at 31 August:	13
		(c) Reporting on GTS at 31 August:	13
	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, also contributing to: - International Buoy Programme for the Indian Ocean. - Southern Ocean Buoy Programme. - International Programme for Antarctic buoys.	
C	Agency or programme:	Global Drifter Program	
	Number and type of buoys:	(a) Deployed during the year for GDP:	22
		6 SVP	
		16 SVP-B	
		(b) Operational at 31 August:	21
		(c) Reporting on GTS at 31 August:	20
	Purpose of programme:	To (1) increase the number of pressure buoys in the Indian Ocean and support the Bureau's operational forecasting and warning service, and (2) Conduct an experiment studying the behaviour of the East Australia Current.	

Purpose of programme: To (1) increase the number of pressure buoys in the Indian Ocean and support the Bureau's operational forecasting and warning service, and (2) Conduct an experiment studying the behaviour of the East Australia Current.

Main deployment area: Southern and Indian Oceans, also contributing to:
- International Buoy Programme for the Indian Ocean.
- Southern Ocean Buoy Programme.
- International Programme for Antarctic Buoys.
Coral Sea for the East Australia Current experiment.

D Agency or programme: Australian Antarctic Division (AAD)

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

1 Tilt meter buoy

1 Stress-gauge buoy

Purpose of programme: To assist AAD's research program, especially to explore the internal ice physics

Main deployment area: Southern Oceans, also contributing to the International Programme for Antarctic Buoys.

TECHNICAL DEVELOPMENTS

(a) Buoy design:

(b) Instrumentation:

(c) Others:

The Australian Bureau of Meteorology purchased and deployed 2 (Metocean) Iridium buoys as part of the DBCP Iridium Pilot Project.

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

The 2008-2009 Deployment Plan for Bureau-owned drifting buoys is published on the JCOMMOPS website:

http://www.jcommops.org/depl_opport/australia/20082009/buoy0809plan.html

SPECIAL COMMENTS (if any)

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

Average life of the barometer on (Technocean) SVP-B buoys

Year of buoy failure	Bureau 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
2008	2.38	10	1.34	3	0.44	6
2007	1.84	7	1.51	4	1.01	7
2006	1.21	7	0.06	1	0.50	7
2005	0.66	7	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 29 August 2008

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

2. Breakdown of surviving barometers on (Technocean) SVP-B buoys:

Surviving barometers on SVP-B Buoys (Technocean) *

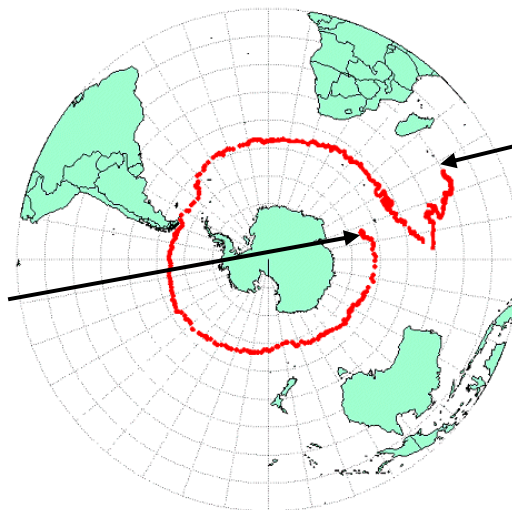
Buoy Program					
	2004	2005	2006	2007	2008
Bureau Buoy Program	3	0	3	2	3
Barometer Upgrade Program	0	-	4	5	4
Global Drifter Program	-	1	2	5	7

* as at 29 August 2008

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).

Country: BRAZIL

Year: August 2007 – August - 2008

CURRENT PROGRAMMES

A. Agency or programme: DHN-CHM – National GOOS Programme that includes PNBOIA (NATIONAL BUOY PROGRAM) and MOVAR

Number and type of buoys: (a) deployed during year: 17 SVP-B
(b) operational at 31 August: 24 SVP-B
(c) reporting on GTS at 31 August: 24 SVP-B

Purpose of programme: (a) operational: YES
(b) met/ocean research: YES
(c) developmental: NO

Main deployment areas: BRAZILIAN EEZ.

B. Agency or programme: DHN-CHM – National GOOS Programme that includes PNBOIA (NATIONAL BUOY PROGRAM) and MOVAR

PLANNED PROGRAMMES

A. Agency or programme: DHN-CHM – National GOOS Programme that includes PNBOIA (NATIONAL BUOY PROGRAM) and MOVAR

Number and type of buoys planned for deployment in next 12 months: 70 (SVP) and 10 (SVP-B), and seven moored buoys, additionally to PIRATA ATLAS buoys.

Purpose of programme: (a) operational: YES
(b) met/ocean research: YES
(c) developmental: NO

Main deployment areas: BRAZILIAN EEZ

B. Agency or programme: DHN-CHM – National GOOS Programme that includes PNBOIA (NATIONAL BUOY PROGRAM) and MOVAR

TECHNICAL DEVELOPMENTS

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

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

- xxx

SPECIAL COMMENTS (if any)

- (a) Quality of buoy data: -xxx
 - (b) Communications: - xxx
 - (c) Buoy lifetimes:- xxx
 - (d) Others: - xxx
-

Country: Canada

Year: September 1, 2007 – August 31, 2008

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:
Number of drifting buoys without winds – 4
 - (b) Operational at 31 August 2008:
Number of moored 3 meter – 13
Number of developmental (platform for testing new equipment etc.) 3 meter (AXYS) - 1
Number of moored 6 meter NOMADs -3
Number of 1.75 meter Watchkeepers – 0
Number of drifting buoys without winds – 24
Number of Canadian funded barometer upgrade drifters reporting – 10
2 drifters using Iridium telemetry deployed in NE Pacific this year, as part of Iridium Pilot Project.
 - (c) Reporting on GTS at 31 August 2008:
Number of moored buoys– total 16
Number of drifting buoys – total 24 (includes 10 Canadian funded barometer upgraded units)

Purpose of programme: (a) Operational: Operational Marine forecasting/warning program. Input for NWP in data sparse areas, upstream of west coast of Canada.

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
Number of moored 3 meter discus - 7
Number of 1.75 meter Watchkeepers – 6
 - (b) Operational at 31 August 2008: 13
Number of moored 3 meter discus - 7
Number of 1.75 meter Watchkeepers – 6
Reporting on GTS at 31 August 2008: 13
Number of moored buoys– total 13

Purpose of programme: (a) Operational Marine forecasting/warning program, Input for NWP in data sparse areas. Support of significant number of recreational boaters.

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:
Number of moored 3 meter – 1 (seasonal)
Number of 1.7 meter watchkeepers - 1
 - (b) Operational at 31 August 2008:
Number of moored 3 meter – 2
Number of moored 6 meter NOMADs -8
Number of drifting buoys without winds – 3
With winds - 2
 - (d) Reporting on GTS at 31 August:
Number of moored buoys– total 10
Number of drifting buoys – total 5

Purpose of programme: (a) Operational - Marine forecasting/warning program, including upstream data for Tropical Storms in Canadian waters. Input for NWP in data sparse areas.

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 (1.75 m Watchkeeper)) deployed in Great Slave Lake July 2008 (seasonal: deployed July, retrieved late September)
3 moored buoys (all 1.75 m Watchkeeper) deployed in Lake Winnipeg June 2008 (seasonal: deployed May or June, retrieved late September or October)
1 moored buoy (Watchkeeper) deployed southwestern Hudson Bay August 2008 (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 south-western 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: 4 MSC funded drifting buoys (ICEX) deployed on ice 4th of August by U.S. Naval Meteorology and Oceanography Command.
(b) Operational at 31 August: 12 Arctic Basin on-ice drifting buoys
(c) Rreporting on GTS at 31 August: 12 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 + 3 Calibs to be deployed by CCG Amundsen soon (part of IPY 2008)
(b) Operational at 31 August: 3 + 3 if CCG Amundsen deploys buoys as planned.
(c) Reporting on GTS at 31 August: 3 + (3 more likely)

Purpose of programme: (a) Operational: Follow leading edge of old ice, validate ice drift model, tracking of ice island fragments.
(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 (WMO region 47) plus one on each of the Ayles Island fragments (off Amund Ringnes Island)

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

Number and type of surface buoys:

- (a) Deployed during year:
- 1 Minimet Buoy Sept-Nov 2007, Lunenburg Bay, NS)
 - 1 Carioca (CO2) May/07 – Aug/08, Halifax Harbour, NS

- (b) 4 Argos Beacons operational Mar – Apr/08, Gulf of St. Lawrence

Subsurface moorings:

- 6 Instrumented moorings Orphan Basin May/07 – May/08
 - 3 Instrumented moorings Orphan Basin May/08 – May/09
 - 3 Instrumented moorings Orphan Knoll May/08 – May/09
 - 1 Instrumented mooring Labrador Sea May/07 – May/08
 - 1 Instrumented mooring Labrador Sea May/08 – May/09
 - 1 Instrumented mooring Halifax Harbour Aug/07 - Sept/07
 - 1 Instrumented mooring Halifax Harbour May/08 – Oct/08
 - 7 Instrumented moorings Barrow Strait Aug/07 – Aug/08
 - 7 Instrumented moorings Barrow Strait Aug/08 – Aug/09
 - 1 Instrumented mooring Scotian Slope May/07 – Dec/07
 - 2 Instrumented moorings Scotian Slope Oct/07 – Oct/08
 - 1 Instrumented mooring St. Pierre Bank Dec/07 – Jan/08
 - 1 Instrumented mooring Sydney Bight, NS Mar/08 – Apr/08
 - 3 Instrumented moorings Off Halifax Harbour May/08 – Oct/08
 - 4 Instrumented moorings Northumberland Strait July/08 – Nov/08
 - 1 Instrumented mooring Lunenburg Bay, NS Sept – Nov/07
-
- 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 areas of study.
 - Minimet Buoy: To demonstrate the ability to provide a real-time link to a bottom-mounted ADCP that measured waves and currents. The data from the ADCP was transmitted to the Minimet via an acoustic modem and from there to a shore station with an RF modem. The meteorological data collected by the Minimet was transmitted separately by satellite.

Main deployment areas: Northumberland Strait (PEI), Lunenburg Bay, Mouth of Halifax Harbour, Scotian Slope, Labrador Sea, Orphan Basin, Orphan Knoll, Barrow Strait.

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:

Number of drifting buoys without winds – 14 (4 of these are already on ships of opportunity awaiting arrival at deployment zone)

3 Iridium drifters (part of Iridium PP) will be deployed in the NE Pacific in the fall of 2008.

Number of Canadian funded barometer upgrades in support of GDP – 10 (stored at Stennis Space Center)

Number of moored 3 meter – 13

Number of developmental 3 meter (AXYS) - 1

Number 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:
Number of moored 3 meter – 7
Number 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:
Number of drifting buoys without winds - 3
Number 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 7 Calibs including 3 for IPY (CIS might have the beacons dropped in Nares Strait instead of Western Arctic), 2 for ice island fragment(s) tracking and possibly 2 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 (WMO area 47), Western Arctic (Amundsen IPY - WMO area 48) and East Coast (iceberg, WMO area 44).

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

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

- ARGOS ice drifters with GPS, PEI
- Iridium beacons with GPS, PEI
- Continue moorings at Halifax Harbour, Labrador Sea, Scotian Slope, Davis Strait, Barrow Strait, Orphan Knoll, and Bay of Fundy

ANNEX, p. 2

TECHNICAL DEVELOPMENTS

(a) Buoy design:

Continue evaluation/testing of foam hulls for 3 m discus buoys.

Foam Buoy hull –	Manufacturer	The Gilman Corporation
	Material	Ionomer foam
	Size	3.3 meter diameter

Currently have one foam buoy deployed in Fraser River near Vancouver as part of water quality study (2-year project). The buoy is equipped with next generation AXYS WM500 system, enabling 2-way communications (CDMA modem in this case), as well as integration of wide range of sensors including video camera, water quality sensors, as well as an underwater power generator (turbine).

Two other foam buoys will be deployed in spring of 2009, one in Western Lake Ontario and the second in Atlantic Canada (likely Northumberland Strait). Buoys may be utilized as test platform for new sensors or communication systems. There is specific interest in performance of foam hulls, and potential impacts on buoy maintenance (methodology and costs), and lifespan of hulls.

- Compact Air Launch Ice Beacon being tested for IABP

(b) Instrumentation:

Continue evaluation of ultrasonic anemometers (Vaisala) on our 3 m and 6 m buoys, a number of buoys have ultrasonic as secondary wind. Awaiting results from our Engineering Test/Evaluation group as part of MSC procurement process for new wind sensors.

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) Buoy Payload/Marine Logger:
Evaluation of AXYS Technologies WM500 continues, with integration into 6 m NOMAD south of Newfoundland (in parallel to our operational WM100). WM500 will be onboard for next 12 months as part of our evaluation.
- (d) All the 1.75M Watchkeepers have new MLED120 LED navigation lights on board. The 3Metre navigation lights are to be replaced in the future as well. Main advantage is reduced power consumption and more reliable operation in fall in northern waters (less chance of losing all battery power).
- (e) Environment Canada is participating in the Iridium Pilot Project, with the deployment of 5 Iridium drifters in the Northeast Pacific Ocean planned. Evaluation will consider the reliability of telemetry, as well as potential cost savings VS current Service ARGOS data service.
- (f) Continue to deploy XEOS Iridium beacon on Atlantic 6 m NOMAD buoys. The beacon provides a self-contained (battery power and transmitter not integrated into the buoy), as the current buoy design has limitation that both the GOES and ARGOS transmitter are powered by main batteries.

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 (note new redesigned web page for access to MSC marine forecast and observations).
- PowerPoint presentation of past and future deployments by Canadian Ice Services was made at the 18th meeting of the International Arctic Buoy Program in Toulouse, France on June 16th 2008.
- 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: 90% of moored buoy data delivered to users
 - GOES - Primary communications,
 - Service ARGOS - Backup communications and buoy position monitoring
 - Iridium Beacon Backup position (self contained unit with power separate from NOMAD buoy, now deployed on 3 Atlantic Buoys).
- (c) Buoy lifetimes: Moored buoys – 4 years at which time they are refurbished (weld/leak tests, sandblasting, painting etc.) Annual maintenance was delayed in the fall of 2007 due to limited access to Coast Guard Ship (main Pacific buoy tender was in mid-life retrofit), resulted in buoys going 18+ months between maintenance visits, some with no wind sensors.

Drifting buoys – 16 months – 2 years

(d) Others:

Canadian Ice Services

- (a) Quality of buoy data: Excellent...although one beacon deployed by CHC Partner failed to transmit any signal. The unit was recovered and sent back to Metocean for verification and testing; the unit will be examined once summer production slows down at Metocean; CIS will be notified of the outcome.
The Ayles-1 beacon fell into a melt pond and stop transmitting between Aug. 7th 2007 and Sept 24th 2007; the signal started back as the melt pond re-froze in the fall. A similar signal loss was noted this summer, but the signal came back after a week of silence; it is believe that the melt pond formed again this summer but rapidly drained itself this time around.
- (b) Communications: good.
- (c) Buoy lifetimes: 1+ year for Lithium battery (Ayles-1 deployed 16 months ago...and still ticking).
Up to 10 months using alkaline battery in Nares Strait.

Fisheries & Oceans Canada- Bedford Institute of Oceanography.

- (a) Quality of buoy data: drift location data are good but short time series.
- (b) Communications: good, drifters use Service ARGOS and have GPS
DWR, good, uses Service ARGOS and also radio link to shore station for real time wave data access through a website.
- (c) Buoy lifetimes: drifters are expendable, < 2 months battery life, retrieved if near shore.
-

Country: Ecuador

Year: 2008

CURRENT PROGRAMMES:

A. Agency or programme: Instituto Oceanografico de la Armada del Ecuador

Number and type of buoys: (a) deployed during (year): 1
(b) operational as of 31 August: 0
(c) reporting on GTS as of 31 August: 0

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

Main deployment areas: Galapagos Islands

Country: FRANCE

Year: 1 September 2007 - 31 August 2008

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) 19 drifting buoys owned by Meteo-France were deployed in last 12 months :

- 9 SVP-B barometer drifters (Iridium);
- 8 SVP-BS drifter (salinity measurements)
- 2 SVP-BTC drifters with 80 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 one automated stations put aboard aid-to-navigation buoys ;

(b) 15 buoys were operational at 31 August 2008 ;

(c) 15 buoys were reporting on GTS at 31 August 2008.

NB: The operational drifting buoys for the North Atlantic and the Mediterranean Sea are funded by E-SURFMAR (78 deployments in last 12 months, 97 operational and reporting on GTS at 31 August 2008).

Meteo-France deployed 15 SVP-B for Global Drifter Center (GDC) of NOAA in Biscay Bay by August 2008, fitted with strain gauge on the anchor, in 5 clusters of 3 buoys, for evaluation.

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 GDC 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 automated station put aboard aid-to-navigation buoy will be also 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) 2 CARIOCA II buoys deployed in the Southern Atlantic Ocean in January 2007, operational during respectively 14 and 16 months, reporting on GTS until March 2008 and May 2008;
- (b) 2 CARIOCA II buoys deployed in the Southern Atlantic Ocean in April 2008 still operational in July 2008 and reporting on GTS.

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 CO₂ 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 of GOOS.

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

Deployment areas :

Southern Ocean.

Plans :

No buoy deployment foreseen in 2009. One buoy should be deployed during LATEX campaign in Mediterranean Sea in 2010.

B2. LOCEAN (salinity drifters)

Number and type of buoys deployed:

- (a) 1 Surfact drifter deployed in Bay of Biscay (September 2007), 1 Surfact drifter deployed in western Pacific (October 2007), two Surfact drifters on moorings near Banyuls (April-May 2007). None of these drifters still operating.
- (b) 1 SIO/Pacific Gyre salinity drifter moored at the Catalonian Islas de Medes site (July 2 2007) and still transmitting usable data; 5 SIO/Pacific Gyre deployed in the western tropical Atlantic (October 2007) (all died at sea, but damage during transportation, water leaks or poor wire connections are strongly suspected); 1 Pacific Gyre deployed in the North Atlantic (June 2008) (still transmitting)
- (c) 2 Metocean drifters deployed in Bay of Biscay in September 2007 (1 died at sea, one recovered by a fisherman in June 2008); 2 Metocean drifters deployed in

the western tropical Atlantic (October 2007) (1 died at sea; one still drifting, but its salinity is not usable any more); 2 Metocean drifters deployed in the North Atlantic (June 2008) (still transmitting, data on the GTS).

Purposes of programmes :

- (a) Research : to understand, quantify and monitor the variability of near-surface salinity (in particular in regions with strong spatial variability due to river runoff or strong rainfall). Will be related in the future to GLOSCAL, an ESA project for the calibration/validation of the SMOS L-band radiometer mission
- (a) Technical : to develop drifters able to measure surface salinity over a multi-month mission with little drifts.

Web sites : <http://www.locean-ipsl.upmc.fr/SSS/2007> (or 2008)

<http://www.locean-ipsl.upmc.fr/CAROLS>

Plans for the next 12 months :

Deployments of 3 drifters (1 Pacific Gyre, 2 Metocean salinity drifters) in the western tropical Atlantic (August 2008); 1 SURPLAS drifter moored in Banyuls in September-October 2008 ('Surface Plastic Salinity' drifter, a modified plastic-hull drifter derived from SURFACT); deployment of 2 Pacific Gyre and 1 SURPLAS in November 2008 in the Bay of Biscay. Deployment of 2 Metocean drifters and 5 SURPLAS drifters in May 2009 in the Bay of Biscay.

B3. COM (EGYPT programme)

Number and type of buoys:

- (a) 5 SVP drifters have been deployed in 2007 during the EGYPT cruise. One is still reporting, but lost its drogoue.

Purposes of programme :

- (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 : non

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 13 directional buoys (DATAWELL). In addition, CETMEF implemented wave measurement systems on two Aid-to-Navigation moored buoys.

(b) 21 buoys were operational at 31 August;

(c) 12 were reporting on GTS at 31 August.

Purpose of programme :

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

Deployment area :

French coasts, Guadeloupe, Guyana and La Reunion Island.

Plans for the next 12 months :

The network will be maintained. CETMEF plans to complete it with six 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 buoy was 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/difMareISeine/>

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 TACE-CLIVAR programmes (international collaborations)

A) PIRATA:

Number and type of buoys :

IRD operates from 1997 a network of 5 Atlas buoys in the tropical Atlantic in co-operation with NOAA/PMEL; they are maintained yearly.

All the buoys have been replaced in May-July 2007 during the EGEE 5 / PIRATA FR17 cruise, onboard the R/V ANTEA, and also thanks to the contribution of US RON BROWN vessel cruise for one site (23°W-Equator).

The additional buoy deployed in July 2006 off Congo (6°S-8°E) in the framework of the PIRATA South Eastern Extension, supported by South Africa and the BCLME program for an one-year test period, has been retrieved in July 2007 during EGEE 5.

Thus, 6 Atlas buoys under French responsibility were reporting on GTS during the June 2006 – July 2007 period, and 5 from July 2007 in the central and eastern tropical Atlantic.

The deployment of a CO₂ sensor associated to the ATLAS buoy at 10°W-6°S, ensured in June 2006 during the EGEE 3 cruise, has been replaced in June 2007 during EGEE 5.

One current meter mooring (ADCP) is maintained at 23°W-Equator by IRD from about six years (with periods of interruption). This mooring has been replaced in February 2008 by the German METEOR vessel.

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

All the buoys perfectly worked during this last full year. Note however the replacement of sensors at the 10°W-Equator ATLAS buoy in April 2008 during an US opportunity cruise.

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 by BCLME for one year).

B) AMMA-EGEE and TACE-CLIVAR:

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). One of these mooring (at 10°W-0°75'N) will be replaced during the PIRATA FR18 cruise in September 2008.

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 and the two currentmeter moorings located in the eastern equatorial Atlantic, in summer 2008 during a French PIRATA cruise, and also in close collaboration with USA (NOAA/PMEL and NOAA/RSMAS) and Germany (IFM/GEOMAR).

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 was stopped for maintenance from June to October 2007 and has been 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) 77 drifting buoys owned by SHOM were deployed in last 12 months :
 - 25 Davis Drifter (lagrangian drifters for measuring water currents within one meter of water surface);
 - 26 WOCE (World Ocean Circulation Experiment) buoys drogued at 15m;
 - 14 WOCE (World Ocean Circulation Experiment) buoys drogued at 75m;
 - 8 WOCE (World Ocean Circulation Experiment) buoys drogued at 50m;
 - 4 ADOS drifters (surface drifters with 120m or 200m thermistor string)
- (b) 32 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) observation of internal tidal waves

Deployment area :

Bay of Biscay

Plan for the next 12 months :

- 40 surface lagrangian drifters will be deployed in the next 12 months.

G. IFREMER

Number and type of buoys :

- (a) IFREMER operates two MAREL boys.
- (b) The buoys are operational at 31 August
- (c) None was reporting on GTS at 31 August.
- (d) Beside these large buoys, few very small buoys (with remote control features) are to be deployed in the Bay of Vilaine area.

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://marelvilaine.ifremer.fr/dif/index.htm>
<http://marelcarnot.ifremer.fr/dif/index.htm>

Deployment area :

Boulogne sur Mer (on a wharf)
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. The buoy moored in Bay of Vilaine is able to sample water in surface and at the sea bottom using a flow through sensors system. The buoy will provide room

energy and communication to test new instrumentation to detect chemical components. All the buoys can send data in real time which can be assimilated by numerical models. The whole operating process is done under quality assurance

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) Meteo-France contributes to the DBCP Iridium Pilot Project to evaluate the Iridium SBD transmission for operational purposes.
- (v) In 2009, DT-INSU and LOCEAN will study a revised version of CARIOCA buoys including oxygen measurement (to be deployed in 2010).

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

-Boutin, J., L. Merlivat, C. Hénocq, N. Martin, and J.B. Sallée, Air-sea CO₂ flux variability in frontal regions of the Southern Ocean from CARIOCA drifters, *Limnology and Oceanography*, *in press*, 2008.

-Bourlès, B., R. Lumpkin, M.J. McPhaden, F. Hernandez, P. Nobre, E. Campos, L. Yu, S. Planton, A. J. Busalacchi, A.D. Moura, J. Servain, and J. Trotte, The PIRATA program: history and accomplishments of the 10 first years tropical Atlantic observing system's backbone, *Bulletin of the American Meteorological Society*, August 2008.

-Brandt, P., V. Hormann, B. Bourlès, J. Fischer, F.A. Schott, L. Stramma & M. Dengler, Oxygen tongues and zonal currents in the equatorial Atlantic, *J. Geophys. Res.*, *113*, C04012, doi/10.1029.2007JC004435, 2008.

- Lebel, T., D.J. Parker, B. Bourlès, C. Flamant, B. Marticorena, C. Peugeot, A. Gaye, J. Haywood, E. Mougin, J. Polcher, J.L. Redelsperger, C.D. Thorncroft: The AMMA field campaign: multiscale and multidisciplinary observations in the West African region. In revision for *Annales Geophysicae*, 2008.

- 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, in revision in *J.Phys. Ocean*, 2008.

- Merlivat, L., M.G. Davila, G. Caniaux, J. Boutin, and G. Reverdin, Mesoscale and diel to monthly variability of CO₂ and carbon fluxes at the ocean surface in the northeastern Atlantic, *J.Geophys. Res.*, *submitted*, 2008.
- 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 meteorological centers 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 report 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 thirteenth consecutive year, Meteo-France funded 10 barometers to be added to SVP drifters deployed in the Tropical Indian Ocean, each year in November. Twenty other upgrades were funded in 2008. These drifters are devoted to the Southern Ocean, south of 40°S in the Indian Ocean, as a principle. These actions will be renewed in 2009.
- (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 programme

CORIOLIS

Country: Germany

Year: 2008

CURRENT PROGRAMMES:

A. Agency or programme: Sea Ice Buoys (ARGOS-No. 919), Alfred-Wegener Insititute, Bremerhaven

Number and type of buoys: (a) deployed during (2008): **4**
(b) operational as of 31 August: **12**
(c) reporting on GTS as of 31 August: **5**

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

Main deployment areas: **Weddell Sea, Arctic Ocean**

B. Agency or programme: Monitoring of subsurface mooring (ARGOS-No. 8919), Alfred-Wegener Insititute, Bremerhaven

Number and type of buoys: (a) deployed during (2008):
(b) operational as of 31 August: **12**
(c) reporting on GTS as of 31 August: **0**

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

Main deployment areas: **Weddell Sea, Arctic Ocean**

C. Agency or programme: Argo-Floats studying Weddell Sea convection WCON (ARGOS-No. 10919), Alfred-Wegener Insititute, Bremerhaven

Number and type of buoys: (a) deployed during (2008): **15**
(b) operational as of 31 August: **49**
(c) reporting on GTS as of 31 August: **0**

Purpose of programme: (a) operational:
(b) met / ocean research: **49**
(c) developmental:

Main deployment areas: **Weddell Sea, Arctic Ocean**

D. Agency or programme: Gravimetric measurements on ice floes (ARGOS-No. 12919), Alfred-Wegener Insititute, Bremerhaven

Number and type of buoys: (a) deployed during (2008): **6**
(b) operational as of 31 August: **6**
(c) reporting on GTS as of 31 August: **0**

Purpose of programme: (a) operational: **6**
(b) met / ocean research:
(c) developmental:

Main deployment areas: **Arctic Ocean**

E. Agency or programme: Migrating seals (ARGOS_No. 1535), Alfred-Wegener Insititute, Bremerhaven

Number and type of buoys: (a) deployed during (2008): **0**
(b) operational as of 31 August: **15**
(c) reporting on GTS as of 31 August: **0**

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

Main deployment areas: **Weddell Sea**

F. Agency or programme: University of Hamburg, Institute of Marine Research, SFB512-E2, Argo floats

Number and type of buoys: (a) 4 floats deployed during 2008
 (b) operational as of 31 August: 31
 (c) reporting on GTS as of 31 August: 31

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

Main deployment areas: **Nordic Seas**

G. Agency or programme: University of Hamburg/Meteorological Institute, Meteorological buoys measuring sea ice drift (DAMOCLES Project)

Number and type of buoys: (a) deployed during 2008 : 7
 (b) operational as of 31 August: yes
 (c) reporting on GTS as of 31 August: no

Purpose of programme: (a) operational: no
 (b) met / ocean research: yes
 (c) developmental:

Main deployment areas: **Ice-covered Arctic Ocean**

H. Agency or programme: Research and Technology Centre Westcoast, Buesum / Ocean Monitoring Project Group, Kiel

Number and type of buoys: (a) deployed during year:
 2 ODAS buoys (C, T, turbidity, currents, wave
 by ADCP below buoy)
<http://134.245.146.47/db-oms/>
 (b) operational at 31 August: 1
 (c) reporting on GTS at 31 August: no

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

Main deployment areas:

German North Sea Coast

I. Agency or programme: IfM-Geomar Kiel, Argo floats, SFB Climate-Biogeochemistry interactions in the tropical ocean

Number and type of buoys: (a) deployed during 2008 : 5
(b) operational as of 31 August: 30
(c) reporting on GTS as of 31 August: 30

Purpose of programme: (a) operational: no
(b) met / ocean research: yes
(c) developmental:

Main deployment areas: **Tropical Atlantic**

J. Agency or programme: German ARGO (ARGOS-No. 01895), Bundesamt für Seeschifffahrt und Hydrographie, Hamburg, Germany

Number and type of buoys: (a) deployed during (year): 21
(b) operational as of 31 August: 59
(c) reporting on GTS as of 31 August: 57

Purpose of programme: (a) operational: 59
(b) met / ocean research:
(c) developmental:

Main deployment areas: **North Atlantic, Nordic Seas, Weddell Gyre**

K. Agency or programme: Marnet Bundesamt für Seeschifffahrt und Hydrographie, Hamburg Germany

Number and type of buoys: (a) deployed during (year): 8
(b) operational as of 31 August: 8
(c) reporting on GTS as of 31 August: 8

Purpose of programme: (a) operational: 8

(b) met / ocean research:

(c) developmental:

Main deployment areas: **North Sea, Baltic Sea**

L. Agency or programme: Monitoring of sea state, Bundesamt für Seeschifffahrt und Hydrographie, Hamburg Germany

Number and type of buoys: (a) deployed during (year): 6
(b) operational as of 31 August: 6
(c) reporting on GTS as of 31 August: 0

Purpose of programme: (a) operational: 6
(b) met / ocean research:
(c) developmental:

Main deployment areas: **North Sea, Baltic Sea**

PLANNED PROGRAMMES:

B. Agency or programme: Monitoring of subsurface mooring (ARGOS-No. 8919), Alfred-Wegener Insititute, Bremerhaven

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

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

Main deployment areas: **Arctic Ocean**

C. Agency or programme: Argo-Floats studying Weddell Sea convection WCON (ARGOS-No. 10919), Alfred-Wegener Insititute, Bremerhaven

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

Purpose of programme: (a) operational:
(b) met / ocean research: **6**
(c) developmental:

Main deployment areas: **Weddell Sea**

D. Agency or programme: Gravimetric measurements on ice floes (ARGOS-No. 12919), Alfred-Wegener Insitute, Bremerhaven

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

Purpose of programme: (a) operational: **6**
(b) met / ocean research:
(c) developmental:

Main deployment areas: **Arctic Ocean**

E. Agency or programme: Migrating seals (ARGOS_No. 1535), Alfred-Wegener Insitute, Bremerhaven

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

Purpose of programme: (a) operational:
(b) met / ocean research: **5-10**
(c) developmental:

Main deployment areas: **Weddell Sea**

G. Agency or programme: University of Hamburg / Meteorological Institute, Meteorological buoys measuring sea ice drift (DAMOCLES Project)

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

Purpose of programme: (a) operational: no
(b) met / ocean research: yes
(c) developmental:

Main deployment areas: **Ice-covered Arctic Ocean**

I. Agency or programme: IfM-Geomar Kiel, Argo floats, SFB Climate-Biogeochemistry inteactions in the tropical ocean

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

Purpose of programme: (a) operational: no
(b) met / ocean research: yes
(c) developmental:

Main deployment areas: **Oxygen minimum layer area in the Pacific**

J. Agency or programme: German ARGO (ARGOS-no. 01895), Bundesamt für Seeschifffahrt und Hydrographie, Hamburg, Germany

Number and type of buoys planned for deployment in next 12 months: 50

Purpose of programme: (a) operational: 50

(b) met / ocean research:

(c) developmental:

Main deployment areas: **North Atlantic, Nordic Seas, Weddell Gyre**

K. Agency or programme: Marnet, Bundesamt für Seeschifffahrt und Hydrographie, Hamburg Germany

Number and type of buoys planned for deployment in next 12 months: 0, but maintenance and replacement of existing buoys 8-9

Purpose of programme: (a) operational: 8

(b) met / ocean research:

(c) developmental:

Main deployment areas: **North Sea, Baltic Sea**

L. Agency or programme: Monitoring of sea state at Marnet stations, Bundesamt für Seeschifffahrt und Hydrographie, Hamburg Germany

Number and type of buoys planned for deployment in next 12 months: 0, but maintenance and replacement of existing buoys 6

Purpose of programme: (a) operational: 6

(b) met / ocean research:

(c) developmental:

Main deployment areas: **North Sea, Baltic Sea**

G. TECHNICAL DEVELOPMENTS:

(a) Buoy design: Meteorological and sea-ice drift

(b) Instrumentation: GPS-position, sea level pressure, wind speed, wind direction, temperature, humidity, ice temperature

(c) Others:

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

G. SPECIAL COMMENTS (if any):

- (a) Quality of buoy data:
- (b) Communications: Iridium
- (c) Buoy lifetimes: approx. 1 year
- (d) Other: Producer of buoys: Metocean/Canada

H. TECHNICAL DEVELOPMENTS

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

J. TECHNICAL DEVELOPMENTS:

- (a) Buoy design: APEX and Nemo Floats
- (b) Instrumentation: Seabird CTD measuring temperature and salinity
- (d) Others:

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

<http://www.german-argo.de/>

J. SPECIAL COMMENTS (if any):

- (a) Quality of buoy data: good
- (b) Communications: ARGOS
- (c) Buoy lifetimes: 4-6 years

(d) Other:

K. TECHNICAL DEVELOPMENTS:

(a) Buoy design: fixed stations of various types (unmanned lightships, piles, buoys, lighthouses and platforms).

(b) Instrumentation: Temperature and salinity, oxygen sensors, ADCP and meteorological instruments operated by DWD

(c) Others:

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

<http://www.bsh.de/de/Meeresdaten/Beobachtungen/MARNET-Messnetz/index.jsp>

K. SPECIAL COMMENTS (if any):

(a) Quality of buoy data: good

(b) Communications: Data transmission by Meteosat. Temperature profiles are communicated on the GTS by BSH. Weather data, SST and swell are combined by DWD and will be inserted in the GTS by DWD in the future

(c) Buoy lifetimes: Buoys will continuously be serviced and replaced if necessary since Marnet is a governmental monitoring programme.

(d) Other:

L. TECHNICAL DEVELOPMENTS:

(a) Buoy design: fixed stations

(b) Instrumentation: Waverider Buoys

(c) Others:

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

<http://www.bsh.de/de/Meeresdaten/Beobachtungen/Seegang/index.jsp>

L. SPECIAL COMMENTS (if any):

- (a) Quality of buoy data: good
- (b) Communications: Weather data, SST and swell are combined by DWD and will be inserted in the GTS by DWD in the future.
- (c) Buoy lifetimes: Buoys will continuously be serviced and replaced if necessary.
- (d) Other:

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Country: India

Year: October 2007 to September 2008

CURRENT PROGRAMMES:

A. Agency or programme: **Ocean Observation Systems
National Institute of Ocean Technology
Ministry of Earth Sciences, Govt. of India
NIOT Campus, Pallikaranai, Chennai - 600 100**

Number and type of buoys: (a) deployed during (year): - 38
(b) operational as of 31 August: - 17
(c) reporting on GTS as of 31 August: - 16

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

Main deployment areas: **Bay of Bengal & Arabian Sea**

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

**Ocean Observation Systems
National Institute of Ocean Technology
Ministry of Earth Sciences, Govt. of India
NIOT Campus, Pallikaranai, Chennai - 600 100**

PLANNED PROGRAMMES:

A. Agency or programme: **Ocean Observation Systems
National Institute of Ocean Technology
Ministry of Earth Sciences, Govt. of India
NIOT Campus, Pallikaranai, Chennai - 600 100**

Number and type of buoys planned for deployment in next 12 months : **37 more buoys**

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

Main deployment areas: **Bay of Bengal & Arabian Sea**

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

**Ocean Observation Systems
National Institute of Ocean Technology
Ministry of Earth Sciences, Govt. of India
NIOT Campus, Pallikaranai, Chennai - 600 100**

TECHNICAL DEVELOPMENTS:

- | | | |
|----------------------|---|-----------------------------|
| (a) Buoy design: | } | Please see Annex - A |
| (b) Instrumentation: | | |
| (c) Others: | | |

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

Please see Annex- B

SPECIAL COMMENTS (if any):

- (a) Quality of buoy data:

<i>Sensor</i>	<i>Remarks</i>
Wind sensor	The wind sensor has been proven more than 10 years and the quality of the data is good. (Make – Lambrecht)
Sea Surface Temperature	This sensor has good performance, but the resolution need to be improved. - (Make –Astra))
Wave sensor	Wave parameters such as wave height, wave direction, wave period which are derived from the heave pitch and roll are good. (Make - Seatex, Geni – Oceanor)
Air Temperature / Humidity	Good quality (Make – Rotronic)
Air Pressure	Good quality (Make – Vaisala)
Current meter	Good quality (Make –Aanderaa)

- (b) Communications:

The communication between the buoy in the sea and the data reception centre in NIOT has been achieved through satellite link. NIOT has been availing INMARSAT link all through these years and data to global community is sent through GTS. NIOT is now attempting INSAT link between the buoy system in the sea and the Data Reception Centre and few of the buoys are now

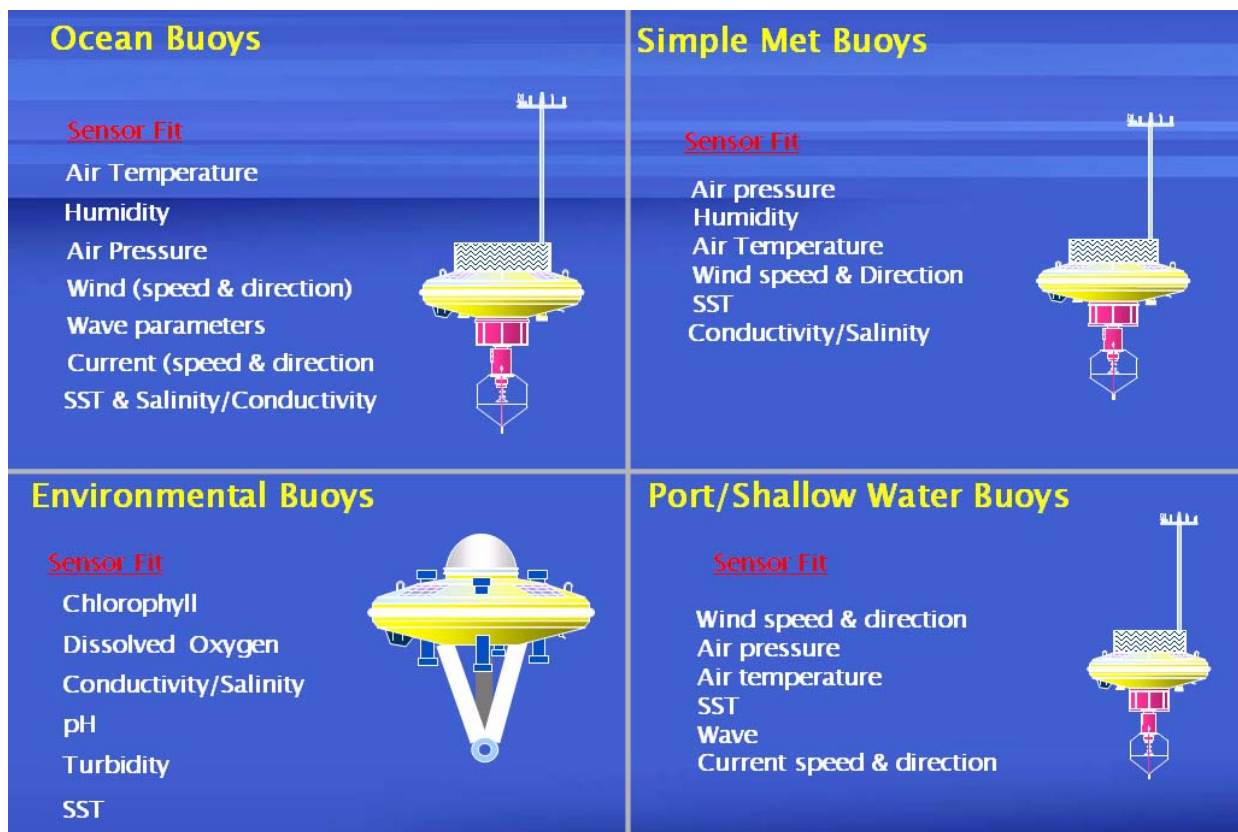
transmitting data through INSAT. This is in testing phase now and would require a few more months to establish the reliability.

(c) Buoy lifetimes: **5 to 6 months on an average.**

(d) Other: -----

1. Buoy Design, Instrumentation & Others

In order to cater the different user sectors, categorized data buoys such as Port Buoys, Ocean Buoys, Met Buoys and Environmental Buoys have been developed with the following sensors.



Port Buoys: This buoy is meant for shallow water locations closer to the predominant ports along the coast of India. These buoys are fitted with sensors such as Wind (speed & direction), Air Pressure, Air Temperature, Sea Surface Temperature, Wave and Current (speed & direction).

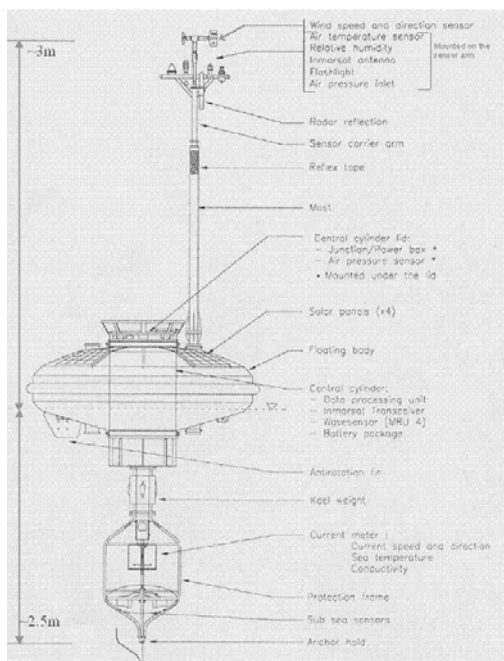
Ocean Buoys: These buoys are meant for deep sea operations which contains meteorological sensors like Air Temperature, Humidity, Air Pressure, Wind (speed & direction), and Wave parameters, Current (speed & direction), SST and Salinity / Conductivity

Met Buoys: The metrological buoys are meant for shallow and deep sea operations, with meteorological sensors such as Air pressure, Humidity, Air Temperature, Wind (speed & direction), SST, and Conductivity/Salinity

Environmental buoy: These buoys are deployed closer to the port buoys to study environmental factors such as dissolved oxygen, chlorophyll, conductivity/Salinity, pH, Turbidity, SST etc. At present

various sensors which are proven in the field are procured and the Assembly & Integration of electrical and mechanical components for the buoys are carried out in-house.

The indigenized buoy developed by NIOT is shown in the figure given below:



Sensor	Range	Accuracy	Resolution	Duration / Freq.
Air pressure	800 – 1100 hPa	± 0.1 hPa	0.01 hPa	5 sec, 1 Hz
Air temperature	10 – 50°C	± 0.1°C	0.01°C	10 min, 1 Hz
Wind (spd, dir)	0 – 60 ms ⁻¹ , 0 – 360°C	± 1.5% FS, ± 3.6°C	0.07 ms ⁻¹ , 0.1°C	10 min, 1 Hz
SST**	-5 – 45°C	± 0.1°C	0.01°C	10 min, 1 Hz
Conductivity**	2 – 77 m mho cm ⁻¹	± 0.06 mmho cm ⁻¹	0.01 m mho cm ⁻¹	10 min, 1 Hz

Surf. Cur.** (spd, dir)	0 – 6 ms ⁻¹ , 0 – 360°C	± 3% FS, ± 2°C	0.005 ms ⁻¹ , 0.36°C	10 min, 1 Hz
Wave** (full spectrum)	± 20m, 0 – 360°C	± 10 cm, ± 5°C	1 cm, < 0.1°C	17 min, 1 Hz
Humidity & Air Temp.*	Humidity 0:100% Air Temp:-40 to + 60°C	Humidity± 1%RH Air Temp. ±3°C	-	10 min, 1 Hz

***Sensor at 3m above the sea surface, ** Sensor at 3m depth below the sea surface**

The meteorological/ocean sensors of various parameters shown above have been procured from internationally competitive firms and have been integrated in the buoy system. The components such as solar panel, mast, mooring line and data acquisition system enclosure have been designed in-house and integrated in the buoy system. The data acquisition unit for the met sensors have been developed indigenously, integrated with the buoy and proven in the field. With regard to Wave sensor, till now the DAS acquires the heave, pitch and roll data from the MRU and alongwith the compass direction the wave parameters are derived using the software in-built and the CPU called GENE supplied by Oceanor. Now NIOT has indigenously developed the wave processing and analysis software to derive the parameters and it has been tested in the lab. Development of a wave buoy with the in-house software is being carried out. The table given below shows the sensor performance:

<i>Sensor</i>	<i>Remarks</i>
Wind sensor	The wind sensor has been proven more than 10 years and the quality of the data is good. (Make – Lambrecht)
Sea Surface Temperature	This sensor has good performance, but the resolution need to be improved. - (Make –Astra))
Wave sensor	Wave parameters such as wave height, wave direction, wave period which are derived from the heave pitch and roll are good. (Make - Seatex, Geni – Oceanor)
Air Temperature / Humidity	Good quality (Make – Rotronic)
Air Pressure	Good quality (Make – Vaisala)

Current meter	Good quality (Make –Aanderaa)
---------------	-------------------------------

The solar panels have been incorporated in surface buoy to make use of solar energy to charge the battery. The batteries have been packed and encapsulated, so that they can constantly get recharged and supply power to the buoy.

The communication between the buoy in the sea and the data reception centre in NIOT has been achieved through satellite link. NIOT has been availing INMARSAT link all through these years and data to global community is sent through GTS. NIOT is now attempting INSAT link between the buoy system in the sea and the Data Reception Centre and few of the buoys are now transmitting data through INSAT. This is in testing phase now and would require a few more months to establish.

Annex- B

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

1. 11th plan document on Maintenance of buoy network submitted to Ministry of Earth Sciences, Govt. of India.
2. **QUALITY CONTROL**
 - Quality Control Report for the recent deployed met buoys
 - Quality control for the buoy data from the entire network for the year 2006.
 - Monthly report the buoy data
3. Ready reckoner for wind and wave for the Bay of Bengal
4. Ready reckoner for wind wave statistics for Arabian Sea.

Publications

1. Jossia Joseph K, Balchand, A.N, Hareeshkumar, P.V, Rajesh, G (2007). '*Inertial Oscillation forced by the September 1997 Cyclone in the Bay of Bengal*'. Current Science, Vol 92 (6) pp 180-184.
 2. G.Rajesh, R. Sajeev, K. Jossia Joseph, G. Latha and V. Rajendran (2007): '*Intra-annual Variability of Wave Characteristics in Central Arabian Sea*', Tropmet 2007, Bhopal, India.
 3. K.Jossia Joseph, AN Balchand, PV Hareeshkumar, G Rajesh, G Latha and V Rajendran (2007): '*Spatial and Temporal Variability of Inertial Oscillations in the North Indian Ocean*', Tropmet 2007, Bhopal, India.
 4. V.Gowtham, P.Muruges, K.Ramasundaram, AThirunavukkarasu, R,Srinivasan and V.Rajendran, "*Development of Sub Surface Float for Bottom Observatory Systems*".
 5. Tata Sudhakar, M.Arul Muthiah, G.Latha and V.Rajendran, "*Performance of Tsunameters deployed in Indian seas under National Tsunami Early warning system*".
 6. M.Arul Muthiah, Tata Sudhakar, K.Ramesh, G.Vengatesan, S.Elango, V.Rajendran, "*Establishment of Deep Sea Tsunami warning system using the indigenous moored data buoy off Andaman Islands (12Deg26'N, 89Deg 00'E)*".
 7. G.Rajesh, G.Latha and V.Rajendran, "*Extreme Wave Characterization and Predication using Weibull model during Cyclones in Indian Seas*".
 8. K.Ramasundaram, V.Gowthaman, A.Thirunavukkarasu, P.Muruges, R.Srinivasan and V.Rajendran, "*Development of a Dual Data Buoy for Calibration & Validation of Satellite Based Ocean Colour Monitor*".
 9. J.Vimala, G.Latha, V.Rajendran, "*Developmental Wave Model and Application to Wave Forecasting*".
-

Country: Ireland

Year: 2008

CURRENT PROGRAMMES:

A. Agency or programme: Marine Institute, Irish Weather Buoy Network.

Number and type of buoys: (a) deployed during (year): 0

(b) operational as of 31 August: 5 ODAS MK2B systems

(c) reporting on GTS as of 31 August: 5 ODAS MK2B systems

Purpose of programme: (a) operational: Yes

(b) met / ocean research: Yes

(c) developmental: No

Main deployment areas: West, north west, east, south west, south east coast of Ireland

B. Agency or programme: Marine Institute, Irish Weather Buoy Network.
(as indicated above, repeat as often as necessary)

PLANNED PROGRAMMES:

A. Agency or programme: Marine Institute, Irish Weather Buoy Network.

Number and type of buoys planned for deployment in next 12 months: 2 Fugro Oceanor
Wavescan Buoy

1 ODAS Mk2B system

4 Coastal monitoring buoys

Purpose of programme: (a) operational: Yes

(b) met / ocean research: Yes

(c) developmental: Yes

Main deployment areas: North west, west, south west and south east coast of Ireland

B. Agency or programme: Marine Institute, Irish Weather Buoy Network.
(as indicated above, repeat as often as necessary)

TECHNICAL DEVELOPMENTS:

- (a) Buoy design: Offshore buoys: Two new Fugro Oceanor wavescan hulls and sensors have been purchased. The aim is to deploy these buoys within the next 6 months for cross comparison with existing ODAS MK2B buoys.
Coastal Buoys: Three coastal buoys have been bought through Techworks Marine and these will be deployed in the coastal environment.
- (b) Instrumentation: Offshore buoys: These new buoy systems will accommodate ultrasonic wind sensors and a direction wave sensor.
Coastal buoys : They will have the following sensors on board; PCO², WQM (Water Quality Monitoring), SB37, Fluorescence, Turbidity, Dissolved Oxygen, Optical Nitrate Sensor.
- (c) Others:

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

SPECIAL COMMENTS (if any):

- (a) Quality of buoy data:
- (b) Communications: Offshore buoys: The current aim is to have communications from the buoys via Iridium.
Coastal buoys: Data will be sent via GPRS.
- (c) Buoy lifetimes:
- (d) Other:
-

Country: JAPAN

Year: 2008

CURRENT PROGRAMMES

A. Japan Meteorological Agency (JMA)

Number and type of buoys:

- (a) deployed during year:
 - (Type 1) 23 drifting buoys with air pressure, SST, wave height and wave period sensors
 - (Type 2) 10 profiling floats
- (b) operational at 31 August:
 - (Type 1) 7
 - (Type 2) 29
- (c) reporting on GTS at 31 August:
 - (Type 1) 7
 - (Type 2) 29

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: 3 profiling floats
- (c) reporting on GTS at 31 August: 3

Purpose of programme:

oceanographic research (subarctic 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) None meteorological and oceanographic drifter (POPS)
 - (Type 2) 17 meteorological and subsurface oceanographic surface moorings (15 TRITON buoys and 2 m-TRITON buoys)
 - (Type 3) 80 profiling floats
- (b) operational at 31 August:
 - (Type 1) None
 - (Type 2) 17
 - (Type 3) 300
- (c) reporting on GTS at 31 August
 - (Type 1) None

(Type 2)	14 (14 TRITON buoys)
(Type 3)	300
Purpose of programme:	
(Type 1)	meteorological and oceanographic research
(Type 2)	ENSO, IOD and meteorological and oceanographic research 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:	8 profiling floats
(b) operational at 31 August:	7
(c) reporting on GTS at 31 August:	7
Purpose of programme:	oceanographic research
Main deployment areas:	the North Pacific ("boundary area between subtropical and subarctic regions" , "western subtropical region" & "central subtropical region")

F. Tohoku National Fisheries Research Institute, Fisheries Research Agency

Number and type of buoys:	
(a) deployed during year:	
(Type 1)	4 profiling floats
(Type 2)	3 subsurface current meter moorings
(b) operational at 31 August:	
(Type 1)	3
(Type 2)	4
(c) reporting on GTS at 31 August:	
(Type 1)	3
(Type 2)	None
Purpose of programme:	
(Type 1)	oceanographic research (subarctic 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 subarctic North Pacific)

G. Hokkaido National Fisheries Research Institute, Fisheries Research Agency

Number and type of buoys:	
(a) deployed during year:	None
(b) operational at 31 August:	5 profiling floats
(c) reporting on GTS at 31 August:	5
Purpose of programme:	oceanographic research (subarctic intermediate circulation)
Main deployment areas:	Oyashio-Kuroshio mixed water region (the western North Pacific)

H. Seikai National Fisheries Research Institute, Fisheries Research Agency

Number and type of buoys
 (a) deployed during year: 4 surface drifters
 (b) operational at 31 August: 3
 (c) reporting on GTS at 31 August: None
 Purpose of programme: oceanographic research
 Main deployment areas: East China Sea, Tsushima Strait and Japan Sea

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) 80 profiling floats
 Purpose of programme:
 (Type 1) meteorological and oceanographic research
 (Type 2) ENSO, IDO and meteorological and oceanographic research 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

F. Tohoku National Fisheries Research Institute, Fisheries Research Agency

Number and type of buoys planned
 for deployment in next 12 months:
 (Type 1) 1 profiling float
 (Type 2) 8 subsurface current meter moorings
 Purpose of programme:
 (Type 1) oceanographic research (subarctic 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 subarctic region
(the western boundary current of subarctic North Pacific)
-

Country: Kenya (Kenya Meteorological Services)

Year: 2008

CURRENT PROGRAMMES:

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

Number and type of buoys: 20 Drifters

(a) Deployed during (year): 2007

(b) Operational as of 31 August: Not known

(c) Reporting on GTS as of 31 August: Not known

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:

(as indicated above, repeat as often as necessary)

PLANNED PROGRAMMES:

A. Agency or programme: Argo project

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

Purpose of programme:

(a) operational: Same as above

(b) met / ocean research: Same as above

(c) developmental: Same as above

Main deployment areas: Same as above

B. Agency or programme:

(as indicated above, repeat as often as necessary)

TECHNICAL DEVELOPMENTS:

(a) Buoy design:

(b) Instrumentation:

(c) Others:

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

SPECIAL COMMENTS (if any):

(a) Quality of buoy data:

(b) Communications:

(c) Buoy lifetimes:

(d) Other:

Country: New Zealand

Year: 2008

CURRENT PROGRAMMES (for period 1 Oct 2007 – 16 September 2008)

- A Agency or programme:** Meteorological Service of NZ Ltd (MSNZ)
- Number and type of buoys: (a) Deployed during the year: **7 SVPB**
 (b) Operational at 31 August: **10**
 (c) Reporting on GTS at 31 August: **10**
- 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: **10 SVPB**
 (b) Operational at 31 August: **7**
 (c) Reporting on GTS at 31 August: **7**
- Purpose of programme: To increase the number of pressure observations in the data-sparse Southern Ocean for MetService's 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: **29 SVPB**
 (b) Operational at 31 August: **27**
 (c) Reporting on GTS at 31 August: **27**
- 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 2008 – 1 Oct 2009)

- A Agency or programme:** Meteorological Service of NZ Ltd (MSNZ)
- Number and type of buoys planned for deployment in next twelve months: **7 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 MetService's 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: In early 2008, MetService placed SVPB buoys on two remote islands, Three Kings Island to the north of NZ and Antipodes Island to the SE of NZ to act as basic AWS. The pressure data has been corrected for height above MSL and the SST data is not disseminated on GTS.

SPECIAL COMMENTS

- (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, twenty two MetService SVPB (Technocean) buoys have been deployed into the Tasman Sea network. One buoy failed immediately following deployment. As at 16 September 2008, eleven buoys had finished operating having achieved an average lifetime of 16.8 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 ten buoys are all still fully operational, with two buoys aged more than thirty six months, one buoy more than twenty four months and two buoys more than twelve months, while the remaining five buoys were all deployed in the last twelve months.

Since 2000, twenty seven of the GDC SVPB (Technocean) buoys deployed by MetService have finished after an average lifetime of 16.4 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. Forty one GDC Technocean buoys are still operational as at 16 September 2008, aged from one to forty six months old.

Of the MetService Barometer Upgrade buoys (Technocean) deployed since 2000, twenty seven buoys have finished after an average lifetime of 24.4 months each. The longest lifetime achieved by these Upgrades was 66.2 months and the shortest was 0.8 months due to unreliable barometer data. Nineteen Technocean Upgrade buoys are still operational as at 16 September 2008, aged from nine to forty two months.

Ten GDC Clearwater buoys were deployed by MetService in 2007. Disappointingly the pressure data was not reliable and the buoys averaged only 5.3 months on GTS.

- (d) Others: Record High and Low pressures. A record high pressure of 1048.0hPa was recorded by Buoy WMO 16571 at 2000UTC 1 September 2008 at 41.2S 168.1W to the east of NZ. Buoy ID 67786 WMO 55582 recorded 962.5 hPa at 0200UTC 26 July 2008 at 34.1S 172.2 E when a deep low approached northern NZ.
-

Country: Republic of Korea

Year: 2008

CURRENT PROGRAMMES

A. Agency or programme: Korea Meteorological Administration

Number and type of buoys: (a) deployed during year: 2 moored buoys
(To be moored in October)

(b) operational as of 31 August: 5 moored buoys

(c) reporting on GTS as of 31 August: 5 moored buoys

Purpose of programme: (a) operational: 7

(b) met/ocean research:

(c) developmental:

Main deployment areas: regional sea around the Korea Peninsula

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

Number and type of buoys: (a) deployed during year: 15 argo floaters

(b) operational as of 31 August: 52 argo floaters

(c) reporting on GTS as of 31 August: 52 argo floaters

Purpose of programme: (a) operational:

(b) met/ocean research: 52

(c) developmental:

Main deployment areas: the East Sea and the Western Pacific

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

Number and type of buoys: (a) deployed during year: 10 argo floaters
(To be deployed 10 floats in August)

(b) operational as of 31 August: 55 argo floaters
(10 floats will be added later-on)

(c) reporting on GTS as of 31 August: 55 argo floaters

(10 floats will be added later-
on)

Purpose of programme: (a) operational:
(b) met/ocean research: 55
(c) developmental:

Main deployment areas: the East Sea and the Antarctic Sea

D. Agency or programme: National Oceanographic Research Institute / Ministry of Land, Transport and Maritime Affairs

Number and type of buoys: (a) deployed during year:
(b) operational as of 31 August: 3 moored buoys
(c) reporting on GTS as of 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: 1 moored buoys

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

Main deployment areas: the Yellow Sea

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 and the Western Pacific

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

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

Purpose of programme: (a) operational:

(b) met/ocean research: 10

(c) developmental:

Main deployment areas: the East Sea

D. Agency or programme: National Oceanographic Research Institute / Ministry of Land, Transport and Maritime Affairs

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 Western Pacific

E. Agency or programme: National Oceanographic Research Institute / Ministry of Land, Transport and Maritime Affairs

Number and type of buoys planned for deployment in next 12 months: 23 argo floaters

Purpose of programme: (a) operational:

(b) met/ocean research: 23

(c) developmental:

Main deployment areas: The East Sea and The Western Pacific Ocean.

Country: MALAYSIA

Year: 2008

CURRENT PROGRAMMES

- A. Agency or programme:** Malaysian Meteorological Department
- Number and type of buoys:
- (a) deployed during year 2005 and 2006:
Two Wavescan buoys with Deep Sea Module
 - (b) operational at 31 August: Yes
 - (c) reporting on GTS at 31 August: Nil
- Purpose of programme:
- (a) operational: i) Malaysian Tsunami Early Warning System
ii) Monitoring and forecasting sea condition.
 - (b) met/ocean research: verification of wave and storm surge models operated by the Malaysian Meteorological Department
 - (c) developmental: No.
- Main deployment areas: i) Near Rondo Island, Indonesia.
ii) Near Layang-Layang Island, South China Sea

PLANNED PROGRAMMES

- A. Agency or programme:** Malaysian Meteorological Department
- Number and type of buoys planned for deployment in next 12 months:
One Wavescan buoy with Deep Sea Module
- Purpose of programme:
- (a) operational: i) Malaysian Tsunami Early Warning System
ii) Monitoring and forecasting sea condition.
 - (b) met/ocean research: verification of wave and storm surge models operated by the Malaysian Meteorological Department
 - (c) developmental: Nil
- Main deployment areas: Sulu Sea, Philippines

TECHNICAL DEVELOPMENTS

(a) Buoy design:

The design objective is to have a strong but lightweight buoy. The materials are polyethylene, aluminium and stainless steel. The shape, size and geometric aspects are given by the dynamic response and stability requirements. With this in mind, the buoy is designed for safe and easy handling, and simple repair and maintenance even in the field.

Buoy characteristics:

Total weight with 200 kg counterweight: 900 kg

Diameter of float with fenders: 2.80 m

Maximum height from mast to bottom (depending on antenna): 6.75 m

Natural frequency in pitch: 0.5 Hz

Sensitivity in trim angle: $< 1.0^\circ$ at 2 knots current

(b) Instrumentation:

i) Seawatch Deep Sea Module (SDSM) - The SDSM consists of a high resolution pressure sensor interfaced to a processor, which is interfaced to an acoustic modem / release.

ii) Meteorological components – directional wave data sensor, wind sensor, and sea surface current sensor.

(c) Others: Nil

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

Nil

SPECIAL COMMENTS

(a) Quality of buoy data:

The quality of the buoy data for meteorological and sea surface temperature elements are satisfactory.

(b) Communications:

The communication with the buoy is a bi-directional link based on the INMARSAT-C satellite system. In this system, it is possible to transmit data as frequently as necessary. The buoy has configurable transmitting and receiving intervals. The Inmarsat-C satellite send and receive unit used in the buoy (and onshore) is a Thrane & Thrane terminal (maritime version), which also includes a GPS receiver providing positional information.

(c) Buoy lifetimes:

With regular maintenance and calibration, the buoy will be able to operate for very long period.

(d) Others: Nil

Country: Portugal

Year: 2008

The Institute of Meteorology from Portugal does not have any buoy working currently or any planned programme at the moment.

Contact point:

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Country: South Africa

Year: 2008

CURRENT PROGRAMMES:

- A. Agency or programme:** South African Weather Service Programme 243
- Number and type of buoys: (a) deployed during 2008: 1 (Fin yr 2007/2008)
 (b) operational as of 31 August: 3
 (c) reporting on GTS as of 31 August: 2
- Purpose of programme: (a) operational: To contribute to the network of ocean observation platforms utilised for operational forecasting
 (b) met / ocean research: Buoy data is currently being used for operational purposes
 (c) developmental: XXX
- Main deployment areas: South Atlantic Ocean and Southern Ocean
- B. Agency or programme:** 6129
- Number and type of buoys: (a) deployed during 2008: 12 Fin yr 2007/2008
 (b) operational as of 31 August: 12
 (c) reporting on GTS as of 31 August: 12
- Purpose of programme: (a) operational: To expand the network of ocean observation platforms for operational and research use
 (b) met / ocean research: X
 (c) developmental: X
- Main deployment areas: Southern Ocean
- C. Agency or programme:** 6325
- Number and type of buoys: (a) deployed during 2007/2008: 4 in 2007, 3 in 2008 fin yr
 (b) operational as of 31 August: 7
 (c) reporting on GTS as of 31 August: 7

Purpose of programme: (a) operational: To expand the network of ocean observation platforms for operational and research use

(b) met / ocean research: X

(c) developmental: X

Main deployment areas: South Atlantic

D. Agency or programme: 7325

Number and type of buoys: (a) deployed during 2007/2008: 1

(b) operational as of 31 August: 12

(c) reporting on GTS as of 31 August: 9

Purpose of programme: (a) operational: To expand the network of ocean observation platforms for operational and research use

(b) met / ocean research: X

(c) developmental: X

Main deployment areas:

E. Agency or programme: 9325

Number and type of buoys: (a) deployed during 2007/2008: 3 in 2007 (11 in 2008)

(b) operational as of 31 August: 17

(c) reporting on GTS as of 31 August: 13

Purpose of programme: (a) operational: To expand the network of ocean observation platforms for operational and research use

(b) met / ocean research: X

(c) developmental: X

Main deployment areas: South Atlantic Ocean

PLANNED PROGRAMMES:

A. Agency or programme: X

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

Purpose of programme: (a) operational: X

(b) met / ocean research: X

(c) developmental: X

Main deployment areas: X

TECHNICAL DEVELOPMENTS:

(a) Buoy design: SVP-B

(b) Instrumentation:

(c) Others:

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

SPECIAL COMMENTS (if any):

(a) Quality of buoy data:

(b) Communications:
SAWS might start with a 3 year project as from April 2009 by installing 3 AHRPT over a three year period replacing the existing LUT's at Gough, Marion and Cape Town

(c) Buoy lifetimes:

(d) Other:

Country: Sweden

Year: 2008

Contact:

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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. Data will be available on GTS in 2009.

Purpose of programme:

(a) operational:

Collection of real-time data and to create 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:

The buoy is not operational yet.

(f) reporting on GTS at 31 August:

No.

Purpose of programme:

(c) operational:

Collection of real-time data and to create 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 and 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:
Buoy data in real-time can be obtained through the following webpage:
<http://www.smhi.se/cmp/jsp/polopoly.jsp?d=7816&l=en>

UK National Report to the DBCP, 2008

Organisation	Type of programme	Platforms deployed in 2008	Location	Active at 31 Aug / on GTS at 31 Aug	Platforms planned for 2009	Location
Met Office	Moored buoy network	9 (includes 2 inshore buoys and 2 operated jointly with Meteo France)	UK waters and Biscay	7/9 (Gascogne destroyed late 2007, replacement being deployed Sept 2008, K4 also due to be replaced)	Buoy to be deployed at NOCS PAP site	UK waters and Biscay
	Drifting buoy network	5 SVP-B Iridium drifters deployed (Dec 2007)	Southern Ocean	5 3/4 deployed May 2007 (Argos with lithium batteries) plus 2/5 (Iridium) deployed Dec 2007	7 SVP-B Iridium drifters (Oct 2008) 2 more available	South Atlantic Southern Ocean
	Argo float programme	24 deployed in year to end Aug 2008	N Atlantic, S Atlantic, Indian and Southern Oceans, Arabian Sea	91/91	~30-40	N Atlantic, S Atlantic, Indian and Southern Oceans
NOCS	Oceanographic research	4 gliders	Mediterranean			
Plymouth Marine Laboratory	Tracer patch monitoring	1			1 GPS/Argos drifter	Mediterranean
Scottish Association for Marine Science	Sea ice research	25 Iridium ice buoys and thermistor chains	Arctic Ocean and Antarctic seas	20	18 Iridium ice buoys and thermistor chains	Arctic Ocean and Antarctic seas

Technical Developments

Met Office

A new wind system based on a Gill WindSonic and True North Revolution compass has been deployed on K7 (April 2008) and K5 (July 2008). Initial results show good agreement with the co-

located Vector Instruments cup and vane system. The new wind system will continue to be rolled out across the network alongside a Vector Instruments system. If they prove reliable over the winter then the new wind system will be deployed on both sensor suites and use of the Vector Instruments cup and vane anemometer will cease.

Dual Iridium/Meteosat DCP communications will continue to be rolled out across the network to reduce our dependence on the legacy analogue DCP systems.

A Triaxys spectral wave system has been deployed at K5 (July 2007). The system reports directional wave spectra every 6 hours. The Met Office data handling system is being adapted to handle these data and convert them into BUFR format so they can be used operationally and forwarded to GTS.

Several new moored buoy systems are being built utilising dual Watchman 500 systems on a new polyethylene DB300 hull (much lighter than Balmoral hulls presently used) and will be tested at sea over the winter months.

The Marine Engineering Team, who maintain the moored buoy network, have relocated to new premises at the National Oceanography Centre, Southampton (NOCS). The team has been enlarged to facilitate the new development work. By working with NOCS technologists we aim to add oceanographic measuring capability to the buoys.

SAMS

The Scottish Association for Marine Science and University of Cambridge continue to make Iridium deployments in the Arctic as part of an EU-funded study to investigate changing patterns of sea ice dynamics and thickness. In 2008 we pioneered the deployment of novel high-resolution thermistor chains for sea-ice mass balance (SIMBA) studies.

Country: U.S.A.

Year: 2008

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: 6
(b) operational at 31 August: 108
(c) reporting on GTS at 31 August: 103

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: 5
(b) operational at 31 August: 39
(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: 0

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/NWS/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/NWS/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

PUBLICATIONS

- Bernard, L.; Kern, K.; Zhou, J.; Teng, C. 2008. Refreshed Data System for Tropical Atmosphere Ocean (TAO) Array, Oceans 2008 Kobe, April 2008.
- Bouchard, R, D. Henderson, W. Burnett, R. V. Hervey, and R. Crout, 2008. The Integrated Ocean Observing System Data Assembly Center , *Eos Trans. AGU, Eos Trans. AGU, 89(23)*, Jt. Assem. Suppl., Abstract IN33A-12.
- Bouchard, R, D. Henderson, and L. Locke, 2008. From One Extreme to Another: Tsunami, Hurricane, and El Niño Observations from the NDBC Ocean Observing Systems of Systems, *Eos Trans. AGU, 89(23)*, Jt. Assem. Suppl., Abstract U53A-04.
- Bouchard, R., L. Locke, W. Hansen, S. Collins, and S. McArthur, 2007. The Catalog of Event Data of the Operational Deep-ocean Assessment and Reporting of Tsunamis (DART) Stations at the National Data Buoy Center, *Eos Trans. AGU, 88(52)*, Fall Meet. Suppl., Abstract S53A-1027.
- Bouchard, R, S. McArthur, W. Hansen, K.J. Kern, and L. Locke, 2007. Operational Performance of the Second Generation Deep-ocean Assessment and Reporting of Tsunamis (DART II), *Proc. MTS/IEEE Oceans'07*, Vancouver, Canada, 29 Sep – 4 Oct 2007.
- Bouchard, R.H, D. Wang, and F. Branski, 2008. Faster from the Depths to Decision: Collecting, Distributing, and Applying Data from NOAA's Deep-Sea Tsunameters, *Eos Trans. AGU, 89(23)*, Jt. Assem. Suppl., Abstract G21A-04.
- Crout, R.L. and W. Burnett, 2008, NOAA's National Data Buoy Center Data Assembly Center, *Sea Technology*, May 2008.
- Crout, R.L. and W. Burnett, 2008, NOAA's National Data Buoy Center Data Assembly Center, *Mariners Weather Log*, 52(2), August 2008
- Donoho, N., C. E. Zervas and R. Bouchard, 2008. The effects of Hurricane Dean on seafloor pressure, atmospheric pressure and coastal water levels, *Proc. 28th Conference on Hurricanes and Tropical Meteorology*, AMS: Boston, MA.
- Moersdorf, P.F., W. Burnett, C-C. Teng, R. Crout, and R. Bouchard, 2008. The NDBC Ocean Observing System of Systems in the Western Pacific, *Eos Trans. AGU, 89(23)*, West. Pac. Geophys. Meet. Suppl., Abstract OS44A-07.

- Moersdorf, P.F., W. Burnett, C-C. Teng, R. Crout, R. Bouchard, and L. Bernard, 2008. Climate Monitoring in the Western Pacific by the Tropical Atmosphere Ocean Array (TAO), *Eos Trans. AGU*, 89(23), West. Pac. Geophys. Meet. Suppl., Abstract OS43A-07.
- Moersdorf, P. F., W. Burnett, C-C. Teng, S. McArthur, R. Bouchard, and S. Collins, 2008. The U.S. Tsunami Detection Buoy Network in the Western Pacific, *Eos Trans. AGU*, 89(23), West. Pac. Geophys. Meet. Suppl., Abstract U35B-05.
- Teng, C.; Mettlach, T.; Chaffin, J.; Bass, R.; Bond, C.; Carpenter, C.; Dinoso, R.; Hellenschmidt, M.; Bernard, L.; NDBC 1.8-Meter Disc Buoy, Directional Wave System, Oceans 2007, October 2007.
- Teng, C.; Bernard, L.; LeBlanc, L.; Hensen, B.; Test and Evaluation of Refreshed Tropical Atmosphere Ocean (TAO) Buoy System, Oceans 2008 Kobe, April 2008.

CURRENT PROGRAMMES

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

Number and type of buoys: (a) deployed during year: 8 surface toroids,
(b) operational at 31 August: 12
(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: 22

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: 12 surface toroids, 10
subsurface
(b) operational at 31 August: 5 surface, 10 subsurface
(c) reporting on GTS at 31 August: 9

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: 14 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:

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

http://www.pmel.noaa.gov/tao/oceansites/RAMA_BAMS.pdf

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: 977
- (b) operational at 31 August: 1159
- (c) reporting on GTS at 31 August: 1159

Purpose of programme:

- (a) operational: 844
- (b) met/ocean research: 133
- (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.)

Huang, B., Y. Xue, and D. W. Behringer (2008), Impacts of Argo salinity in NCEP Global Ocean Data Assimilation System: The tropical Indian Ocean, /J. Geophys. Res./, 113, C08002, doi:10.1029/2007JC004388.

Chaigneau, A., O. Pizarro, and W. Rojas (2008), Global climatology of near-inertial current characteristics from Lagrangian observations, /Geophys. Res. Lett./, 35, L13603, doi:10.1029/2008GL034060.

Elipot, S., and R. Lumpkin (2008), Spectral description of oceanic near-surface variability, /Geophys. Res. Lett./, 35, L05606, doi:10.1029/2007GL032874.

For a complete list of publications please visit:
http://www.aoml.noaa.gov/phod/dac/gdp_biblio.html

CURRENT PROGRAMMES

G. Agency or programme: Naval Oceanographic Office (NAVOCEANO)

Number and type of buoys:

- (a) deployed during year: 32 APEX floats, 47 SLDMB Davis drifters, 13 WOCE drifters, 7 Arctic-MET drifters
- (b) operational at 31 August: 13 surface drifters, 36 floats
- (c) reporting on GTS at 31 August: 13 surface drifters, 36 floats

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

Main deployment areas: Primarily northern hemisphere

PLANNED PROGRAMMES

G. Agency or programme: Naval Oceanographic Office (NAVOCEANO)

Number and type of buoys planned for deployment in next 12 months: 120 surface drifters, 60 floats

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

Main deployment areas: Primarily northern hemisphere
