NATIONAL REPORTS

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

Appendices: National reports for:

A. Australia;
B. Brazil;
C. Canada;
D. China;
E. France;
F. Germany;
G. India;
H. Japan;
I. Malaysia;
J. New Zealand;
K. Republic of Korea;
L. South Africa; and
M. United States of America.

APPENDIX A

Country: Australia

Year: 2009

CURRENT PROGRAMMES ***(for period 1 July 2008 – 30 June 2009)***

A **Agency or programme:** Australian Bureau of Meteorology (ABOM)

Number and type of buoys:

(a) Deployed during the year: 20

18 SVP-B

2 SVP-BW

(b) Operational at 31 July: 29

(c) Reporting on GTS at 31 July: 28

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

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

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

Number and type of buoys:

(a) Deployed during the year: 8

8 SVP-B (Bureau sponsored upgrades)

(b) Operational at 31 July: 10

(c) Reporting on GTS at 31 July: 10

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

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

C **Agency or programme:** ABOM deployments for the Global Drifter Program

Number and type of buoys:

(a) Deployed during the year: 26

6 SVP

20 SVP-B

(b) Operational at 31 July: 23

(c) Reporting on GTS at 31 July: 23

Purpose of programme: To support the Global Drifter Program through the IBPIO, and to support the Bureau's operational forecasting and warning service.

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

D **Agency or programme:** Australian Antarctic Division (AAD)

Number and type of buoys:
(a) Deployed during the year: 2
1 Tilt-meter buoy
1 Stress-gauge buoy
(b) Operational at 31 July: 2
(c) Reporting on GTS at 31 July: 0

Purpose of programme: To assist AAD's research program, especially the investigation of sea-ice motion and deformation off East Antarctica, as well as the exploration of internal ice physics

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

PLANNED PROGRAMMES ***(for period 1 July 2009 – 30 June 2010)***

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

Number and type of buoys planned for deployment in next twelve months: 20
0 FGGE
0 FGGE-W
0 SVP
18 SVP-B
2 SVP-BW

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

Main deployment area: Southern and Indian Oceans.

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

Number and type of buoys planned for deployment in next twelve months: 8
8 SVP-B (Bureau sponsored upgrades)

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

Main deployment area: Indian Ocean

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

Number and type of buoys planned for deployment in next twelve months: 26
6 SVP

20 SVP-B

Purpose of programme: To support the Global Drifter Program through the IBPIO, and to support the Bureau's operational forecasting and warning service.

Main deployment area: Indian Ocean

D **Agency or programme:** Australian Antarctic Division (AAD)

Number and type of buoys planned for deployment in next twelve months: 2-3

1 Tilt meter buoy

1-2 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:

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

The deployment plans for Bureau-owned buoys will be published on the JCOMMOPS website under deployment opportunities < http://www.jcommops.org/depl_opport/australia.html >.

SPECIAL COMMENTS (if any)

(a) Quality of buoy data:

(b) Communications:

(c) Buoy lifetimes:

(d) Others:

APPENDIX B

Country: Brazil

Year: June 2008 – June 2009

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):
02 moored buoys of Platform type
01 moored buoy of Costal type
38 SVP drifters

(b) operational as of 30 June:
02 moored buoys of Platform type
01 moored buoy of Costal type
26 SVP drifters

(c) reporting on GTS as of 30 June:
02 moored buoys of Platform type
01 moored buoy of Costal type
26 SVP drifters

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 (to be confirmed), and four moored buoys, additionally to 8 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: - air temperature and relative humidity, SST, wind, atmospheric pressure, solar radiation, directional wave, ADCP, thermistor chain, fluorometer and automatic identification system (AIS), as moored buoys instrumentation set.

(c) Others: - use of Inmarsat-C (two-way telemetry), in redundancy to Argos-CLS.

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

- xxx

SPECIAL COMMENTS (if any):

(a) Quality of buoy data: - data being received is considered of good quality.

(b) Communications: - xxx

(c) Buoy lifetimes: - xxx

(d) Others: - xxx

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APPENDIX C

Country: Canada

Year: September 1st, 2008 – August 31st, 2009

Items A-E under section headers Current Programs and Planned Programs are the Environment Canada - Meteorological Service of Canada regional breakdown of drifter buoys, moored buoys and ice beacons.
Item F covers Environment Canada - Canadian Ice Service
Item G covers Canada's Department of Fisheries and Oceans (DFO)

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: 3
Number of drifting buoys without winds – 18 (includes 9 barometer upgrades).

(b) Operational as of 31 August 2009:
Number of moored 3 meter – 13
Number of developmental (platform for testing new equipment etc.) 3 meter (AXYS) - 2
Number of moored 6 meter NOMADs - 3
Number of 1.75 meter Watchkeepers – 0
Number of drifting buoys without winds – 9
Number of drifting buoys from barometer upgrade program - 9
Number of Iridium drifters (Iridium Pilot Project) - 2

(c) Reporting on GTS as of 31 August 2009:
Number of moored buoys– total 17
Number of drifting buoys – total 18 (includes 9 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 (drifters), Pacific Coast of British Columbia (moored)

B. **Agency or programme**: Moored Buoys Ontario Region (Great Lakes and Ontario Interior Lakes)

Number and type of buoys:

(a) Deployed during year: 14 (All Seasonal)
Number of moored 3 meter discus – 7
(1 new 3 meter foam buoy deployed in Lake Ontario)
Number of 1.75 meter Watchkeepers – 6

(b) Operational as of 31 August 2009: 14
Number of moored 3 meter discus - 8
Number of 1.75 meter Watchkeepers – 6
Reporting on GTS at 31 August 2009: 14

Number of moored buoys– total 14

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

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: 6
Number of moored 3 meter – 1 (seasonal)
Number of 1.7 meter watchkeepers - 1

(b) Operational as of 31 August 2009:
Number of moored 3 meter – 2
Number of moored 6 meter NOMADs - 8
Number of drifting buoys without winds – 4
With winds - 2

(c) Reporting on GTS as of 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 (Central Canada)

Number and type of buoys: (a) Deployed during year: 5
Number of moored 3 meter discus – 2 (Seasonal deployment Great Slave Lake)
Number of 1.75 meter Watchkeepers – 4 (Lake Winnipeg and south western Hudson Bay)

(b) Operational as of 31 August 2009: 5
Number of moored 3 meter – 2
Number of 1.75 meter Watchkeepers – 4

(c) Reporting on GTS as of 31 August 2009:
Number of moored buoys– total 5
(assumes logistical support in place for all Northern Developments later this summer).

Purpose of programme: (a) Operational: Operational Marine forecasting/warning program. Input for NWP in data sparse areas, and support of commercial and recreational shipping.

Main deployment areas: Central Canada

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

Number and type of buoys:
(a) Deployed during year: 2 MSC funded drifting buoys (ICEX) deployed on ice 4th of August by U.S. Naval Meteorology and Oceanography Command.

(b) Operational as of 31 August: 10 Arctic Basin on-ice drifting buoys +1 grounded on north coast of Alaska.

(c) Reporting on GTS as of 31 August: 10 Arctic Basin on-ice drifting buoys +1 grounded on north coast of Alaska.

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 (year): 10+ 1 (expected deployment in August) all CALIBs; 2 with barometric pressure sensor.

(b) Operational as of 31 August: 2+1

(c) Reporting on GTS as of 31 August: 2+1 (1 was deployed during spring of 2008)

Purpose of programme:
(a) Operational: Track sea ice, icebergs and ice shelf fragments. Validate ice and iceberg drift model output.

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

(c) Developmental: None

Main deployment areas: Eastern Arctic (WMO region 47) and East Coast of Canada (WMO region 44)

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

Number and type of buoys:
(a) Deployed during year:
- 1 Carioca (CO2) Apr/08 – Dec/08, Halifax Harbour, NS
- May be redeployed Oct 2009

Subsurface moorings:
- 2 Instrumented moorings Orphan Basin May/09 – May/10. Planned to be redeployed in May/10

- 3 Instrumented moorings Orphan Knoll May/09 – May/10. Planned to be redeployed in May/10
- 1 Instrumented mooring Labrador Sea May/09 – May/10. Planned to be redeployed in May/10
- 1 instrumented mooring Laurentian Channel May/09 – May/10
- 7 Instrumented moorings Barrow Strait June/09 – June/10. Planned to be redeployed in June/10
- 6 Instrumented moorings Scotian Slope Oct/08 – Oct/09
- 6 Instrumented moorings Scotian Slope Oct/09 – Oct/10
- A series of bottom mounted instrument package moorings deployed in the Cape Split/ Minas Channel, Bay of Fundy Dec/08 continuously
- 1 Instrumented mooring Sydney Bight, NS Mar/08 – Apr/08
- 3 Instrumented moorings Off Halifax Harbour Oct/08 – Oct/09
- 3 Instrumented moorings Off Halifax Harbour Oct/09 – Oct/10
- 3 Instrumented moorings Makkovik Labrador Sea Nov/08 – Aug/09
- 1 instrumented mooring Northeast Channel, Gulf of Maine area

Purpose of programme: (b) Met/ocean research:

- 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.
- Carioca Buoy. Measures carbon dioxide in air and water for Climate Studies.
- Minas Channel. For Tidal Power Research

Main deployment areas: Mouth of Halifax Harbour, Scotian Slope, Labrador Sea, Orphan Basin, Orphan Knoll, Barrow Strait, Makkovik, Labrador Sea, Minas Channel, Bay of Fundy.

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 – 18 (5 of these are already on ships of opportunity awaiting arrival at deployment zone)
7 Iridium drifters (part of Iridium PP) will be deployed in the NE Pacific in the fall of 2009, have been problems with deployment opportunities to date.
Number of Canadian funded barometer upgrades in support of GDP – 20 (contribution of ~$20K CDN)
Number of moored 3 meter – 13
Number of developmental 3 meter (AXYS) - 2
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: 14

Purpose of programme: (a) Operational:
Number of moored 3 meter – 7 (+1 3m foam)
Number of 1.75 meter Watchkeepers – 6

Purpose of programme: (a) Operational

Main deployment areas: Great Lakes and large inland Lakes in Ontario (Seasonal)

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 drifting buoys with winds – 2
Deployment of 1 3 m seasonal buoy, and 1 3m foam hull (location TBD).

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. Also coordinate drifting buoy deployments with 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: 3 (2 new and one refurbished buoy)

Purpose of programme: (a) Operational

Main deployment areas: - Arctic Basin

F. Agency or programme: Canadian Ice Service - Environment Canada

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

Purpose of programme: (a) Operational: 7-8

(b) Met / ocean research: 4 validating coupled Gulf model.

(c) Developmental: 0

Main deployment areas: 1 In high Arctic, 1 Eastern Arctic, 1 Labrador Coast, 4 Gulf of St-Laurence. 1 beacon dispatched on Aircraft for opportunistic deployment in the Arctic.

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), as well as integration of wide range of sensors including video camera, water quality sensors, as well as an underwater power generator (turbine).

An additional 3 m foam buoy (45159) was deployed in Western Lake Ontario this spring. Buoy was configured with standard suite of sensors and AXYS WM100 payload . A 2nd 3 m foam buoy will be deployed off the Atlantic Coast, likely in the Northumberland Straight to allow for performance in a more extreme environment, note that the final deployment location has yet to be finalized. There is specific interest in performance of foam hulls, and potential impacts on buoy maintenance (methodology and costs), and lifespan of hulls.

New type of drifters for deployment in the Arctic

With more open water across the Arctic Basin, those deploying buoys are seeing changes. Many of the buoys on the basin are now "southern, blue water" buoys such as SVP buoys whereas even 5 years ago, only "white water" (ice) buoys were used. A group in the United States have developed a buoy designed to float, freeze, and jostle in ice. Such a buoy should be good for both poles. Canada is interested in possible future deployments of this new type buoy in the future.

(b) Instrumentation:

Continue evaluation of utlrasonic anemometers (Vaisala) on MSC 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. Formal evaluation by MSC Engineering has been delayed, MSC buoys will continue to utilize ultrasonic anemometers only in secondary position.

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 to extend life in Arctic.

Procurement process underway for 2 Datawell waverider buoys for contribution to the DBCP Pilot Project on wave measurement evaluation and test from moored buoys. Expected deployment in winter or spring 2010 (T.B.D) depending on requirements of wave measurement pilot project, as well as operational resources.

(c) Other:

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. Awaiting the results of the comparison, as retrieval of the WM500 payload will be necessary.

Environment Canada continues to participate in the Iridium Pilot Project, with the deployment of 6 additional 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.

Continued deployments of 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. Pacific Region is considering deployment of the same system.

Environment Canada is working with MetOcean, JouBeh, and Scotia Weather to facilitate delivery of FM18 messages from 3rd party drifting buoys to the GTS. The goal is to provide a conduit for commercial (i.e. oil and gas operations) or other groups deploying buoys (research community) to share meteorological and oceanographic data with EC, as well as the broader community via the GTS. The project hopes to prove concept of routing Iridium based observations from buoys to the GTS via CMC (Canadian Meteorological Centre).

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).
- 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 5 Atlantic Buoys).

(c) Buoy lifetimes: Moored buoys – 4 years at which time they are refurbished (weld/leak tests, sandblasting, painting etc.) Experience has shown that extending maintenance period beyond 18 months results in loss of data (missing winds), and degradation quality and reliability of other parameters.

Drifting buoys – 16 months – 2 years

Canadian Ice Service

(a) Quality of buoy data: Good.

(b) Communications:

(c) Buoy lifetimes: 2-weeks to several 23 months depending on battery pack.

(d) Other: 1 air-dropped Calib on Arctic ice shelf fragment stopped sending signal after only 2 months; it is believed to be sitting in melt pond. Confirmation will only be possible comes late September when water re-freeze and signal transmit through ice. Water dielectric property absorb signal transmitted, but ice does not.

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APPENDIX D

Country: China

Year: 2009

CURRENT PROGRAMMES ***(for period 1 July 2008 – 30 June 2009)***

A **Agency or programme:** State Ocean Administration China (SOA)

Number and type of buoys:

(a) Deployed during the year: 32

- 1 Drift buoy
- 10 Moored buoy
- 1 IMB ice buoy
- 17 Argo float
- 1 Subsurface buoy
- 2 EMM2000

(b) Operational at 31 July: 25

(c) Reporting on GTS at 31 July: 17

Purpose of programme: support the operational forecasting and warning service ocean state and climate monitoring

internal wave research

Main deployment area: seas around China
the Antarctic Ocean
the Arctic Ocean

B **Agency or programme:** China Meteorological Administration

Number and type of buoys:

(a) Deployed during the year: 3

(b) Operational at 31 July: 3

(c) Reporting on GTS at 31 July:

Purpose of programme: support the operational forecasting and warning service of China

Main deployment area: seas around China

C **Agency or programme:** Chinese Academy of Science

Number and type of buoys:

(a) Deployed during the year: 5

(b) Operational at 31 July: 7

- 2 subsurface buoy
- 5 3m and 2m moored buoy

(c) Reporting on GTS at 31 July: 5

Purpose of programme: Ocean observation
To observe West Boundary Current

Main deployment area: seas around China

D **Agency or programme:** China Earthquake Administration

Number and type of buoys:
(a) Deployed during the year:
(b) Operational at 31 July: 2
2 Seabed earthquake platform
(c) Reporting on GTS at 31 July:

Purpose of programme: Monitor earthquake
Develop observation technique for sea earthquake

Main deployment area: seas around China

PLANNED PROGRAMMES ***(for period 1 July 2009 – 30 June 2010)***

A **Agency or programme:** State Ocean Administration China (SOA)

Number and type of buoys planned for deployment in next twelve months: 23
1 Drift buoy
21 Moored buoy
1 IMB ice buoy

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

Main deployment area: Sea around China

B **Agency or programme:** China Meteorological Administration

Number and type of buoys planned for deployment in next twelve months: 10
10 10 meters diameter moored buoy

Purpose of programme: To develop new precipitation observation method by buoy
To invert wave by buoy motivation
To optimize the wind inversion method

Main deployment area: seas around China

C **Agency or programme:** Chinese Academy of Science

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

1 Optic buoy

1 10 meters diameter moored buoy

Purpose of programme: research

Main deployment area: Near Dangan island

D **Agency or programme:** China Earthquake Administration

Number and type of buoys planned for deployment in next twelve months: 7

7 Sea bed earthquake platform

Purpose of programme: Monitor earthquake
Develop observation technique for sea earthquake

Main deployment area: Near Dangan island

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) Others:

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APPENDIX E

Country: France

Year: 1 July 2008 – 30 June 2009

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

- 6 SVP-B barometer drifters (Iridium);
- 1 SVP-BS drifter (salinity measurements)
- 1 SVP-BW (wind measurements)
- 1 Marisonde with 300 m long thermistor chain

In addition, Meteo-France operated 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) 10 buoys were operational at 30 June 2009 ;

(c) 10 buoys were reporting on GTS at 30 June 2009.

NB: The operational drifting buoys for the North Atlantic and the Mediterranean Sea are funded by E-SURFMAR (100 deployments in last 12 months, 110 operational and reporting on GTS at 30 June 2009).

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 three ocean weather stations (one in West Indies and two in the Mediterranean Sea). The co-operation with the UK MetOffice 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 were deployed in the Southern Atlantic Ocean in April 2008 and reported on GTS. One is still operational in July 2009, the other stopped in December 2008.

Purposes of programmes :

(a) Research: to understand, quantify and monitor the CO2 fluxes exchanged at the air-sea interface ;
Web site : *http://www.lodyc.jussieu.fr/carioca/home.html*

Deployment areas :

Southern Ocean.

Plans :

One buoy should be deployed during LATEX campaign in Mediterranean Sea in 2010.

B2. LOCEAN (salinity drifters)

Number and type of buoys deployed:

(a) 5 Surplas salinity drifters deployed in May 2009 and recovered in June 2009.
(b) 1 SIO/Pacific Gyre salinity drifter moored at the Catalonian Islas de Medes site (July 2007) which stopped transmitting (on a beach) in May 2009; in 2008, 3 salinity Pacific Gyre drifters deployed in the western tropical Atlantic were picked up by a fisherman. Two more salinity Pacific Gyre drifters deployed in the Bay of Biscay in May 2009 (one did not transmit after deployment).

Web sites : *http://www.locean-ipsl.upmc.fr/SSS/2008*

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

Plans for the next 12 months :

Deployments of 5 salinity Pacific Gyre drifters in the western tropical Pacific (end 2009). Deployment of 5 salinity Pacific Gyre drifters in western Indian Ocean, tropical Atlantic and Bay of Biscay (early 2010)

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

C1. Wave measurement network

Number and type of buoys :

(a) CETMEF operates a network of 12 scalar buoys and 14 directional buoys (DATAWELL). In addition, CETMEF implemented wave measurement systems on two Aid-to-Navigation moored buoys.

(b) 20 buoys were operational at 30 June;
(c) 12 were reporting on GTS at 30 June.

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://candhis.cetmef.developpement-durable.gouv.fr 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) One buoy was operational at 30 June;
(c) None was reporting on GTS at 30 June.

Purposes of programme :

To provide coastal environmental data in order to study and monitor the direct or indirect effects of human activities on marine environment ;
Web site : http://www.ifremer.fr/difMarelSeine/

Deployment area :

Bay of Seine

Plans for the next 12 months :

CETMEF waits decision from central administration to stop measurement or to continue with one buoy and one estuary station

D. IRD - French participation to PIRATA and to AMMA-EGEE programmes – (in cooperation with Meteo-France) and TACE-CLIVAR + PROPAO 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 September-October 2008 during the PIRATA-FR18 cruise.

Thus, 5 Atlas buoys under French responsibility were reporting on GTS from July 2007 in the central and eastern tropical Atlantic.

The deployment of a CO_2 sensor and an oxygen optode 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, and in September 2008 during the PIRATA cruise.

A CO_2 sensor and an oxygen optode installed on the ATLAS buoy at 38°W-8°N in April

2008 during the Brazilian PIRATA cruise, have been replaced in April 2009 during the PIRATA BR XI cruise.
One current meter mooring (ADCP) is maintained at 23°W-Equator by IRD from about height years (with periods of interruption). This mooring has been replaced in February 2008 by the German METEOR vessel.
The current meter mooring (ADCP) 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 has been replaced during the PIRATA-FR18 cruise in October 2008, and offered a two years time series of measurements. It will be replaced in fall 2010 during a french Pirata 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 and salinity, of the fugacity of CO_2 and of dissolved oxygen concentration, upper ocean thermal structure and air-sea fluxes of momentum, heat and fresh water in the Tropical Atlantic.

Web site : *http://www.ifremer.fr/ird/pirata/*

Deployment area:

Tropical Atlantic Ocean, the 5 ATLAS buoys under French responsibility are located at: along the equator at 23°W, 10°W and 0°E, and at 10°W- 6°S, 10°W- 10°S.

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) has been replaced during the PIRATA FR18 cruise in September 2008, along with the Pirata ADCP mooring at 10°W-0°N.

Plans for the next 12 months :

IRD will continue to yearly maintain the five PIRATA ATLAS buoys and the two currentmeter moorings located in the eastern equatorial Atlantic, during French PIRATA dedicated cruises, 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. The buoy was operational at 30 June 2009. In addition, in March 2009, a CO2 atmospheric sensor was installed ashore, very close to the 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/difMarelStanne*

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) 27 drifting buoys owned by SHOM were deployed in last 12 months:
- 15 Davis Drifter (lagrangian drifters for measuring water currents within one meter of sea surface);
- 8 WOCE (World Ocean Circulation Experiment) buoys drogued at 50 m;
- 4 ADOS drifters (surface drifters with 120m or 200m thermistor string)

(b) 2 buoys were operational at 30 June 2009;
(c) None was reporting on GTS at 30 June 2009.

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

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...)

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SPECIAL COMMENTS

(a) Buoy QC

(i) The Centre de Météorologie Marine (CMM) 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 : Real time observations from drifting buoys are subject to routine quality monitoring. Besides monthly statistics provided by various meteorological centres for individual buoys, tools are used by Meteo-France to identify buoys reporting dubious data as quickly as possible. These tools have been enhanced. More parameters than before are Quality Controlled: humidity, wave height and period are now compared to model outputs. As for wind speed, results are presented in the form of rates rather than biases. ECMWF analysis is systematically used for all parameters in parallel to Arpege French models outputs. Mercator SST and SSS outputs are also used.

(b) Buoy data

(i) The CMM reports the wave data collected by CETMEF in real time onto the GTS.

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

(c) Other activities

(i) For the fourteenth consecutive year, Meteo-France funded 10 barometers to be added to SVP drifters deployed in the Tropical Indian Ocean, each year in November. Twenty four other upgrades were funded in 2009. 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 2010.

(ii) IRD, also contributes to the deployment of SVP buoys and ARGO profilers in the equatorial Atlantic during the PIRATA servicing cruises and also in the framework of the CORIOLIS programme. IRD maintains a meteorological station installed at Sao Tome in October 2003 in the framework of EGEE/AMMA, now part of PIRATA.

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APPENDIX F

Country: Germany

Year: 2009

CURRENT PROGRAMMES:

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

Number and type of buoys:
(a) deployed during 2009: 0
(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: yes
(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 2009: 12
(b) operational as of 31 August: 27
(c) reporting on GTS as of 31 August: 0

Purpose of programme:
(a) operational: yes
(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 2009: 2
(b) operational as of 31 August: 26
(c) reporting on GTS as of 31 August: 26 (delays during winter season because of ice coverage)

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

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

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

Number and type of buoys:
(a) deployed during 2009: 3
(b) operational as of 31 August: 3
(c) reporting on GTS as of 31 August: 0

Purpose of programme:
(a) operational: yes
(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 2009:
Up to now only monitoring of position, buoys deployed next year will include CTD-Tags
(b) operational as of 31 August: ~30-40
(c) reporting on GTS as of 31 August: 0

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

(c) developmental:

Main deployment areas: **Weddell Sea**

F. Agency or programme: University of Hamburg, Institute of Marine Research, SFB512-E2, Argo floats (ARGOS-No. 592)

Number and type of buoys: (a) deployed during 2009: 3

(b) operational as of 31 August: 31: 16

(c) reporting on GTS as of 31 August: 31: 16

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), (ARGOS-No 636)

Number and type of buoys: (a) deployed during 2009 : 8

(b) operational as of 31 August: 4-5

(c) reporting on GTS as of 31 August: 0

Purpose of programme: (a) operational:

(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 2009: None, data buoy programme ended in 2008, was replaced by fixed station

(b) operational at 31 August: 0

(c) reporting on GTS at 31 August: 0

Purpose of programme: (a) operational:

(b) met/ocean research: yes

(c) developmental: yes

Main deployment areas: **German North Sea Coast**

I. Agency or programme: IfM-Geomar Kiel, Argo floats, SFB Climate-Biogeochemistry inteactions in the tropical ocean (ARGOS-No. 8165)

Number and type of buoys: (a) deployed during 2009 : 10

(b) operational as of 31 August: 35

(c) reporting on GTS as of 31 August:: 35

Purpose of programme: (a) operational:

(b) met / ocean research: yes

(c) developmental:

Main deployment areas: **Tropical Atlantic**, **Pacific**

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

Number and type of buoys: (a) deployed during 2009: 30

(b) operational as of 31 August: 123

(c) reporting on GTS as of 31 August: 123

Purpose of programme: (a) operational: yes

(b) met / ocean research:

(c) developmental:

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

K. Agency or programme: Marnet (ARGOS-NO. 2120), Bundesamt für Seeschifffahrt und Hydrographie, Hamburg Germany

Number and type of buoys: (a) deployed during 2009: only replacement of fixed stations after repairs

(b) operational as of 31 August: 10

(c) reporting on GTS as of 31 August: 10

Purpose of programme: (a) operational: yes

(b) met / ocean research:

(c) developmental:

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

L. Agency or programme: Norwave: Monitoring of sea state ARGOS-No. 9481), Bundesamt für Seeschifffahrt und Hydrographie, Hamburg Germany

Number and type of buoys: (a) deployed during 2009: 7 (replacement of stations after repairs)

(b) operational as of 31 August: 7

(c) reporting on GTS as of 31 August: 7

Purpose of programme: (a) operational: yes

(b) met / ocean research:

(c) developmental:

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

M. Agency or programme: Transdrift-TR (ARGOS-No. 3635), University of Trier, Meteorology Department, Trier, Germany

Number and type of buoys: (a) deployed during 2009: 2

(b) operational as of 31 August: 0

(d) reporting on GTS as of 31 August: 0

Purpose of programme: (a) operational:

(b) met / ocean research: yes

(c) developmental:

Main deployment areas: **Laptev Sea**

PLANNED PROGRAMMES:

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

Number and type of buoys planned for deployment in next 12 months: 0

Purpose of programme: (a) operational:

(b) met / ocean research: yes

(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 planned for deployment in next 12 months: 18

Purpose of programme: (a) operational: yes

(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: 20

Purpose of programme: (a) operational:

(b) met / ocean research: yes

(c) developmental:

Main deployment areas: **Weddell Sea**

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

Number and type of buoys planned for deployment in next 12 months: 0

Purpose of programme: (a) operational: yes

(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 planned for deployment in next 12 months: 10-12

Purpose of programme: (a) operational:

(b) met / ocean research: yes

(c) developmental:

Main deployment areas: **Southern Ocean**

G. Agency or programme: University of Hamburg / Meteorological Institute, Meteorological buoys measuring sea ice drift (DAMOCLES Project), (ARGOS_No. 592)

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

Purpose of programme: (a) operational:

(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 (ARGOS-No. 8165)

Number and type of buoys planned for deployment in next 12 months: None

Purpose of programme: (a) operational:

(b) met / ocean research:

(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: yes

(b) met / ocean research:

(c) developmental:

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

K. Agency or programme: Marnet (ARGOS-No. 2120), Bundesamt für Seeschifffahrt und Hydrographie, Hamburg Germany

Number and type of buoys planned for deployment in next 12 months: 0, but maintainance and replacement of exiting buoys 9-10

Purpose of programme: (a) operational: yes

(b) met / ocean research:

(c) developmental:

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

L. Agency or programme: NORWAVE: Monitoring of sea state (ARGOS_No. 9481), Bundesamt für Seeschifffahrt und Hydrographie, Hamburg Germany

Number and type of buoys planned for deployment in next 12 months: 0, but maintaince and replacement of exiting buoys 7

Purpose of programme: (a) operational: yes

(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 meteorologicalinstruments 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 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 are inserted in the GTS by DWD. Identifiers do not comply GTS standards.

(c) Buoy lifetimes: Buoys will continuously be serviced and replaced if necessary.

(d) Other:

CONTACT POINTS:

A.
Dr. Gerd Rohardt, Alfred Wegener Institute, P.O.Box 120161, 27515 Bremerhaven, Germany
Email: Gerd.Rohardt@awi.de

B.
Dr. Gerd Rohardt, Alfred Wegener Institute, P.O.Box 120161, 27515 Bremerhaven, Germany
Email: Gerd.Rohardt@awi.de

C.

Dr. Olaf Boebel, Alfred Wegener Institute, P.O.Box 120161, 27515 Bremerhaven, Germany
Email: Olaf.Boebel@awi.de

D.
Dr. Gerd Rohardt, Alfred Wegener Institute, P.O.Box 120161, 27515 Bremerhaven, Germany
Email: Gerd.Rohardt@awi.de

E.
Dr. Joachim Plötz, Alfred Wegener Institute, P.O.Box 120161, 27515 Bremerhaven, Germany
Email: Joachim.Ploetz@awi.de

F.
Dr. Detlef Quadfasel, Universität Hamburg , Zentrum für Meeres- und Klimaforschung
Institut für Meereskunde, Bundesstr. 53, 20146 Hamburg, Germany
Email: quadfasel@zmaw.de

G.
Dr. Gerd Mueller, Meteorological Institute, ZMAW, University of Hamburg, Bundesstrasse 55, 20146 Hamburg; Germany
Email: gerd.mueller@zmaw.de

H.
Dr. Klaus Ricklefs, Forschungs- und Technologiezentrum Westküste (FTZ), Hafentörn, 25761 Büsum, Germany.
Email: ricklefs@ftz-west.uni-kiel.de

I.
Dr. Jürgen Fischer, Dr. Lothar Stramma, Leibniz-Institut für Meereswissenschaften, IFM-GEOMAR, Düsternbrooker Weg 20, 24105 Kiel, Germany
Email: jfischer@ifm-geomar.de, lstramma@ifm-geomar.de

J.
Dr. Birgit Klein, Bundesamt für Seeschifffahrt und Hydrographie, Bernhard-Nocht-Str. 78, 20359 Hamburg, Germany,
Email: Birgit.Klein@bsh.de

K.
Kai Herklotz, Bundesamt für Seeschifffahrt und Hydrographie, Bernhard-Nocht-Str. 78, 20359 Hamburg, Germany,
Email: Kai.Herklotz@bsh.de

L.
Dieter Schrader, Bundesamt für Seeschifffahrt und Hydrographie, Bernhard-Nocht-Str. 78, 20359 Hamburg, Germany,
Email: Dieter.Schrader@bsh.de

M.
Prof. Guenther Heinnemann, Umweltmeteorologie, Uiniverstität Trier, Behringstraße 21 (Campus II), 54286 Trier, Germany
Email: heinemann@uni-trier.de

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APPENDIX G

Country: **India**

Year: **2009**

CURRENT PROGRAMMES:

A. **Agency or programme**: **National Institute of Ocean Technology**
Ministry of Earth sciences,
Govt. of India,
Pallikaranai, Chennai - 600 100

Number and type of buoys: (a) **18** deployed during (year): **2008-2009**

(b) **4** operational as of 31 August: **2009**

(c) **3** reporting on GTS as of 31 August: **2009**

Purpose of programme: (a) operational: ✓

(b) met / ocean research: ✓

(c) developmental: ✓

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

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

National Institute of Ocean Technology
Ministry of Earth sciences, Govt. of India, Pallikaranai, Chennai - 600 100

PLANNED PROGRAMMES:

A. **Agency or programme:**

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

Purpose of programme: (a) operational: ✓

(b) met / ocean research: ✓

(c) developmental: ✓

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

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

National Institute of Ocean Technology
Ministry of Earth sciences, Govt. of India, Pallikaranai, Chennai - 600 100

TECHNICAL DEVELOPMENTS:

(a) Buoy design:

- **Solar panel will be removed**
- **Mooring design for the buoy will be changed for met buoys**

(b) Instrumentation:

- **Incorporation of sensors/ Data Acquisition System for measuring sub surface parameters and with long batter life.**

(c) Others:

- **Two way communication between the buoy and shore station is being developed.**

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

- **QC reports**
- **G.Muralidharan, M.Sinha, A.D.Rao, G.Latha and S.K.Dube "Modified Weibull derived spectrum for deep water significant wave height estimation" "Natural Hazards" – Springer, November 2008.**
- **J.Vimala, G.Latha, V.Rajendran "Wave Forecasting Using Artificial Neural Networks" International Conference in Ocean Engineering, IIT, Madras, February 2009.**

SPECIAL COMMENTS (if any):

(a) Quality of buoy data:

- **Except SST other data set are of high quality.**

(b) Communications:

- **INMARSAT – Continuity of data sets achieved in this communication.**
- **INSAT- This has been tested and made operational but loss of data transmission occurred, the cause of failure of communication is being restored.**

(c) Buoy lifetimes:

- **5 to 6 months**

(d) Other:

- **Buoys are damaged due to vandalism and these issues need to be analysed.**

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APPENDIX H

Country: Japan

Year: 2008

CURRENT PROGRAMMES

A. Japan Meteorological Agency (JMA)

Number and type of buoys:

(a) deployed during year 2008:

(Type 1) 22 drifting buoys with air pressure, SST, wave height and wave period sensors

(Type 2) 16 profiling floats

(b) operational as of 31 August:

(Type 1) 9

(Type 2) 24

(c) reporting on GTS as of 31 August:

(Type 1) 9

(Type 2) 24

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. Japan Coast Guard

Number and type of buoys

(a) deployed during year 2008: 3 surface drifters with SST sensor

(b) operational as of 31 August: 3

(c) reporting on GTS as of 31 August: 3

Purpose of programme: operational

Main deployment areas: the Antarctic Ocean

C. Japan Agency for Marine-Earth Science and Technology

Number and type of buoys:

(a) deployed during year 2008:

(Type 1) 1 meteorological and oceanographic drifter (POPS)

(Type 2) 18 meteorological and subsurface oceanographic surface moorings (15 TRITON buoys, 2 m-TRITON buoys and 1 K-TRITON buoy)

(Type 3) 75 profiling floats

(b) operational as of 31 August:

(Type 1) 0

(Type 2) 18

(Type 3) 331

(c) reporting on GTS as of 31 August

(Type 1) 0

(Type 2) 15 (14 TRITON buoys and 1 K-TRITON buoy)

(Type 3) 327

Purpose of programme:

(Type 1) meteorological and oceanographic research

(Type 2) ENSO, IOD, Kuroshio 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 for TRITON and m-TRITON, and the north of Kuroshio Extension region for K-TRITON

(Type 3) the North Pacific, the South Pacific, the South Indian, the Southern and the Arctic Oceans

D. Tohoku National Fisheries Research Institute, Fisheries Research Agency

Number and type of buoys:

(a) deployed during year 2008:

(Type 1) 1 profiling floats

(Type 2) 8 subsurface current meter moorings

(b) operational as of 31 August:

(Type 1) 4

(Type 2) 8

(c) reporting on GTS as of 31 August:

(Type 1) 4

(Type 2)	0
Purpose of programme:	
(Type 1)	oceanographic research (subarctic intermediate circulation)
(Type 2)	oceanographic research (western boundary current transport and mode water ormation)
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) Oyashio-Kuroshio mixed water region (the western North Pacific)

E. Hokkaido National Fisheries Research Institute, Fisheries Research Agency

Number and type of buoys:	
(a) deployed during year 2008:	0
(b) operational as of 31 August:	5 profiling floats
(c) reporting on GTS as of 31 August:	5
Purpose of programme:	oceanographic research (subarctic intermediate circulation)
Main deployment areas:	Oyashio-Kuroshio mixed water region (the western North Pacific)

F. Seikai National Fisheries Research Institute, Fisheries Research Agency

Number and type of buoys	
(a) deployed during year 2008:	12 surface drifters
(b) operational as of 31 August:	11
(c) reporting on GTS as of 31 August:	0
Purpose of programme:	oceanographic research
Main deployment areas:	the East China Sea, Tsushima Straight and the 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) 19 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 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) 19 meteorological and subsurface oceanographic surface moorings (15 TRITON buoys, 3 m-TRITON buoys and 1 K-TRITON buoy)

(Type 3) 80 profiling floats

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 (15 TRITON buoys), the eastern Indian Ocean (3 m-TRITON buoys) and the north of Kuroshio Extension region(K-TRITON)

(Type 3) the North Pacific, the South Pacific, the Indian and the Southern Oceans

D. Tohoku National Fisheries Research Institute, Fisheries Research Agency

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

(Type 2) 8 subsurface current meter moorings

Purpose of programme:

(Type 2) oceanographic research (western boundary current transport and mode water formation)

Main deployment areas:

(Type 2) Oyashio region
(the western boundary current of subarctic North Pacific)
Oyashio-Kuroshio mixed water region
(the western North Pacific)

F. Seikai National Fisheries Research Institute, Fisheries Research Agency

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

Purpose of programme: oceanographic research

Main deployment areas: the East China Sea, Tsushima Straight and the Japan Sea

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APPENDIX I

Country: **MALAYSIA**

Year: **July 2008 – July 2009**

CURRENT PROGRAMMES

A. **Agency or programme**: Malaysian Meteorological Department

Number and type of buoys:
(a) deployed during year: Nil
(b) operational, as of July 2009: two tsunami and weather buoys
(c) reporting on GTS, as of July 2009: 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: Nil

Main deployment areas: i) Near Rondo Island, Indonesia.
ii) Near Layang-Layang Island, South China Sea

***PLANNED PROGRAMMES (*July 2009 – July 2010)**

A. **Agency or programme:** Malaysian Meteorological Department

Number and type of buoys planned for deployment in next 12 months: 1 (one)

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° 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 meteorological data is 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 maintenances and calibration, the buoy will be able to operate for very long period

(d) Others: Nil

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APPENDIX J

Country: **New Zealand**

Year: **2009**

CURRENT PROGRAMMES ***(for period 1 Sept 2008 – 1Sept 2009)***

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: **11**
- (c) Reporting on GTS at 31 August: **11**

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: **8**
- (c) Reporting on GTS at 31 August: **8**

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: **30 SVPB**
- (b) Operational at 31 August: **24**
- (c) Reporting on GTS at 31 August: **24**

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 2009 – 1 Oct 2010)***

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

Number and type of buoys planned for deployment in next twelve months: **6 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.

D **Agency or programme:** Argos3 Pilot Project

Number and type of buoys planned for deployment in next twelve months: **5 SVPB with ARGOS3 PMT**

Purpose of programme: To participate in the Argos3 Pilot Project by deploying 5 Metocean buoys provided by Argos, in the sea around NZ to trial the two-way communications.

Main deployment area: Tasman Sea and 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, autonomous 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:
During the southern summer (2008/2009) MetService New Zealand deployed 40 SVPB buoys into the Southern Ocean to the south and east of NZ under the Southern Ocean Buoy Programme (SOBP). The buoys were all manufactured by Technocean, 30 were GDC Buoys and 10 were NOAA buoys upgraded by MetService NZ.

The performance of these 40 buoys was marred by some early drogue failures and intermittent spikey air pressure data. Of the 40 buoys deployed in the period August 2008 to February 2009, thirteen drogues were lost in the first 90 days. The pressure data from 8 buoys was removed from GTS due to spikey and erratic data, 7 within the first six months and another at 9 months.

The problem of spikey buoy pressure was raised with Technocean and members of the TT IBPDTD, and individual buoys showing spikey pressure in December and January were compared with wave data to see if there was any correlation between air pressure spiking and significant sea state. In this period, no relationship between spikes and waves could be seen, and this led to discussions about whether buoys without drogues were submerged more often, thus not allowing barometer breathing to occur.

In March 2009, three buoys within close proximity of each other showed an odd diurnal signal where pressure spiking occurred in a synchronized manner at about local noon. The reason for this effect was discussed and solar heating was discounted as a possible cause. All three buoys had lost their drogues.

MetService NZ would welcome a review of the air pressure de-spiking algorithm. It was hoped that the DBCP-M2-TEST format, as used on some buoys, might offer clues to how the de-spiking algorithm could be improved. The on-board processing capability of buoys is now such that a new sampling regime and algorithm could be performed.

(b) Communications:

(c) Buoy Lifetimes:

The MetService Tasman Sea Buoy Network now consists entirely of SVPB type buoys. Since 2002, twenty seven MetService SVPB (Technocean) buoys have been deployed into the Tasman Sea network. As at 1 September 2009, sixteen buoys had finished operating having achieved an average lifetime of 20.4 months per buoy. The maximum lifetime achieved by one buoy was 40.2 months. Lifetime is counted for as long as good pressure data remains on GTS, or until battery or transmission failure. The remaining eleven operational buoys range in ages from newly deployed, to almost two years old.

Since 2000, Thirty eight of the GDC SVPB (Technocean) buoys deployed by MetService have finished after an average lifetime of 15.7 months each. The maximum lifetime achieved by one GDC buoy was 42.4 months and the shortest lifetime was 0.1 months when transmissions failed. Fifty one GDC (Technocean) buoys are still operational as at 1 September 2009, aged from seven to fifty eight months old.

Of the MetService Barometer Upgrade buoys (Technocean) deployed since 2000, thirty nine buoys have finished after an average lifetime of 24.3 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. Eighteen Technocean Upgrade buoys are still operational as at 1 September 2009, aged from nine to fifty three 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 each on GTS.

(d) Others:

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APPENDIX K

Country: Republic of Korea

Year: 2009

CURRENT PROGRAMMES

A. **Agency or programme**: Korea Meteorological Administration

Number and type of buoys:
(a) deployed during year: 1 moored buoys
(To be moored in October)
(b) operational as of 31 July: 7 moored buoys
(c) reporting on GTS as of 31 July: 7 moored buoys

Purpose of programme:
(a) operational: 8
(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: 12 argo floaters
(b) operational as of 31 July: 42 argo floaters
(c) reporting on GTS as of 31 July: 42 argo floaters

Purpose of programme:
(a) operational:
(b) met/ocean research: 42 argo floaters
(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: 5 argo floaters
(To be deployed 5 floats in October)
(b) operational as of 31 July: 54 argo floaters
(5 floats will be added later-on)

(c) reporting on GTS as of 31 July: 54 argo floaters
(5 floats will be added later-on)

Purpose of programme: (a) operational:
(b) met/ocean research: 54 argo floaters
(c) developmental:

Main deployment areas: the East Sea and the Antarctic Sea

D. **Agency or programme**: Korea Hydrographic and Oceanographic Administration(Program No. : 3464)/ Ministry of Land, Transport and Maritime Affairs

Number and type of buoys: (a) deployed during (Sep. 2008 - Aug. 2009): 21(SVP) Drifters (Argos)
(b) operational as of 31 July: 8
(c) reporting on GTS as of 31 July: 18

Purpose of programme: (a) operational: Service of East Sea Current
(b) met / ocean research:
(c) developmental: Program of East Sea Current products

Main deployment areas: The East Sea

E. Agency or programme: Korea Hydrographic and Oceanographic Administration / Ministry of Land, Transport and Maritime Affairs

Number and type of buoys: (a) deployed during(Sep. 2008 - Aug. 2009): 1 moored buoy
(b) operational as of 31 July: 8: 4 moored buoys
(c) reporting on GTS as of 31 July: not yet

Purpose of programme: (a) operational: Real time service
(b) met / ocean research:
(c) developmental:

Main deployment areas: regional sea around the Korea Peninsula

PLANNED PROGRAMMES

A. **Agency or programme:** Korea Meteorological Administration

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

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

Main deployment areas:

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

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

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

Main deployment areas: the East Sea 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: ? argo floaters
(Not decided yet)

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

Main deployment areas: the East Sea

D. **Agency or programme:** Korea Hydrographic and Oceanographic Administration / Ministry of Land, Transport and Maritime

Number and type of buoys planned for deployment in next 12 months:18 drifters(Argos)

Purpose of programme: (a) operational: Service of East Sea Current
(b) met / ocean research:

(c) developmental:

Main deployment areas: The East Sea

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

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

Purpose of programme: (a) operational: Real time service
(b) met / ocean research:
(c) developmental:

Main deployment areas: regional sea around the Korea Peninsula

- Changed the English name of office

from National Oceanographic Research Institute to Korea Hydrographic and Oceanographic Administration

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APPENDIX L

Country: **South Africa**

Year: **2009**

CURRENT PROGRAMMES:

A. **Agency or programme**: South African Weather Service Programme 243

Number and type of buoys:
(a) deployed during 2009: 2 (Fin yr 2008/2009)
(b) operational as of 31 August: 1
(c) reporting on GTS as of 31 August: 1

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 2009: Nil (Fin yr 2008/2009)
(b) operational as of 31 August: 8
(c) reporting on GTS as of 31 August: 8

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 2009: 1 (Financial yr 2008/09)
(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: South Atlantic

D. Agency or programme: 7325

Number and type of buoys:
(a) deployed during 2009: 1 (Financial yr 2008/09)
(b) operational as of 31 August: 1
(c) reporting on GTS as of 31 August: 1

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: 8325

Number and type of buoys:
(a) deployed during 2009: 23 (Financial yr 2008/09)
(b) operational as of 31 August: 17
(c) reporting on GTS as of 31 August: 17

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 2009: 1 (Financial yr 2008/09)

(b) operational as of 31 August: 1

(c) reporting on GTS as of 31 August: 1

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

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:

(c) Buoy lifetimes:

(d) Other:

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APPENDIX M

Country: **U.S.A.**

Year: **2009**

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: 7
(b) operational at 31 August: 115
(c) reporting on GTS at 31 August: 115

Purpose of programme:
(a) operational: X
(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: X
(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: 39

Purpose of programme: (a) operational: X

(b) met/ocean research:

(c) developmental:

Main deployment areas: 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: X

(b) met/ocean research:

(c) developmental:

Main deployment areas: Pacific, Atlantic, Gulf of Mexico

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: 55 surface, 4 subsurf.
(c) reporting on GTS at 31 August: 55 surface

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

Main deployment areas: Tropical Pacific

CURRENT PROGRAMMES

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

Number and type of buoys:
(a) deployed during year: 16 surface toroids,
(b) operational at 31 August: 17
(c) reporting on GTS at 31 August: 17

Purpose of programme: (a) operational:

(b) met/ocean research: X

(c) developmental:

Main deployment areas: Tropical Atlantic

PLANNED PROGRAMMES

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

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

Purpose of programme: (a) operational:

(b) met/ocean research: X

(c) developmental:

Main deployment areas: Tropical Atlantic

CURRENT PROGRAMMES

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

Number and type of buoys: (a) deployed during year: 17 surface toroids, 7 subsurface

(b) operational at 31 August: 16 surface, 7 subsurface
(c) reporting on GTS at 31 August: 16

Purpose of programme: (a) operational:

(b) met/ocean research: X

(c) developmental:

Main deployment areas: Indian Ocean

PLANNED PROGRAMMES

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

Number and type of buoys planned for deployment in next 12 months: 27 surface toroids, 6 subsurface

Purpose of programme: (a) operational:

(b) met/ocean research: X

(c) developmental:

Main deployment areas: Tropical Indian Ocean

SPECIAL COMMENTS (if any)

(a) Quality of buoy data: Monitored Daily

(b) Communications: Service Argos communications.

(c) Buoy lifetimes: 1 year

(d) Others:

CURRENT PROGRAMMES

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

Number and type of buoys: (a) deployed during year: 1307

(b) operational at 31 August: 1307

(c) reporting on GTS at 31 August: 1307

Purpose of programme: (a) operational: 908

(b) met/ocean research: 165

(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

CURRENT PROGRAMMES

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

Number and type of buoys: (a) deployed during year: 54 APEX floats, 108 SLDMB Davis drifters, 11 WOCE drifters, 4 Arctic-MET drifters

(b) operational at 31 August: 13 surface drifters, 56 floats

(c) reporting on GTS at 31 August: 13 surface drifters, 56 floats

Purpose of programme: (a) operational: X

(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: 108 surface drifters, 54 floats, 11 WOCE drifters, 4 Arctic-MET drifters

Purpose of programme: (a) operational: X

(b) met/ocean research:

(c) developmental:

Main deployment areas: Primarily northern hemisphere

CURRENT PROGRAMMES

H. Agency or programme: Interagency Arctic Buoy Programme

Number and type of buoys: (a) deployed during year: 68 (higher than normal for International Polar Year)

(b) operational at 31 August: 50

(c) reporting on GTS at 31 August: 48

Purpose of programme: (a) operational: X

(b) met/ocean research: X

(c) developmental: X

Main deployment areas: Arctic Ocean

PLANNED PROGRAMMES

H. Agency or programme: Interagency Arctic Buoy Programme

Number and type of buoys planned for deployment in next 12 months: 30

Purpose of programme: (a) operational: X

(b) met/ocean research: X

(c) developmental: X

Main deployment areas: Arctic Ocean

SPECIAL COMMENTS (if any)

(a) Quality of buoy data: Monitored daily.

(b) Communications: Primarily Argos for met, ice buoys and Iridium for Ocean buoys.

(c) Buoy lifetimes: 1 – 4 years, average 2 years.

(d) Others: The U.S. Interagency Arctic Buoy Program is a collaboration between many US operational and research agencies including the National Ice Center and the Polar Science Center, Applied Physics Lab, University of Washington. The buoys deployed monitor air, sea and ice conditions.

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