

DATA BUOY COOPERATION PANEL

DBCP-28/ Doc. 13 rev. 6  
(15-Oct-12)

TWENTY-EIGHTH SESSION

ITEM: 13

FREMANTLE, AUSTRALIA  
2-6 OCTOBER 2012

ENGLISH ONLY

## NATIONAL REPORTS

*(Submitted by Members/Member States<sup>1</sup>)*

---

### 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. Chile
- B. Sweden
- C. France
- D. South Africa
- E. Brazil
- F. Canada
- G. India
- H. Australia
- I. Republic of Korea
- J. Japan
- K. China
- L. USA
- M. Germany
- N. United Kingdom
- O. New Zealand
- P. Iran

---

<sup>1</sup> The content of national reports included in this document is the sole responsibility of the authors of the reports, and not of the Secretariat. Please be informed that "Sea of Japan" is the standard geographical term used by the Secretariat of the United Nations, in its own documents, for the body of water separated from the Pacific Ocean by the Japanese Archipelago and Sakhalin.

## APPENDIX A

### NATIONAL REPORTS ON CURRENT AND PLANNED BUOY PROGRAMMES

Country	CHILE
Year	2012

**1. CURRENT PROGRAMME:**

Agency or programme	Hydrographic and Oceanographic Service of the Chilean Navy (SHOA)	
Number and type of buoys	(a) deployed during the year	0
	(b) operational as of 31 August	2
	(c) reporting on GTS as of 31 August	0
Purpose of programme <i>(check/uncheck boxes using [ ] or [x] as appropriate)</i>	(a) operational	<input checked="" type="checkbox"/>
	(b) met / ocean research	<input type="checkbox"/>
	(c) developmental	<input type="checkbox"/>
Main deployment areas		

*(repeat table above as often as necessary)*

**2. PLANNED PROGRAMMES:**

	Hydrographic and Oceanographic Service of the Chilean Navy (SHOA)	
Number and type of buoys	planned for deployment in the next 12 months	1
Purpose of programme <i>(check/uncheck boxes using [ ] or [x] as appropriate)</i>	(a) operational	<input checked="" type="checkbox"/>
	(b) met / ocean research	<input type="checkbox"/>
	(c) developmental	<input type="checkbox"/>
Main deployment areas		

**3. TECHNICAL DEVELOPMENTS:**

(a) Buoy design	1.- DART II manufactured by PMEL-NOAA 2.- Watchkeeper manufactured by Axyx Technologies
(b) Instrumentation	1.- Tsunameter 2.- Waves, wind, currents
(c) Others	

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

	<b>Title</b>	<b>Type</b>
1		
2		
3		
4		

*(repeat rows in the table above as necessary)*

**5. SPECIAL COMMENTS (if any):**

	Hydrographic and Oceanographic Service of the Chilean Navy (SHOA)
(a) Quality of buoy data	
(b) Communications	Reliable
(c) Buoy lifetimes	
(d) Other	

**Note:** It is recommended that this form is filled in electronically and returned also electronically to the Secretariat. A template of the form can be downloaded from the following ftp site:

[ftp://ftp.wmo.int/Documents/PublicWeb/amp/mmop/documents/dbcp/templates/ Format-DBCP-National-Reports.doc](ftp://ftp.wmo.int/Documents/PublicWeb/amp/mmop/documents/dbcp/templates/Format-DBCP-National-Reports.doc)

\_\_\_\_\_

## APPENDIX B

### NATIONAL REPORTS ON CURRENT AND PLANNED BUOY PROGRAMMES

<b>Country</b>	<b>SWEDEN</b>
<b>Year</b>	<b>2012</b>

**Contact:**

*Thomas Hammarklint*

Swedish Meteorological and Hydrological Institute (SMHI),

Sven Källfelts gata 15, SE-42671 Västra Frölunda, Sweden

Telephone: +46 11 4958000, Telefax: +46 11 4958001,

Email: [Thomas.Hammarklint@smhi.se](mailto:Thomas.Hammarklint@smhi.se)

Buoy info: <http://www.smhi.se>

### CURRENT PROGRAMMES

#### A. SMHIs Ocean Buoy Network

Number and type of buoys: 4

(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 AxysBuoy Axys

Knolls grund 57°31'N 17°37'E 200606 WaveRider DataWell

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:

Finngrundet, Huvudskär Ost and Väderöarna.

Knolls grund in operation since 19 November 2011.

(c) reporting on GTS at 31 August:

None.

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

### PLANNED PROGRAMMES

A new purchased oceanographic buoy from Canada have been deployed during the year at Huvudskär Ost.

## **TECHNICAL DEVELOPMENTS**

- (a) Buoy design:  
None for the moment.
- (b) Instrumentation:  
None for the moment.
- (c) Others:  
Change from Orbcomm to IRIDIUM for better availability of data.

## **PUBLICATIONS**

-

## **SPECIAL COMMENTS**

- (a) Quality of buoy data:  
Excellent as long as the buoys are deployed.
  - (b) Communications:  
Orbcomm and Iridium satellite system
  - (c) Buoy lifetimes:  
SeaWatch five years.  
WaveRider ten years.  
AxyBuoy five years.
  - (d) Others:  
Swedish buoy data in real-time can be obtained from [www.smhi.se](http://www.smhi.se)
-

## APPENDIX C

### NATIONAL REPORTS ON CURRENT AND PLANNED BUOY PROGRAMMES

<b>Country</b>	<b>FRANCE</b>
<b>Year</b>	<b>1 July 2011 – 30 June 2012</b>

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) 13 drifting buoys were deployed in last 12 months :

- 7 SVP-BS drifters (salinity measurements) with LPO and LOCEAN;
- 1 SVP-BTC (bathy measurements)
- 5 SVP-B (4 Argos, 1 Iridium) in the North Tropical Atlantic

(b) 26 SVP were upgraded to SVP-B (Iridium) and deployed in Indian Ocean

In addition, Meteo-France operated 3 moored buoy stations (plus two others in co-operation with UKMO), four directional waveriders and one automated stations put aboard aid-to-navigation buoy ;

(c) 30 buoys were operational at 30 June 2012 ;

(d) 30 buoys were reporting on GTS at 30 June 2012.

NB: The operational drifting buoys for the North Atlantic and the Mediterranean Sea are funded by E-SURFMAR (133 deployments in last 12 months, 77 operational and reporting on GTS at 30 June 2012).

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.  
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 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 austral ocean (KEOPS2 Oct 2011). One of which is still working properly

Purposes of programmes :

- (a) Research: to understand, quantify and monitor the CO<sub>2</sub> fluxes exchanged at the air-sea interface in an environment not constrained by macro-nutrient supply;  
Web site : <http://www.lodyc.jussieu.fr/carioca/home.html>

Plans :

None in the short term.

### **B2. LOCEAN (salinity drifters)**

Number and type of buoys:

- (a) 1 Surplas and two surpact salinity floats deployed
- (b) 14 salinity Pacific Gyre drifters deployed: 5 in the western tropical Pacific Ocean, 9 in the tropical Atlantic Ocean.

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). In relation to GLOSCAL, an ESA project for the calibration/validation of the SMOS L-band radiometer mission. In this framework, small floats have also been used and developed to provide consistent data in order to better understand near-surface stratification, and at the same time, provide information on associated wave/SLP conditions. The newest version, Surpact, developed in collaboration with SMRU, measures C/T at 4cm depth, surface wave spectra and SLP.
- (b) Validation of past data from salinity drifters and transmission of the validated data to users through a website. Investigate more specifically daily cycles from the salinity drifters.
- (c) Technical : to develop drifters able to measure surface salinity over a multi-month mission with little drifts.

Web sites : <http://www.locean-ipsi.upmc.fr/smos/drifters/>

Plans:

Deployment of 2 salinity drifters in sub-tropical Atlantic (summer 2012)  
Deployments of 2 salinity drifters in the tropical Atlantic (fall 2012).  
Deployment of 2 salinity drifters in south equatorial Indian Ocean (early 2013)  
Deployment of 5 salinity drifters W Pacific (2013)  
Deployment of 7 to 10 surfact floats (first in N sub-tropical Atlantic summer 2012; then south equatorial Indian Ocean, early 2013)

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

Number and type of buoys :

- (a) CETMEF operates a network of 5 scalar buoys and 19 directional buoys (DATAWELL).
- (b) 24 buoys were operational at 30 June;
- (c) 20 were reporting on GTS at 30 June.

Purpose of programme :

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, Saint Pierre & Miquelon, Guyana and La Reunion Island.

Plans for the next 12 months :

The network will be maintained. CETMEF plans to complete it with two directional buoys. Real time data are available on the Internet at <http://candhis.cetmef.developpement-durable.gouv.fr> and on the GTS thanks to Meteo-France.

**D. IRD - French participation to PIRATA – (in cooperation with Meteo-France) and TACE-CLIVAR + AMMA2 + PROPAO/ALOC-GG programmes (international collaborations)**

**A) PIRATA:**

Number and type of buoys:

IRD has been operating 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 March-May 2012 during the PIRATA-FR22 cruise carried out between Dakar (Sénégal) and Abidjan (Côte d'Ivoire).

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

One current meter mooring (ADCP) is maintained at 23°W-Equator by IRD from about eight years. This mooring has been replaced in May 2011 during an IFM-GEOMAR cruise (on the MERIAN).

One other current meter mooring (ADCP) deployed at 10°W-Equator from June 2006 is replaced every two years and has been replaced during the PIRATA-FR22 cruise in March 2012.



The CO<sub>2</sub> sensor and an oxygen optode associated to the ATLAS buoy at 10°W-6°S from in June 2006 installed during the EGEE 3 cruise), have been replaced in April 2012 during the PIRATA FR22 cruise. A 2<sup>nd</sup> CO<sub>2</sub> sensor and an oxygen optode, initially installed on the ATLAS buoy at 38°W-8°N in April 2008 during a Brazilian PIRATA cruise, have been replaced in August 2011 during the yearly PIRATA BR XIII cruise. Both systems are under IRD responsibility (PI: N.Lefevre).

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<sub>2</sub> 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.

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).

The next French PIRATA cruise should take place in the tropical Atlantic Ocean in April-May 2013. Also, a German (IFM-GEOMAR) cruise is scheduled in October 2012 during which the ADCP mooring at 23°W-0°N will be replaced.

The meteorological station at São Tomé should be replaced in 2013.

**E. SHOM** (Hydrographic and Oceanographic Service of the Navy)

Number and type of buoys:

- (a) 30 drifting buoys owned by SHOM were deployed in last 12 months:
  - 12 Davis Drifter (lagrangian drifters for measuring water currents within one meter of sea surface);
  - 10 WOCE (World Ocean Circulation Experiment) buoys drogued at 15 m;
  - 5 WOCE (World Ocean Circulation Experiment) buoys drogued at 75 m;
  - 3 WOCE (World Ocean Circulation Experiment) buoys drogued at 60 m;
  - 2 SC40-ITP drifters (surface drifters with 120m or 200m thermistor string)
- (b) 1 buoys were operational at 30 June 2012;

(c) all WOCE were reporting on GTS at 30 June 2011.

Purposes of program :

- (a) to get oceanic data (current and temperature in depth) that could be introduced in real time into prediction models.

Deployment area :

Bay of Biscay

Plan for the next 12 months :

- 30 drifting buoys will be deployed in the next 12 months.

## **F. IFREMER (Institut Français de Recherche pour l'Exploitation de la MER)**

### **F1. LPO**

Number and type of buoys :

- (a) a total of 8 buoys were deployed in the last 12 months:
  - 5 WOCE (World Ocean Circulation Experiment) buoys drogued at 15 m.
  - 3 WOCE (World Ocean Circulation Experiment) buoys drogued at 50 m
- (b) 3 buoy were operational as of June 30 th 2011;
- (c) 3 were reporting on GTS as of June 30th 2011.

Purposes of program :

To gather information on the mesoscale features of currents and the general circulation pattern on the continental shelf of the Bay of Biscay, both as part of focussed at-sea experiments and with the aim of feeding a regional database of drifter trajectories.

Deployment area :

Bay of Biscay

### **F2- IMEDIA**

Number and type of buoys :

- (a) a total of 22 buoys were deployed in the last 12 months:
  - 22 SVP-GPS buoys drogued at 50 m
- (b) 8 were reporting on GTS as of June 30th 2011.

Deployment area :

Mediterranean Sea

These surface drifters are processed by the Coriolis data centre (<http://www.coriolis.eu.org>)

All the results are available on :

<http://www.coriolis.eu.org/Data-Services-Products/View-Download/Surface-drifters-data>

## **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), including the validation of temperature measurements, with comparison with Surplas/Surpact floats.
- (iii) Meteo-France is participating in the evaluation of drifters fitted with thermistor string SVP-BTC.
- (iv) Meteo-France contributes to the DBCP Pilot Projects: Iridium and GHRSSST.

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

Caniaux, G., H. Giordani, J.L. Redelsperger, F. Guichard, E. Key, and M. Wade: Coupling between the Atlantic Cold Tongue and the African Monsoon in boreal Spring and Summer, *J. Geophys. Res.*, 116, C04003, doi:10.1029/2010JC006570, 2011.

Giordani, H., and G. Caniaux : Diagnosing vertical motion at the equatorial Atlantic, *Ocean Dynamics*; 61:1995–2018, DOI 10.1007/s10236-011-0467-7, 2011.

Hummels, R., M. Dengler, and B. Boulès, Seasonal and regional variability of upper ocean diapycnal heat flux in the Atlantic Cold Tongue, submitted to *Progress in Oceanogr.*, 2012.

Jouanno, J., F. Marin, Y. Du Penhoat, J. Sheinbaum and J.-M. Molines, Seasonal heat balance in the upper 100 m of the equatorial Atlantic Ocean. *J. Geophys. Res.*, 116, C09003, doi:10.1029/2010JC006912, 2011a.

Jouanno, J., F. Marin, Y. Du Penhoat, J.-M. Molines, and J. Sheinbaum: Seasonal modes of surface cooling in the Gulf of Guinea. *J. Phys. Oceanogr.*, 41, 1408-1416, 2011b.

Lebel, T., D.J. Parker, B. Boulès, C. Flamant, B. Marticorena, C. Peugeot, A. Gaye, J. Haywood, E. Mougin, J. Polcher, J.L. Redelsperger, C.D. Thorncroft The AMMA Field Campaigns: accomplishments and lessons learned, *Atmospheric Science Letters*, 12 (1), p. 123-128. ISSN 1530-261X, 2011.

Lefevre N. and Merlivat L., Carbon and oxygen net community production in the eastern tropical Atlantic estimated from a moored buoy. *Sous presse dans Global Biogeochemical Cycles*, 2012

Wade, M., G. Caniaux, and Y. DuPenhoat : Variability of the mixed layer heat budget in the Eastern Equatorial Atlantic during 2005-2007 as inferred from Argo floats. *J. Geophys. Res.*, 116, C08006, doi:10.1029/2010JC006683, 2011.

Boutin J., X. Yin, N. Martin, J. Font, N. Reul, G. Reverdin, E. Lorant, S. Morrisset, A. Lourenço, F. Gaillard, J. Rolland, P. Blouch, C. Maes, "Sea Surface Salinity from SMOS satellite and in situ observations: surface autonomous drifters in the tropical Atlantic Ocean", SMOS Science Workshop, Arles, Sept. 2011 (extended abstract).

Boutin J., N. Martin, X. Yin, G. Reverdin, S. Morrisset, Sea Surface Salinity as measured by SMOS and by surface autonomous drifters: impact of rain, IGARSS conference, 2012 (extended abstract).

Morrisset, S., G. Reverdin, J. Boutin, N. Martin, X. Yin, F. Gaillard, P. Blouch, J. Rolland, J. Font, J. Salvador, 2012. Surface salinity drifters for SMOS validation. Mercator Ocean-Coriolis Quaterly Newsletter 44, April 2012.

Reverdin, G., S. Morisset, J. Boutin, and N. Martin, 2011. Rain-induced variability of near-surface T and S from drifter data. *J. Geophys. Res.*, 117, C2, doi:10.1029/2011JC007549.

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

## **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 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.

### (b) Buoy data

- (i) The CMM reports the wave data collected by CETMEF in real time onto the GTS.
- (ii) Since the 1<sup>st</sup> 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 seventeenth 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 2012. These drifters are devoted to the Southern Ocean, south of 40°S in the Indian Ocean, as a principle. These 30 buoys of 2012 are upgraded to Iridium. These actions will be renewed in 2013.
- (ii) IRD, also contributes to the deployment of SVP (5 SVP-BS in 2012) buoys and ARGO profilers (7 APEX in 2012) in the equatorial Atlantic during the PIRATA servicing cruises and also in the framework of the CORIOLIS programme.
- (iii) IRD also maintains a meteorological station installed at Sao Tome in October 2003 in the framework of EGEE/AMMA, now part of PIRATA, along with a tide gauge (now part of PIRATA). However, both instruments are no more operational since 2010. The tide gauge will be fully replaced in 2013 (if and once funded) and the meteorological station will be stopped (neither funds nor human power).
- (iv) During the PIRATA cruise, IRD provides CTD (68 in 2012) and XBT (86 in 2012) profiles in quasi-real time from the vessel for operational oceanography (MERCATOR).
- (v) in order to increase the vertical resolution of salinity time series, 6 additional TC sensors have been bought and added in 2011 at the ATLAS buoys located at 10°W-

6°S and 10°W-10°S. These sensors have also been maintained and replaced in 2012. Current sensors has been added in 2011 at 10°W-0°N and 0°E-0°N (HR RDI Sentinels) for a one year duration and not replaced.

(vi) During all PIRATA cruises, continuous registration of SST and SSS (thermosalinograph) and current (ADCPs) are ensured all along the trackline.

---

## APPENDIX D

### NATIONAL REPORTS ON CURRENT AND PLANNED BUOY PROGRAMMES

<b>Country</b>	<b>SOUTH AFRICA</b>
<b>Year</b>	<b>2012</b>

#### **1. CURRENT PROGRAMME:**

<b>Agency or programme</b>	South African Weather Service/University of Cape Town/GLOBE Africa	
Number and type of buoys	(a) deployed during the year	43xSVP-B
	(b) operational as of 31 August 2011	38
	(c) reporting on GTS as of 31 August	33
Purpose of programme (check/uncheck boxes using [ ] or [x] as appropriate)	(a) operational	[x]
	(b) met / ocean research	[x]
	(c) developmental	[x]
Main deployment areas	South Atlantic Ocean / South Indian Ocean / Southern Ocean	

#### **2. PLANNED PROGRAMMES:**

<b>Agency or programme</b>	South African Weather Service/University of Cape Town/GLOBE Africa/WIO Science Alliance/DEA	
Number and type of buoys	planned for deployment in the next 12 months	50 SVP-B
Purpose of programme (check/uncheck boxes using [ ] or [x] as appropriate)	(a) operational	[x]
	(b) met / ocean research	[x]
	(c) developmental	[x]
Main deployment areas	South Atlantic Ocean / South Indian Ocean / Southern Ocean	

#### **3. TECHNICAL DEVELOPMENTS:**

(a) Buoy design	<ul style="list-style-type: none"> <li>• Technocean, Metocean, Clearwater, Pacific Gyre</li> <li>•</li> <li>•</li> </ul>
(b) Instrumentation	<ul style="list-style-type: none"> <li>•</li> <li>• SST and Pressure</li> <li>•</li> </ul>
(c) Others	<ul style="list-style-type: none"> <li>•</li> <li>• N/A</li> <li>•</li> </ul>

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

<b>Ref</b>	<b>Title</b>	<b>Type2</b>
1		
2		
3		
4		

**5. SPECIAL COMMENTS (if any):**

(a) Quality of buoy data	<ul style="list-style-type: none"> <li>•</li> <li>• Good</li> <li>•</li> </ul>
(b) Communications	<ul style="list-style-type: none"> <li>•</li> <li>• Good</li> <li>•</li> </ul>
(c) Buoy lifetimes	<ul style="list-style-type: none"> <li>• “Oldest” buoy – 2 years and 5 months.</li> <li>• Had 5 fail on deployment</li> <li>• Average about 1 year.</li> </ul>
(d) Other	<ul style="list-style-type: none"> <li>• The oceanographic/atmospheric institutes in South Africa have been getting a lot of support from NOAA. However, during the past year, a lack of communication between the local institutes caused some confusion as to who should deploy when. After a meeting with most of the role players, it was decided that SAWS will continue to be the contact institute with regards to the drifting weather buoys that we receive in such abundance from NOAA. It will then be distributed to the local institutes as deployment opportunities arise.</li> </ul>

---



---

2: Types of publications: (1) Implementation, (2) Operations, (3) Instrumentation, (4) Quality Management, (5) Data Management, (6) Data collection and/or location, (7) Data use, (8) Other

## APPENDIX E

### NATIONAL REPORTS ON CURRENT AND PLANNED BUOY PROGRAMMES

Country	BRAZIL
Year	Jul 2011 to Jul 2012

#### CURRENT PROGRAMMES:

**A. Agency or programme:** DHN-CHM – National GOOS Programme that includes PNBOIA (Brazilian National Buoy Program) ,PIRATA and Coastal waves network.

- Number and type of buoys: (a) deployed during (2011):  
08 PIRATA buoys  
03 moored buoys of Platform type  
00 moored buoy of Costal type  
01 wave sensor  
51 SVP drifters 8 SVP-B drifters
- deployed during (2012):  
08 PIRATA buoys  
03 moored buoys of Platform type  
01 moored buoy of Costal type  
02 SVP-BWIND drifters  
02 SVP SVP drifters  
31 SVP SVP-B drifters
- (b) operational as of 31 August:  
08 PIRATA buoys  
05 moored buoys of Platform type  
01 moored buoy of Costal type  
01 wave sensor  
41 drifters
- (c) reporting on GTS as of 31 August:  
08 PIRATA buoys  
05 moored buoys of Platform type  
01 moored buoy of Costal type  
21 drifters

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

Main deployment areas: South and Topical Atlantic Ocean

**B. Agency or programme:**

DHN/CHM – National GOOS Programme that includes PNBOIA (Brazilian National Buoy Program) and PIRATA



**PLANNED PROGRAMMES:**

**A. Agency or programme:** PNBOIA (Brazilian National Buoy Program) and Coastal Wave Network.

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

01 moored buoys of Platform type  
30 SVP drifters  
10 ARGO Floats  
03 wave sensors

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

Main deployment areas: South and Tropical Atlantic

**TECHNICAL DEVELOPMENTS:**

- (a) Buoy design: Brazil has two projects to build Brazilian moored buoys, one is Atlas-B and another COPPETEC project for a polypropylene buoy with 2.9 m of diameter.
- (b) Instrumentation: accelerometer
- (c) Others: system integration

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

**SPECIAL COMMENTS (if any):**

- (a) Quality of buoy data: In a general way data is reliable
  - (b) Communications: ARGOS transmission is noisier than Immarsat.
  - (c) Buoy lifetimes: We are still experiencing same problems with drifting buoys :  
3 aground, 9 picked up and 20 quit transmitting in 2011. We will try to replace batteries since we had a long delay importing them.  
One moored buoy suffered a flooding event, due a fishing intervention and the exposure of the rubber vent. We built up a stronger protection for the vent.
  - (d) Other: We took place in a workshop regarding vandalism issues and we will work on awareness campaigns to maritime communities aiming minimize intervention problems on moored and drifting buoys.
-

## APPENDIX F

### NATIONAL REPORTS ON CURRENT AND PLANNED BUOY PROGRAMMES

<b>Country</b>	<b>Canada</b>
<b>Year</b>	<b>2012</b>

#### 1. CURRENT PROGRAMME:

<b>Agency or programme</b>	Moored and drifting buoys in the <b>Northeast Pacific Ocean</b> Pacific and Yukon Region of Environment Canada	
Number and type of buoys	(a) deployed during the year	<ul style="list-style-type: none"> <li>• 18 moored buoys maintained</li> <li>• 4 drifting buoys deployed</li> <li>• 16 GDP Barometer Upgrade buoys deployed (not counted in GTS totals)</li> <li>• 1 waverider deployed</li> </ul>
	(b) operational as of 31 August	<ul style="list-style-type: none"> <li>• 15 - 3 M Discus</li> <li>• 3 - 6 M NOMAD</li> <li>• 1 - 0.7 M waverider</li> <li>• 4 - SVP-B drifters</li> </ul>
	(c) reporting on GTS as of 31 August	23
Purpose of programme <i>(check/uncheck boxes using [ ] or [x] as appropriate)</i>	(a) operational	[x]
	(b) met / ocean research	[x]
	(c) developmental	[x]
Main deployment areas	Coastal waters of British Columbia, as well as open ocean deployments of moored buoys (NOMADS) and drifting buoys.	

<b>Agency or programme</b>	Moored buoys on the <b>Great Lakes and other interior lakes</b> Prairie and Northern Region and Ontario Region of Environment Canada	
Number and type of buoys	(a) deployed during the year	19 (seasonal) moored buoys
	(b) operational as of 31 August	<ul style="list-style-type: none"> <li>• 10 - 3 M Discus</li> <li>• 9 - 1.7 M watchkeeper</li> </ul>
	(c) reporting on GTS as of 31 August	19
Purpose of programme <i>(check/uncheck boxes using [ ] or [x] as appropriate)</i>	(a) operational	[x]
	(b) met / ocean research	[x]
	(c) developmental	[ ]
Main deployment areas	Canadian waters of the Great Lakes, and large interior lakes in central Canada. Note that all deployments are seasonal.	

<b>Agency or programme</b>	Moored buoys in the <b>Northwest Atlantic Ocean and Gulf of St. Lawrence</b> Atlantic Region and Quebec Region of Environment Canada	
Number and type of buoys	(a) deployed during the year	<ul style="list-style-type: none"> <li>• 9 moored buoys maintained (8 NOMADs and 1 3MD in NW Atlantic)</li> <li>• 4 seasonal deployments (Gulf of St. Lawrence)</li> <li>• 2 waveriders redeployed</li> <li>• 8 SVP-B drifting buoys deployed.</li> </ul>
	(b) operational as of 31 August	<ul style="list-style-type: none"> <li>• 2 - 3 M Discus</li> <li>• 8 - 6 M NOMAD</li> <li>• 2 - 1.7 M Watchkeeper</li> <li>• 2 - 0.7 M waverider</li> <li>• 8 - SVPB</li> </ul>
	(c) reporting on GTS as of 31 August	21
Purpose of programme <i>(check/uncheck boxes using [ ] or [x] as appropriate)</i>	(a) operational	<input checked="" type="checkbox"/>
	(b) met / ocean research	<input checked="" type="checkbox"/>
	(c) developmental	<input type="checkbox"/>
Main deployment areas	Northwest Atlantic Ocean and Gulf of St. Lawrence	

<b>Agency or programme</b>	Ice buoys deployed in the <b>Arctic Basin and Eastern Arctic</b> - in collaboration with International Arctic Buoy Program (IABP) and also to meet operational requirements of the Canadian Ice Service and new METAREA obligations.	
Number and type of buoys	(a) deployed during the year	8
	(b) operational as of 31 August	6
	(c) reporting on GTS as of 31 August	6
Purpose of programme <i>(check/uncheck boxes using [ ] or [x] as appropriate)</i>	(a) operational	<input checked="" type="checkbox"/>
	(b) met / ocean research	<input checked="" type="checkbox"/>
	(c) developmental	<input checked="" type="checkbox"/>
Main deployment areas	Beaufort Sea, Canadian Archipelago, Eastern Arctic and Labrador Sea	

**2. PLANNED PROGRAMMES:**

<b>Agency or programme</b>	Moored and drifting buoys in the <b>Northeast Pacific Ocean</b> Pacific and Yukon Region of Environment Canada	
Number and type of buoys	planned for deployment in the next 12 months	<ul style="list-style-type: none"> <li>• 18 moored buoys maintained</li> <li>• 1 waverider buoy redeployed</li> <li>• 20 drifting buoys, including mix of MSC funded buoys and GDP barometer upgrade buoys.</li> </ul>
Purpose of programme (check/uncheck boxes using [ ] or [x] as appropriate)	(a) operational	[x]
	(b) met / ocean research	[x]
	(c) developmental	[x]
Main deployment areas	Coastal waters of British Columbia, as well as open ocean deployments (North Pacific Ocean) of moored buoys (NOMADS) and drifting buoys. Drifting buoy deployments will be coordinated with GDP/AOML.	

<b>Agency or programme</b>	Moored buoys on the <b>Great Lakes and other interior lakes</b> Prairie and Northern Region and Ontario Region of Environment Canada	
Number and type of buoys	planned for deployment in the next 12 months	<ul style="list-style-type: none"> <li>• 22 (seasonal) moored buoys</li> </ul>
Purpose of programme (check/uncheck boxes using [ ] or [x] as appropriate)	(a) operational	[x]
	(b) met / ocean research	[x]
	(c) developmental	[ ]
Main deployment areas	Canadian waters of the Great Lakes, and large interior lakes in central Canada. Note that all deployments are seasonal. Hope to deploy Churchill buoy in James Bay pending availability of suitable logistical support.	

<b>Agency or programme</b>	Moored buoys in the <b>Northwest Atlantic Ocean and Gulf of St. Lawrence</b> Atlantic Region and Quebec Region of Environment Canada	
Number and type of buoys	planned for deployment in the next 12 months	<ul style="list-style-type: none"> <li>• 9 moored buoys</li> <li>• 3 seasonal moored buoys</li> <li>• 1 waverider buoy</li> <li>• 6 SVP-b drifting buoys</li> </ul>
Purpose of programme (check/uncheck boxes using [ ] or [x] as appropriate)	(a) operational	[x]
	(b) met / ocean research	[x]
	(c) developmental	[x]
Main deployment areas	Northwest Atlantic Ocean and Gulf of St. Lawrence. Note EC also provides logistical support for a number of E-SURFMAR drifting buoy deployments each year via the port of Halifax.	

<b>Agency or programme</b>	Ice buoys deployed in the <b>Arctic Basin and Eastern Arctic</b> - in collaboration with International Arctic Buoy Program (IABP) and also to meet operational requirements of the Canadian Ice Service and new METAREA obligations.	
Number and type of buoys	planned for deployment in the next 12 months	16 <ul style="list-style-type: none"> <li>Will include ICEX-Air, SVP-B, CALIB, and AXIB, and IMB</li> </ul>
Purpose of programme (check/uncheck boxes using [ ] or [x] as appropriate)	(a) operational	[x]
	(b) met / ocean research	[x]
	(c) developmental	[x]
Main deployment areas	Northwest Atlantic Ocean and Gulf of St. Lawrence, Beaufort Sea, Canadian Archipelago, Eastern Arctic and Labrador Sea. Note that the METAREA project will facilitate a significant increase in number of deployments in the Arctic, and the MSC will benefit from air deployment support from Royal Canadian Air Force for planned deployment of up to 10 ICEX Air buoys in September 2012. The MSC's Canadian Ice Service will also deploy the first of 2 Ice Mass Balance Buoys (IMB) this summer in the Beaufort Sea.	

### **3. TECHNICAL DEVELOPMENTS:**

(a) Buoy design	<ul style="list-style-type: none"> <li><b>Integration of Iridium SBD modem Moored Buoy Payload:</b></li> </ul> <p>Over the past year, EC the EC has worked with AXYS Technologies to integrate an Iridium short burst data (SBD) modem into the existing "payload". A prototype has been designed and built, and we expect to continue testing both on the bench and in the field (with deployment in water as early as fall 2012). The prototype uses a WM500 system for AXYS to control the communication module on the buoy (both the SUTRON SatLink2 used for GOES transmission, as well as the Iridium 9602 SBD modem). The advantage of using the WM500, was that all new software development could be done externally to the operational system onboard the buoy. The Iridium SBD modem now allows for bidirectional communication with the moored buoy, allowing MSC Technicians and Engineers to interface with the system, to send commands for the following type of actions;</p> <ul style="list-style-type: none"> <li>Power resent</li> <li>Reset of SUTRON GOES transmitter</li> <li>Configuration change</li> <li>Sensor supression</li> </ul>
-----------------	---

	<ul style="list-style-type: none"> <li>• <b>Evaluation of AXIB Buoy:</b>  <p>In summer of 2011, EC successfully deployed our first Air Deployable Expendable Ice Buoy (AXIB) from LBI Corp. AXIB buoy in the southern Beaufort Sea. The buoy was deployed in open water October, and survived freeze-up into the first year ice pack later in the fall. The buoy continues to operate, with only a failure of the temperature sensor. An additional AXIB will be ship deployed in the summer of 2012 in the Beaufort Sea, and we are presently planning on deployment for up to 5 AXIB buoys via aircraft support from the Royal Canadian Air Force in the summer of 2013.</p> </li> <li>• <b>Integration of SUTRON SatLink2 GOES transmitters on moored buoys:</b>  <p>EC continues efforts to install new SUTRON SatLink2 GOES transmitters into the operational moored buoy network. The SatLink2 with a 40W linear signal amplifier was selected to allow EC buoys to transmit at higher baud rate, to meet NESDIS requirements. Over 30 sites have now been upgraded with the SUTRON transmitters, and expect to finish the upgrade of the remaining 20 sites by the end of 2012.</p> </li> </ul>
(b) Instrumentation	<ul style="list-style-type: none"> <li>• <b>Transition to sonic anemometers for moored buoy network:</b>  <p>Continue evaluation of ultrasonic anemometers (Vaisala ws425 and equivalent) on MSC 3 m and 6 m buoys, a number of buoys have ultrasonic as secondary wind. We are awaiting results from our Engineering Test/Evaluation group as part of MSC procurement process for new wind sensors, which will inform the type (make/model) of sensors which will be used in future, with the expectation that EC will migrate to using sonic anemometer in both wind one and wind 2 positions throughout the moored buoy network.</p> </li> </ul>
(c) Others	<p><b>Development of specification for next generation buoy system</b></p> <p>EC is actively developing a requirements and specification for future moored buoy and potentially ship-board automatic weather stations. EC's moored buoy and AVOS (automated VOS) both utilize the WatchMan100 system provided by AXYS Technologies. While this system has proven to be very reliable, there is a requirement to upgrade the buoy network with updated systems that can be supported into the future. We are also looking for a system that will more easily support functionality such bi-directional communications, as well as varied modes of operation (i.e. activation of "storm" mode with</p>

more frequent sampling and data transmission). EC will be finalizing our requirements in early 2013.

We have recently issued a Request for Information (RFI) to industry to solicit their feedback on our desired system functionality. Information obtained from the RFI will help to inform the more formal RFP process. An evaluation process will follow that will select a system that will meet our technical requirements and also be cost effective from both an initial purchase, as well as equipment life cycle.

#### **Routing of Third Party Drifting Buoys to GTS:**

As highlighted at the previous session of DBCP, Environment Canada has entered into a data sharing agreement with Jou Beh Technologies Inc. and Scotia Weather Services to facilitate the routing of buoy data to the GTS. Jou Beh is an Iridium value added reseller (VAR), and has identified a requirement from their clients working in the met/ocean field for end-to-end data management of their buoy data, including broadcast of data to the GTS. With the advent of Iridium buoys offering more timely data, and lower communication costs than the ARGOS system, a need was identified to ensure there was a cost-effective means of relaying Iridium equipped buoy data to the GTS.

Scotia Weather Services provide the required 24/7/365 operations to process data received from the Iridium buoys and generate the required FM18 messages for distribution to the GTS. Scotia Weather has implemented a quality control system to validate each element of the buoy observation prior to transmission of the data. Environment Canada has provided a means to receive the FM18 messages at the Canadian Meteorological Centre in Montreal, and now routing the messages from non-MSB buoys to the GTS under the header: **SSVX02 CWAO**. Earlier this year, Scotia Weather has developed and tested the functionality to generate and disseminate buoy messages in BUFR format.

To date, there have been over 40 buoys routed through this new system. Buoy operators include a number of University researchers, as well as two National Met Services. The majority of the buoy data routed to the GTS have been deployments in the Canadian Arctic, which would not have been broadly available without this new system to route Iridium buoy data to the GTS.

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

Ref	Title	Type
1	Monthly moored and drifting buoy status reports at <a href="http://thetis.pyr.ec.gc.ca/a-buoyestat.phtml">http://thetis.pyr.ec.gc.ca/a-buoyestat.phtml</a>	2, 3, 6
2	Buoy data available at <a href="http://www.weatheroffice.ec.gc.ca/marine/index_e.html">http://www.weatheroffice.ec.gc.ca/marine/index_e.html</a> (real-time) <a href="http://www.meds-sdmm.dfo-mpo.gc.ca/isdm-gdsi/waves-vagues/index-eng.htm">http://www.meds-sdmm.dfo-mpo.gc.ca/isdm-gdsi/waves-vagues/index-eng.htm</a> (DFO - ISDM archive of wave and atmospheric measurements from EC moored buoys)	8
3	Detailed network performance reports are available by contacting EC-MSM Marine Networks - Chris Marshall National Manager of Marine Network - <a href="mailto:chris.marshall@ec.gc.ca">chris.marshall@ec.gc.ca</a> 1 (416) 739-4468	8
4	<i>Buoy wind inhomogeneities related to averaging method and anemometer type: application to long time series</i> --- B.R. Thomas and V.R. Swail - Environment Canada Science and Technology Branch, Climate Research Division International Journal of Climatology 31: 1040-1055 (2011)	3, 4, 5
5	Initial Findings of MINIMET (Surface Velocity Program Buoy with a Sonic Anemometer) CMOS Congress 2012 --- C. Gallage  <a href="https://www1.cmos.ca/abstracts/session_detailsByYear.asp?session_id=5071&amp;nYear=127#">https://www1.cmos.ca/abstracts/session_detailsByYear.asp?session_id=5071&amp;nYear=127#</a>	3

**5. SPECIAL COMMENTS (if any):**

(a) Quality of buoy data	<ul style="list-style-type: none"> <li>For 2<sup>nd</sup> half of 2011 (July to December) Data availability from moored buoys was <b>89%</b> of expected observations received and delivered to clients.</li> <li>For 1<sup>st</sup> half of 2012 (January to June) Data availability from moored buoys was <b>84%</b> of expected observations received and delivered to clients.</li> </ul>
(b) Communications	<ul style="list-style-type: none"> <li>GOES is primary communication for moored buoys</li> <li>ARGOS used as back-up for moored buoy, and primary for SVP-B and Ice buoys</li> <li>Iridium is now utilized for new SVP-B deployments, as well as moored buoy position beacons.</li> <li>Planning to deploy Iridium onto moored buoys as back-up system to offer redundant communication, and bi-directional capabilities.</li> </ul>
(c) Buoy lifetimes	<ul style="list-style-type: none"> <li>2-4 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.</li> </ul>

3: Types of publications: (1) Implementation, (2) Operations, (3) Instrumentation, (4) Quality Management, (5) Data Management, (6) Data collection and/or location, (7) Data use, (8) Other



	<ul style="list-style-type: none"><li>• Drifting buoys 12-24 months --- Average over past 2 years (all buoy types) is 393 days, with ~10% failures on deployment, or within 45 days.</li><li>• ICEX-Air buoys up to 36 months</li></ul>
--	---

Note: It is recommended that this form is filled in electronically and returned also electronically to the Secretariat. A template of the form can be downloaded from the following ftp site:

<ftp://ftp.wmo.int/Documents/PublicWeb/amp/mmop/documents/dbcp/templates/Format-DBCP-National-Reports.doc>

---

## APPENDIX G

### NATIONAL REPORTS ON CURRENT AND PLANNED BUOY PROGRAMMES

<b>Country</b>	<b>INDIA</b>
<b>Year</b>	<b>2011-2012</b>

#### **1. CURRENT PROGRAMME:**

<b>Agency or programme</b>		
Number and type of buoys	(a) deployed during the year	16
	(b) operational as of 31 August	12
	(c) reporting on GTS as of 31 August	12
Purpose of programme (check/uncheck boxes using [ ] or [x] as appropriate)	(a) operational	[x]
	(b) met / ocean research	[x]
	(c) developmental	[x]
Main deployment areas	Bay of Bengal and Arabian Sea	
Vandalism incidents	(a) Number of incidents: 6 Enclosed If vandalism incidents have occurred during the year, please provide the details using the form in the annex.	

#### **2. PLANNED PROGRAMMES:**

<b>Agency or programme</b>		
Number and type of buoys	planned for deployment in the next 12 months	12 Buoy network
Purpose of programme (check/uncheck boxes using [ ] or [x] as appropriate)	(a) operational	[x]
	(b) met / ocean research	[x]
	(c) developmental	[x]
Main deployment areas	Bay of Bengal and Arabian Sea	

#### **3. TECHNICAL DEVELOPMENTS:**

(a) Buoy design	<ul style="list-style-type: none"> <li>• Discuss Buoy with conical hood</li> <li>• Hidden antenna and surveillance camera were developed</li> <li>• FRP Buoy system with Cylindrical hull having larger volume for payload is being developed</li> </ul>
(b) Instrumentation	<ul style="list-style-type: none"> <li>• Indigenous Payload [IDAS]</li> <li>• Lithium Battery/ Solar power</li> <li>• Sub Surface Sensors [ Conductivity &amp; Temperature from 5m to 500m]</li> </ul>
(c) Others	<ul style="list-style-type: none"> <li>• INMARSAT Communication</li> <li>• INSAT Communication (Indian satellite)</li> </ul>

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

<b>Ref</b>	<b>Title</b>	<b>Type<sup>4</sup></b>
1	Best of Practice Method Manual for moored buoys was prepared and is being followed using the inputs from PMEL NOAA and vetted by NOAA NDBC to obtain quality data from moored buoys.	
2	Regional Workshop on “Establishing a Cooperative Mechanism for Protection of Met-ocean Data and Tsunami Buoys in the Northern Indian Ocean Region” was organized by the National Institute of Ocean Technology (NIOT) and the Bay of Bengal Programme – Inter Governmental Organization (BOBP-IGO) at NIOT Campus, Chennai from 6-7 May 2011.	
3	Arulmuthiah M, R. Sundar, A. Tamil Mugilan and R. Venketesan. Analysis on Under Water Seismic Event on June 12, 2010 recorded by Indigenous Tsunami Early Warning Buoy Data Processing System	Instrumentation,
4	Simi Mathew, G.Latha and R. Venkatesan. Barrier layer formation in the Bay of Bengal as observed by OMNI buoys during northeast monsoon OSCICON 2011 held at NIOT, Chennai.	Data use
5	Vimala J and G. Latha Wave Hindcasting using Artificial Neural Network with varying input Parameter, OSICON 2011 held at NIOT, Chennai.	Data use
6	Ramesh, K, Arulmuthiah M and P. Muruges. Analysis of Antenna placement on Data Buoy Systems for INMARSAT Satellite Communication, OSICON 2011 held at NIOT, Chennai	Operations

**5. SPECIAL COMMENTS (if any):**

(a) Quality of buoy data	<ul style="list-style-type: none"> <li>• The SST range from 26.8° C in 28 August 2011 during monsoon and 30.6° C in 24 April 2011 and maximum wind gust experienced was 20.8 m/sec in June 2011. The SST range recorded is considered suitable for survival of coral reef ecosystem.</li> <li>• The Met-ocean buoys which were established before the onset of North-East Monsoon THANE Cyclone which gave a new insight into this phenomenon during 2011</li> </ul>
(b) Communications	<ul style="list-style-type: none"> <li>• INMARSAT Communication</li> <li>• INSAT Communication (Indian Satellite)</li> <li>•</li> </ul>
(c) Buoy lifetimes	<ul style="list-style-type: none"> <li>• 8-12 Months</li> </ul>
(d) Other	<ul style="list-style-type: none"> <li>•</li> <li>•</li> <li>•</li> </ul>

4: Types of publications: (1) Implementation, (2) Operations, (3) Instrumentation, (4) Quality Management, (5) Data Management, (6) Data collection and/or location, (7) Data use, (8) Other

**ANNEX - FORM FOR REPORTING INCIDENTS OF VANDALISM ON DATA BUOYS**

<b>Country</b>		INDIA						
<b>Contact person e-mail</b>		dr.r.venkatesan@gmail.com						
<b>Year</b>	<b>Buoy Location</b>		<b>Type of Buoy (e.g. Tsunami / Met -Ocean Buoy/Drifter/ARGO floats/ Other)</b>	<b>Type of damage to buoy</b>	<b>Buoy id/WMO id</b>	<b>Number of days of transmission lost</b>	<b>Cost of replacement</b>	<b>Remarks (e.g. whether photos have been taken)</b>
	<b>Latitude</b>	<b>Longitude</b>						
2011	06.28 N	86 E	Met-Ocean Buoy	DISCUS	BD07/23499	27 days		photo enclosed
2011	16.5 N	88 E	Met-Ocean Buoy	DISCUS	BD10/23093	2 days		photo enclosed
2011	11 N	86.5E	Met-Ocean Buoy	DISCUS	BD13/23459	68 days		photo enclosed
2011	08.16N	85.5E	Met-Ocean Buoy	DISCUS	BD14/23460	74 days		photo enclosed
2011	8.5 N	73 E	Met-Ocean Buoy	DISCUS	AD04/23494	72 days		photo enclosed
2011	17.37 N	70.70 E	Met-Ocean Buoy	DISCUS	SW02/23496	120 days		photo enclosed
<b>Efforts taken against vandalism</b>			Awareness to Indian fishermen, by distribution of pamphlets, Buoy identification through WMO Identification code, Buoys are fitted with beacon lights as per international standard IALA code, Radar reflector as per standard, also special technological changes like slippery smooth, Protective hood to avoid tie-up by boats, Difficult to remove fixtures / fasteners. Also these buoy locations are notified through Mariners notice sent to Naval Hydrographic Organization and Indian Coast Guard					
<b>Awareness meeting Organised</b>			<ul style="list-style-type: none"> <li>The main objective of the Regional Workshop was to promote awareness amongst concerned stakeholders in the Bay of Bengal rim countries on the importance of data buoys and tsunami buoys and to evolve common strategies to tackle the issue of vandalism. Dr. Sarah Grimes from the Perth Office of the UNESCO-IOC inaugurated the Workshop</li> <li><b>Annex- Awareness on vandalism of buoys</b></li> </ul>					
<b>Suggestions (if any)</b>								
<b>Photos on Vandalism</b>			(please include pictures if available; and email electronic versions to <a href="mailto:support@jcommops.org">support@jcommops.org</a> )					

**INCIDENTS OF VANDALISM ON MOORED BUOYS**



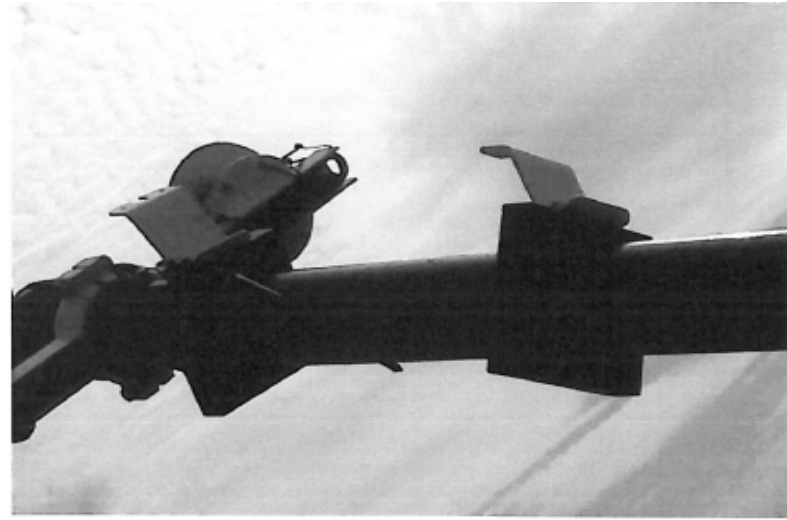
**Damage in ICC Cable**



**Entangled Fishnet on ADCP Frame**



EPPLY Sensor is missing



Vandalism BD13: Rainsensor missing. Bracket displaced, cable cut



**Buoy Upper Mast Sensors were Vandalized**





**AD04 Buoy sensors and Antenna Vandalized**



**SW02 Buoy sensors and Antenna Vandalized**



**BD14 Buoy Vandalized Hull floated at sea**



**Annex- Awareness on vandalism of buoys**

The efforts to conduct awareness among fishers continued by organizing an awareness programme through a Deep sea Fishermen meet on 'Call from the Deep sea 2012' from 16th to 20th July in Southern part of India and subsequently at Chennai from 06th to 08th August 2012. The events and programmes included comprise of seminars, deliberations, discussions, workshops etc. Topics covered included various deep sea fishing issues and challenges. This summit was attended by artisanal deep sea fishers with Fisheries Experts, Fisheries Scientists, Marine and Coastal Environmentalists, Academic Scientists, Researchers, Scholars,

<b>Da y</b>	<b>Morning</b>	<b>Evening</b>	<b>Venue</b>
<b>At Thoothoor</b>			
<b>16.07.2012</b>	<b>Inaugural Ceremony</b>	In house programs Display of posters banner son buoys Address by local elected Member of Legislative Assembly on importance of buoys and climate and weather forecast etc.,	Office of AD SGAF
<b>17.07.2012</b>	Regional Workshop on Deep Sea Fishing-Harvesting of Oceanic Tuna and Allied Resources	In house programs Display of posters and banners of Buoy systems at sea	Chinnathurai
<b>18.07.2012</b>	Awareness class on "Taking or removing research and other equipments, machines etc from sea by fishermen"	In house programs Display of buoys posters banners and pamphlets	Thoothoor
<b>19.07.2012</b>	Awareness class on Safety at sea	In house programs Lecture on ocean technology, ocean observations systems, moored buoys, issue of vandalism of buoys Release of book on code of conduct on fishing	Eraviputhenthurai
<b>20.07.2012</b>	Discussion on Women's issues (deep sea fishermen's family)	Sports and games finals, Special event for Local Police, Marine Police, Coast Guard and Fishermen. Concluding Ceremony	Office of AD SGAF

Professionals in Information and Communication Technology.

This is a follow up to the Regional Workshop on "Establishing a Cooperative Mechanism for Protection of Met-ocean Data and Tsunami Buoys in the Northern Indian Ocean Region" organized by the National Institute of Ocean Technology (NIOT) and the Bay of Bengal Programme – Inter Governmental Organization (BOBP-IGO) in May 2011. The objectives of Ocean Observation Systems (OOS), National Institute of Ocean Technology, Chennai, were to



sensitize the fishermen about the awareness on Met Ocean buoy and Tsunami buoy against vandalism and the safety measures in dealing with the buoy systems at sea. Further to promote awareness about welfare of fishermen and technology in fish catching, developing the improvements of fish catching & preservations, Need for Protection of Buoys at sea. The elected member Honorable Dr. Vijayatharani M.L.A, Vilavancode, Tamil Nadu, delivered a Speech about the fisherman association, uses of Met Ocean buoy and Tsunami buoy awareness on protection of buoys at sea. Dr R Venkatesan, Group Head, OOS briefed about the organization and the importance of the buoy systems deployed in the deep sea through videos and presentations Dr. Y.S. Yadava, Director, BOBP-IGO delivered a speech on the fishermen welfare and technology in fish catching. In response to this call, Association of Deep Sea Going Artisanal Fishermen agreed to propagate the awareness among the fishermen in other areas and protect the buoys against vandalism.

During this meet a publication by FAO on Code of Conduct of Responsible Fishing (CCRF) was released in vernacular language (Tamil). A successful awareness campaign was conducted with stall posters banners video displays were presented in different locations along the villages this was best opportunity to show cause importance of moored buoys and need to protect them In line with this another workshop from 6 to 8 August was organized in Chennai India. These participants mainly fishermen were shown NIOT facilities such as actual buoy system, sensors and data reception

**Sri Lanka:** NIOT had sent various awareness materials for workshop organised in Sri Lanka. Many awareness programmes were organized by Radio broadcasting programs through the " SAYURA radio" regarding the importance and protection of data buoys and also awareness programs for fisheries society along the coastal belt in Sri Lanka. Posters and banners were distributed to all Srilankan District Offices and Fishery Harbour Managers. A workshop for our Assistant Directors was organised throughout island and educated them regarding this matter. Another awareness programs for Sri Lanka Coast Guard Officers and posters and banners were handed over to them. During October / November 2011 two training programmes for Srilanka, Coast Guard was organized in southern part of Sri Lanka. National Aquatic Resources Research and Development Agency (NARA), Dept, of Fisheries & Aquatic Resources, National disaster management authority supported this campaign



**Speech by Honorable Dr. Vijayatharani M.L.A**



**Speech by Dr. Yadava, Director, BOBP**

---

## APPENDIX H

### NATIONAL REPORTS ON CURRENT AND PLANNED BUOY PROGRAMMES

<b>Country</b>	<b>AUSTRALIA</b>
<b>Year</b>	<b>2012</b>

**CURRENT PROGRAMMES** *(for period 1 July 2011 – 30 June 2012)*

- A Agency or programme:** Australian Bureau of Meteorology (ABOM)
- Number and type of buoys:
- |                                  |    |
|----------------------------------|----|
| (a) Deployed during the year:    | 20 |
| 0 SVP                            |    |
| 20 SVP-B                         |    |
| (b) Operational at 31 July:      | 7  |
| (c) Reporting on GTS at 31 July: | 7  |
- 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:       | 2 |
| 2 SVP-B (Bureau sponsored upgrades) |   |
| (b) Operational at 31 July:         | 2 |
| (c) Reporting on GTS at 31 July:    | 2 |
- 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:    | 12 |
| 12 SVP-B                         |    |
| (b) Operational at 31 July:      | 6  |
| (c) Reporting on GTS at 31 July: | 6  |
- 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

<b>D</b>	<b>Agency or programme:</b>	Australian Antarctic Division (AAD)	
	Number and type of buoys:	(a) Deployed during the year:	2
		2 Stress-gauge buoys	
		(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 2012 – 30 June 2013)***

<b>A</b>	<b>Agency or programme:</b>	Bureau of Meteorology	
	Number and type of buoys planned for deployment in next twelve months:		20
		20 SVP-B	
	Purpose of programme:	To support the Bureau's operational forecasting and warning service.	
	Main deployment area:	Southern and Indian Oceans.	
<b>B</b>	<b>Agency or programme:</b>	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	
<b>C</b>	<b>Agency or programme:</b>	Global Drifter Program	
	Number and type of buoys planned for deployment in next twelve months:		20
		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: 14-39

6 Stress-gauge buoy

10-35 Various sea-ice buoys

Purpose of programme: To assist AAD's research program, especially to explore the internal ice physics and sea-ice motion and deformation. The bulk deployment planned for Sep/Oct 2012 will be part of the SIPEX 2012 experiment around 120°E.

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

### **TECHNICAL DEVELOPMENTS**

- (a) Buoy design: Drifting sea-ice buoys using in-house design and commercial (Clearwater, MetOcean and SRSL)
- (b) Instrumentation: Drifting sea-ice buoys all include GPS. Some also include Tair, Tice, Pair, Wind, Snow height and internal ice stress.
- (c) Others: Sea-ice buoys use Argos or Iridium

### **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](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 I

### NATIONAL REPORTS ON CURRENT AND PLANNED BUOY PROGRAMMES

Country	REPUBLIC OF KOREA
Year	2012

#### CURRENT PROGRAMMES:

- A. Agency or programme:** Korea Meteorological Administration
- Number and type of buoys: (a) deployed during (year): 9(Moored Buoys)  
(b) operational as of 31 August: 27(Moored Buoys)  
(c) reporting on GTS as of 31 August: 9
- Purpose of programme: (a) operational: 0  
(b) met / ocean research:  
(c) developmental:
- Main deployment areas: Regional sea around the Korea peninsula
- B. Agency or programme:** National Institute of Meteorological Research
- Number and type of buoys: (a) deployed during (year): 15 Argo floats  
(b) operational as of 31 August: 63 Argo floats  
(c) reporting on GTS as of 31 August: 63 Argo floats
- Purpose of programme: (a) operational: 0  
(b) met / ocean research: 0  
(c) developmental:
- Main deployment areas: The East Sea and Northwest Pacific Ocean
- C. Agency or programme:** Korea Hydrographic and Oceanographic Administration/Ministry of Land, Transport and Maritime Affairs
- Number and type of buoys: (a) deployed during (year): 6(SVP) Drifters,  
11 Moored Buoys  
(b) operational as of 31 August: 9  
(c) reporting on GTS as of 31 August: 9

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

Main deployment areas: East Sea(drifters), Yellow Sea(drifters)  
Regional sea around the Korea Peninsula(moored)

**D. Agency or programme:** Korea Institute of Ocean Science & Technology

Number and type of buoys: (a) deployed during (year): 0  
(b) operational as of 31 August: 44  
(c) reporting on GTS as of 31 August: 44

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

Main deployment areas: The East Sea and the Antarctic Sea

**PLANNED PROGRAMMES:**

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

Number and type of buoys planned for deployment in next 12 months:9(Moored )  
10(Drifters)

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

Main deployment areas: Regional sea around the Korea peninsula

**B. Agency or programme:** National Institute of Meteorological Research

Number and type of buoys planned for deployment in next 12 months: 16 Argo floats

Purpose of programme: (a) operational: 0  
(b) met / ocean research: 0

(c) developmental:

Main deployment areas: The East Sea and Northwest Pacific Ocean

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

Number and type of buoys planned for deployment in next 12 months: 12(SVP) Drifters, 6 Mooring Buoys  
(including 2 Tsunami detection Buoy)

Purpose of programme: (a) operational: o

(b) met / ocean research:

(c) developmental:

Main deployment areas: The East Sea (drifters), Yellow Sea (drifters)  
Regional sea around the Korea Peninsula (moored)

**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:

---



## APPENDIX J

### NATIONAL REPORTS ON CURRENT AND PLANNED BUOY PROGRAMMES

<b>Country</b>	<b>JAPAN</b>
<b>Year</b>	<b>2012</b>

#### 1. CURRENT PROGRAMME:

Agency or programme	Japan Meteorological Agency (JMA)	
Number and type of buoys	(a) deployed during the year	(Type 1) 16 drifting buoys with air pressure, SST, wave height and wave period sensors (Type 2) 28 profiling floats
	(b) operational as of 31 August	(Type 1) 5 (Type 2) 48
	(c) reporting on GTS as of 31 August	(Type 1) 5 (Type 2) 48
Purpose of programme (check/uncheck boxes using <input type="checkbox"/> or <input checked="" type="checkbox"/> as appropriate)	(a) operational	(Type 1) weather and sea condition monitoring (Type 2) ocean state and climate monitoring
	(b) met / ocean research	<input type="checkbox"/>
	(c) developmental	<input type="checkbox"/>
Main deployment areas	seas around Japan	

Agency or programme	Japan Agency for Marine-Earth Science and Technology	
Number and type of buoys	(a) deployed during the year	(Type 1) 2 surface velocity profiler (SVP) Argo Team: 3 oceanographic drifters (Type 2) 22 meteorological and subsurface oceanographic surface moorings (15 TRITON buoys, 4 m-TRITON buoys, 2 K-TRITON buoys and 1 Atlantic Ocean buoy) (Type 3) 50 profiling floats
	(b) operational as of 31 August	(Type 1) 2 (SVP) Argo Team: 1 oceanographic drifter (Type 2) 19 (Type 3) 236
	(c) reporting on GTS as of 31 August	(Type 1) 2 Argo Team: 0 (Type 2) 16 (15 TRITON buoys and 1 K-TRITON buoy) (Type 2) 16 (Type 3) 217
Purpose of programme (check/uncheck boxes using <input type="checkbox"/> or <input checked="" type="checkbox"/> as appropriate)	(a) operational	<input type="checkbox"/>
	(b) met / ocean research	(Type 1) meteorological and oceanographic research (SVP)

		Argo Team: oceanographic research (Type 2) ENSO, IOD, Kuroshio and meteorological and oceanographic research monitoring (Type 3) oceanographic research (Argo project)
	(c) developmental	<input type="checkbox"/>
Main deployment areas	(Type 1) the Arctic Ocean (SVP) Argo Team: the Kuroshio-Oyashio interfrontal zone (Type 2) the western tropical Pacific and the eastern Indian Ocean for TRITON, m-TRITON, and the Kuroshio Extension region for K-TRITON and Atlantic Ocean (Type 3) the North Pacific	

<b>Agency or programme</b>	<b>Seikai National Fisheries Research Institute, Fisheries Research Agency</b>	
Number and type of buoys	(a) deployed during the year	3 surface drifters
	(b) operational as of 31 August	2
	(c) reporting on GTS as of 31 August	0
Purpose of programme (check/uncheck boxes using <input type="checkbox"/> or <input checked="" type="checkbox"/> as appropriate)	(a) operational	<input type="checkbox"/>
	(b) met / ocean research	oceanographic research
	(c) developmental	<input type="checkbox"/>
Main deployment areas	the East China Sea, Tsushima Strait and the Japan Sea	

<b>Agency or programme</b>	<b>Tohoku University</b>	
Number and type of buoys	(a) deployed during the year	0 profiling float
	(b) operational as of 31 August	1 profiling float
	(c) reporting on GTS as of 31 August	1 profiling float
Purpose of programme (check/uncheck boxes using <input type="checkbox"/> or <input checked="" type="checkbox"/> as appropriate)	(a) operational	<input type="checkbox"/>
	(b) met / ocean research	oceanographic research
	(c) developmental	<input type="checkbox"/>
Main deployment areas	the North Pacific Ocean	

<b>Agency or programme</b>	<b>Okinawa Institute of Science and Technology</b>	
Number and type of buoys	(a) deployed during the year	1 Argo equivalent float 22 surface drifters
	(b) operational as of 31 August	12
	(c) reporting on GTS as of 31 August	N/A
Purpose of programme (check/uncheck boxes using <input type="checkbox"/> or <input checked="" type="checkbox"/> as appropriate)	(a) operational	<input type="checkbox"/>
	(b) met / ocean research	current circulation research in Okinawa Trough
	(c) developmental	<input type="checkbox"/>
Main deployment areas	Okinawa Trough	

**2. PLANNED PROGRAMMES:**

Agency or programme	Japan Meteorological Agency	
Number and type of buoys	planned for deployment in the next 12 months	(Type 1) 16 drifting buoys with air pressure, SST, wave height and wave period sensors (Type 2) 27 profiling floats (Type 3) 3 Tsunami buoys
Purpose of programme (check/uncheck boxes using <input type="checkbox"/> or <input checked="" type="checkbox"/> as appropriate)	(a) operational	(Type 1) weather and sea condition monitoring (Type 2) ocean state and climate monitoring (Type 3) Tsunami monitoring
	(b) met / ocean research	<input type="checkbox"/>
	(c) developmental	<input type="checkbox"/>
Main deployment areas	(Type 1) seas around Japan (Type 2) seas around Japan (Type 3) the Pacific Ocean off the coast of Tohoku, Japan	

Agency or programme	Japan Agency for Marine-Earth Science and Technology	
Number and type of buoys	planned for deployment in the next 12 months	(Type 1) 2 oceanographic drifters (Polar Ocean Profiling System: 1 POPS), 10 CO2 drifters Argo Team: 3 oceanographic drifters (Type 2) 20 meteorological and subsurface oceanographic surface moorings (15 TRITON buoys, 3 m-TRITON buoys and 1 K-TRITON buoys) (Type 3) 53 profiling floats
Purpose of programme (check/uncheck boxes using <input type="checkbox"/> or <input checked="" type="checkbox"/> as appropriate)	(a) operational	<input type="checkbox"/>
	(b) met / ocean research	(Type 1) meteorological and oceanographic research (Type 2) ENSO, IOD and meteorological and oceanographic research monitoring (Type 3) oceanographic research (Argo project)
	(c) developmental	<input type="checkbox"/>
Main deployment areas	(Type 1) the Arctic Ocean (POPS), the Antarctic Ocean (CO2 drifter) Argo Team: the Kuroshio-Oyashio interfrontal zone (Type 2) the western tropical Pacific (15 TRITON buoys), the eastern Indian Ocean (3 m-TRITON buoys) and the Kuroshio Extension region (2 K-TRITON buoys) (Type 3) the Pacific and the Indian Oceans	

Agency or programme	Seikai National Fisheries Research Institute, Fisheries Research Agency
---------------------	---

Number and type of buoys	planned for deployment in the next 12 months	5 surface drifters
Purpose of programme (check/uncheck boxes using [ ] or [x] as appropriate)	(a) operational	[ ]
	(b) met / ocean research	oceanographic research
	(c) developmental	[ ]
Main deployment areas	the East China Sea, Tsushima Strait and the Japan Sea	

<b>Agency or programme</b>	<b>Tohoku University</b>	
Number and type of buoys	planned for deployment in the next 12 months	1 profiling float
Purpose of programme (check/uncheck boxes using [ ] or [x] as appropriate)	(a) operational	[ ]
	(b) met / ocean research	oceanographic research
	(c) developmental	[ ]
Main deployment areas	the North Pacific Ocean	

<b>Agency or programme</b>	<b>Okinawa Institute of Science and Technology</b>	
Number and type of buoys	planned for deployment in the next 12 months	3 profiling floats 39 surface drifters
Purpose of programme (check/uncheck boxes using [ ] or [x] as appropriate)	(a) operational	[ ]
	(b) met / ocean research	oceanographic research
	(c) developmental	[ ]
Main deployment areas	Okinawa Trough	

### **3. TECHNICAL DEVELOPMENTS:**

(a) Buoy design	<ul style="list-style-type: none"> <li>•</li> <li>•</li> <li>•</li> </ul>
(b) Instrumentation	<ul style="list-style-type: none"> <li>•</li> <li>•</li> <li>•</li> </ul>
(c) Others	<ul style="list-style-type: none"> <li>•</li> <li>•</li> <li>•</li> </ul>

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

<b>Ref</b>	<b>Title</b>	<b>Type5</b>
1		
2		
3		
4		

(repeat rows in the table above as necessary)

5: Types of publications: (1) Implementation, (2) Operations, (3) Instrumentation, (4) Quality Management, (5) Data Management, (6) Data collection and/or location, (7) Data use, (8) Other

**5. SPECIAL COMMENTS (if any):**

(a) Quality of buoy data	<ul style="list-style-type: none"><li>•</li><li>•</li><li>•</li></ul>
(b) Communications	<ul style="list-style-type: none"><li>•</li><li>•</li><li>•</li></ul>
(c) Buoy lifetimes	<ul style="list-style-type: none"><li>•</li><li>•</li><li>•</li></ul>
(d) Other	<ul style="list-style-type: none"><li>•</li><li>•</li><li>•</li></ul>

Note: It is recommended that this form is filled in electronically and returned also electronically to the Secretariat. A template of the form can be downloaded from the following ftp site:

<ftp://ftp.wmo.int/Documents/PublicWeb/amp/mmop/documents/dbcp/templates/Format-DBCP-National-Reports.doc>

---

## APPENDIX K

### NATIONAL REPORTS ON CURRENT AND PLANNED BUOY PROGRAMMES

<b>Country</b>	<b>CHINA</b>
<b>Year</b>	<b>2011.7-2012.7</b>

#### **1. CURRENT PROGRAMME:**

##### **1) SOA**

<b>Agency or programme</b>	State Oceanic Administration	
Number and type of buoys	(a) deployed during the year	62 buoys, including 3m moored buoys, deep ocean mooring buoys, airdrop polar buoys, and Argo floats
	(b) operational as of 31 August	56
	(c) reporting on GTS as of 31 August	42
Purpose of programme <i>(check/uncheck boxes using [ ] or [x] as appropriate)</i>	(a) operational	[x]
	(b) met / ocean research	[x]
	(c) developmental	[x]
Main deployment areas	China Sea , Indian Ocean, Antarctic Ocean	

##### **2) CMA**

<b>Agency or programme</b>	China Meteorological Administration	
Number and type of buoys	(a) deployed during the year	Two 10m Moored Buoys
	(b) operational as of 31 August	2
	(c) reporting on GTS as of 31 August	1 (in South China Sea)
Purpose of programme <i>(check/uncheck boxes using [ ] or [x] as appropriate)</i>	(a) operational	[ ]
	(b) met / ocean research	[x]
	(c) developmental	[x]
Main deployment areas	China Sea	

#### **2. PLANNED PROGRAMMES:**

##### **1) SOA**

<b>Agency or programme</b>	State Oceanic Administration	
Number and type of buoys	planned for deployment in the next 12 months	9 Buoys, including 3m and 6m mooring buoys, deep ocean mooring buoys, and submerged buoys
Purpose of programme <i>(check/uncheck boxes using [ ] or [x] as appropriate)</i>	(a) operational	[ ]
	(b) met / ocean research	[x]
	(c) developmental	[x]
Main deployment areas	China Seas, Antarctic, and tropical Indian Ocean	

2) CAS

<b>Agency or programme</b>	Chinese Academy of Sciences	
Number and type of buoys	planned for deployment in the next 12 months	One 3m moored buoy and twenty GPS-S buoys
Purpose of programme (check/uncheck boxes using [ ] or [x] as appropriate)	(a) operational	[ ]
	(b) met / ocean research	[x]
	(c) developmental	[x]
Main deployment areas	East China Sea and West Pacific	

**3. TECHNICAL DEVELOPMENTS:**

**(a) Buoy design**

State Oceanic Administration (SOA) developed small airdrop buoy CALIB and sea ice temperature buoy SAMS to monitor the polar sea ice drift with the study of sea ice thermodynamic characteristics. The data transmission is either based on Iridium or Argos satellite. The observations include the location of sea ice, air temperature, ice temperature inside the ice, water temperature below sea ice, etc. Observation time interval is two hours or less. Design life of the buoy is 1-2 years, which makes it capable of providing the characteristics of sea ice changes in a complete seasonal cycle.

South China Sea Branch of SOA independently researched and developed the "Primary and secondary pairs of buoy moored system against strong currents", and had been granted a patent right issued by the National Intellectual Property Office on July 11, 2012.

North China Sea Branch of SOA added directional wave sensor on the mooring buoy to increase wave measurement. All large buoys are installed the dual-sensor control system, and all conventional sensors are equipped with dual-backup mode. Communication control system is upgraded to support a variety of means of communication. Large buoys use Inmarsat-C, CDMA/GPRS, and "Compass" satellite communication systems to complement each other for data transmission. Medium-sized buoys adopt CDMA communication mode. The data receiving rates are both over 99%. Due to the impact of weather condition or communication system malfunction, data transmission might be interrupted sometimes. To ensure data continuity, technicians take copy from the buoy data acquisition card on a regular basis.

Institute of Oceanography, Chinese Academy of Sciences (IOCAS), developed a real-time data transmission communication technology, and data delayed sending module for the interface of marine commercial communication satellites, such as the Globalstar. On this basis, commercial GPS location signal from the satellite terminal is sent back to the land-based receiving station through the above communication system. By carrying out drifting buoys sea trials, and water dynamics research, IOCAS established the errors and the empirical parameters comparable with the buoy and communication systems. During the long-term sea trial observations, buoy data agree with the historical observations, and well reflect the feature of seawater flow.

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

Ref	Title	Type6
-----	-------	-------

6: Types of publications: (1) Implementation, (2) Operations, (3) Instrumentation, (4) Quality Management, (5) Data Management, (6) Data collection and/or location, (7) Data use, (8) Other.

1	Sea ice temperature and mass balance measurements from ice mass –balance buoy in the central Arctic Ocean	Data use
2	The hindcast simulation of 2010 Dalian oil spill incident by using drift buoy trajectories in North Huanghai Sea	Data use
3	Bailong buoy: A new Chinese contribution to RAMA	Instrumentation

Note: It is recommended that this form is filled in electronically and returned also electronically to the Secretariat. A template of the form can be downloaded from the following ftp site:

<ftp://ftp.wmo.int/Documents/PublicWeb/amp/mmop/documents/dbcp/templates/Format-DBCP-National-Reports.doc>

---



## APPENDIX L

### NATIONAL REPORTS ON CURRENT AND PLANNED BUOY PROGRAMMES

Country	USA
Year	2012

#### **CURRENT PROGRAMMES:**

**A. Agency or programme:** National Oceanic and Atmospheric Administration (NOAA)/  
Atlantic Oceanographic and Meteorological Laboratory (AOML) /  
**Global Drifter Program**

Number and type of buoys: (a) deployed during 27/7/11–28/7/12: 1203 drifters  
(b) operational as of 6 August: 1029 drifters  
(c) reporting on GTS as of 6 August: 1029 drifters

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

Main deployment areas: Global.

**B. 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 1 August 2011 – 31 Jul 2012: 43  
(b) operational as of 1 August 2012: 88  
(c) reporting on GTS as of 1 August 2012: 88

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

Main deployment areas: Atlantic and Pacific Oceans and Coastal Zone of the US,  
including the Bering Sea, Gulf of Mexico, and Great Lakes.

**C. Agency or programme:** National Oceanic and Atmospheric Administration (NOAA)/ National Weather Service (NWS)/ National Data Buoy Center (NDBC)

**Tsunami Stations**

Number and type of buoys: (a) deployed during 1 August 2011 – 31 Jul 2012: 11  
(b) operational as of 1 August 2012: 30  
(c) reporting on GTS as of 1 August 12: 30

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

Main deployment areas: Atlantic and Pacific Oceans and Gulf of Mexico

**D. Agency or programme:** National Oceanic and Atmospheric Administration (NOAA)/ National Weather Service (NWS)/ National Data Buoy Center (NDBC)

**Tropical Atmosphere Ocean (TAO) Project**

Number and type of buoys: (a) deployed during 1 August 2011-31 July 2012: 56 surface toroids and 4 subsurface  
(b) operational as of 1 August 2012: 42  
(c) reporting on GTS as of 1 August 2012: 42

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

Main deployment areas: Equatorial Pacific Ocean

**E. Agency or programme:** National Oceanic and Atmospheric Administration (NOAA)/ Pacific Marine Environmental Laboratory (PMEL)

**PIRATA**

Number and type of buoys: (a) deployed during 2012: 11 surface toroids  
(b) operational as of 1 August 2012: 16 surface toroids  
(c) reporting on GTS as of 1 August 2012: 16 surface toroids

Purpose of programme: (a) operational:

(b) met / ocean research: [x]

(c) developmental:

Main deployment areas: Tropical Atlantic Ocean

**F. Agency or programme:** National Oceanic and Atmospheric Administration (NOAA)/  
Pacific Marine Environmental Laboratory (PMEL)/

**RAMA**

Number and type of buoys: (a) deployed during 2012: 21 surface toroids, 6  
subsurface

(b) operational as of 1 August: 18 surface toroids, 10  
subsurface

(c) reporting on GTS as of 1 August: 16

Purpose of programme: (a) operational:

(b) met / ocean research: [x]

(c) developmental:

Main deployment areas: Tropical Indian Ocean

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

Number and type of buoys: (a) deployed during 2012: 65 APEX floats, 27  
SLDMB Davis drifters, 2 Iosphere Iridium drifters

(b) operational as of 31 July 2012: 68 floats, 0  
drifters

(c) reporting on GTS as of 31 July 2012 : 68 floats,  
0 drifters

Purpose of programme: (a) operational: [x]

(b) met / ocean research:

(c) developmental:

Main deployment areas: Floats: primarily northern hemisphere, for drifters: Yellow  
Sea, Indian Ocean, Arabian Gulf, east coast of US (N. Carolina)

**H. Agency or programme:** International Arctic Buoy Programme

Number and type of buoys: (a) Deployed during 2012: 48+

(b) Operational as of 31 August 2012: 41

(c) On GTS as of 31 August 2012: 38

Purpose of programme: (a) operational: [x]

(b) met / ocean research: [x]

(c) developmental: [x]

Main deployment areas: Arctic Ocean

**I. Agency or programme:** International Antarctic Buoy Programme

Number and type of buoys: (a) Deployed during 2012: 8

(b) Operational as of 31 August 2012: 0

(c) On GTS as of 31 August 2012: 0

Purpose of programme: (a) operational: [x]

(b) met / ocean research: [x]

(c) developmental: [x]

Main deployment areas: Antarctic Ocean

**PLANNED PROGRAMMES:**

**A. Agency or programme:** National Oceanic and Atmospheric Administration (NOAA)/  
Atlantic Oceanographic and Meteorological Laboratory (AOML) /  
**Global Drifter Program**

Number and type of buoys planned for deployment in the next 12 months: 1000 drifters,  
800 funded by NOAA's Climate Program Office and  
200 by Consortium Research partners.

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

Main deployment areas: Global.

**B. 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: 40

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

Main deployment areas: Atlantic and Pacific Oceans and Coastal Zone of the US,  
including the Bering Sea, Gulf of Mexico, and Great Lakes.

**C. Agency or programme:** National Oceanic and Atmospheric Administration (NOAA)/  
National Weather Service (NWS)/ National Data Buoy Center (NDBC)  
**Tsunami Stations**

Number and type of buoys planned for deployment in the next 12 months: 20

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

Main deployment areas: Atlantic and Pacific Oceans and Gulf of Mexico

**D. Agency or programme:** National Oceanic and Atmospheric Administration (NOAA)/  
National Weather Service (NWS)/ National Data Buoy Center (NDBC)  
**Tropical Atmosphere Ocean (TAO) Project**

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

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

Main deployment areas: Equatorial Pacific Ocean

**E. Agency or programme:** National Oceanic and Atmospheric Administration (NOAA)/  
Pacific Marine Environmental Laboratory (PMEL)/  
**PIRATA**

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

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

Main deployment areas: Equatorial Atlantic Ocean

**F. Agency or programme:** National Oceanic and Atmospheric Administration (NOAA)/  
Pacific Marine Environmental Laboratory (PMEL)/  
**RAMA**

Number and type of buoys planned for deployment in the next 12 months: 22 surface  
toroids and 10 subsurface

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

Main deployment areas: Tropical Equatorial Indian Ocean

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

Number and type of buoys planned for deployment in the next 12 months: 78 profiling floats and 83 drifting buoys

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

Main deployment areas: Floats: primarily northern hemisphere, for drifters: Yellow Sea, Indian Ocean, Arabian Gulf, east coast of US (N. Carolina)

**H. Agency or Programme:** International Arctic Buoy Programme

Number and type of buoys planned for deployment in the next 12 months: 45+

Purpose of programme: (a) Operational: [x]  
(b) Met / ocean research: [x]  
(c) Developmental: [x]

Main deployment areas: Arctic Ocean

**I. Agency or Programme:** International Antarctic Buoy Programme

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

Purpose of programme: (a) Operational: [x]  
(b) Met / ocean research: [x]  
(c) Developmental: [x]

Main deployment areas: Antarctic Ocean

**TECHNICAL DEVELOPMENTS:**

(a) Buoy design:

Within the drifter fleet the following improvements are being recommended:

Ruggedized tether attachment for strength and water infiltration;  
High quality batteries;  
More accurate SST (0.05°C); and  
Ruggedized drogue design;

SIO completed SVP and SVPB drifter design and started production and new tether material (synthetic rope) is currently under evaluation (20 SIO units).

(b) Instrumentation:

PMEL continues to test “Tropical-Flex” moorings alongside PMEL legacy moorings. T-Flex moorings communicate via Iridium modem and Seabird electronics replace legacy PEML temperature thermistors.

NDBC has deployed 24 TAO Refresh moorings in the TAO array and will continue deploying them at a rate of 11 to 15 per year until the TAO array is completely refreshed

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

Blockley, E. W., M. J. Martin, and P. Hyder, 2012: Validation of FOAM near-surface ocean current forecasts using Lagrangian drifting buoys, *Ocean Sci.*, 8, 551-565, doi:10.5194/os-8-551-2012.

Castro, S. L., G. A. Wick, and W. J. Emery, 2012, Evaluation of the relative performance of sea surface temperature measurements from different types of drifting and moored buoys using satellite-derived reference products, *Journal of Geophysical Research-Oceans*, 117.

Cronin, M.F., R.A. Weller, R.S. Lampitt, and U. Send, 2012: Ocean reference stations. In *Earth Observation*, R.B. Rustamov and S.E. Salahova (eds.), InTech, ISBN: 978-953-307-973-8.

Drushka, K., J. Sprintall, S. T. Gille, and S. Wijffels, 2012: In situ observations of Madden–Julian Oscillation mixed layer dynamics in the Indian and Western Pacific Oceans. *J. Climate*, 25, 2306–2328, doi:10.1175/JCLI-D-11-00203.1.

Foltz, G. R., M. J. McPhaden and R. Lumpkin, 2012: A strong Atlantic Meridional Mode event in 2009: the role of mixed layer dynamics. *J. Climate*, 25, 363–380, doi: 10.1175/JCLI-D-11-00150.1.

Fox-Kemper, B., R. Lumpkin and F. Bryan, 2012: Lateral Transport in the Ocean. Chapter 3.5 of “Ocean Circulation and Climate (Second edition)”, ed. G. Siedler, J. Church, J. Gould and S. Griffies, Academic Press (Elsevier).

Gierach, M. M, T. Lee, D. Turk, and M. J. McPhaden, 2012: Biological Response to the 1997-98 and 2009-10 El Niño events in the Equatorial Pacific Ocean. *Geophys. Res. Lett.*, 39, L10602, doi:10.1029/2012GL051103.

Guo, J. S., X. Y. Chen, J. Sprintall, B. H. Guo, F. L. Qiao, and Y. L. Yuan, 2012: Surface inflow into the South China Sea through the Luzon Strait in winter, *Chinese Journal of Oceanology and Limnology*, 30(1), 163-168.

Haza, A. C., T. M. Ozgokmen, A. Griffa, Z. D. Garraffo, and L. Piterberg, 2012: Parameterization of particle transport at submesoscales in the Gulf Stream region using Lagrangian subgridscale models, *Ocean Modelling*, 42, 31-49.

Hobbs, W. R., and J. K. Willis, 2012: Midlatitude North Atlantic heat transport: A time series based on satellite and drifter data, *Journal of Geophysical Research-Oceans*, 117.

Hormann, V., R. Lumpkin and G. Foltz, 2012: Interannual North Equatorial Countercurrent Variability and its Relation to Tropical Atlantic Climate Modes. *J. Geophys. Res.*, 117, C04035, doi:10.1029/2011JC007697.

Hormann, V., R. Lumpkin and R. C. Perez, 2012: A generalized method for estimating the



structure of the equatorial Atlantic cold tongue: application to drifter observations. *J. Atmos. Oceanic Techn.*, submitted August 2012.

- Hristova, H. G., and W. S. Kessler, 2012: Surface Circulation in the Solomon Sea Derived from Lagrangian Drifter Observations, *Journal of Physical Oceanography*, 42(3), 448-458.
- Karnauskas, K. B., G. C. Johnson, R. Murtugudde, 2012: An Equatorial Ocean Bottleneck in Global Climate Models. *J. Climate*, 25, 343–349.
- Kartadikaria, A. R., Y. Miyazawa, K. Nadaoka, and A. Watanabe, 2012: Existence of eddies at crossroad of the Indonesian seas, *Ocean Dynamics*, 62(1), 31-44.
- Letscher, R. T., D. A. Hansell, C. A. Carlson and R. Lumpkin, 2012: Distribution and fate of dissolved organic nitrogen in the global surface ocean. *Global Biogeochem. Cycles*, submitted July 2012.
- Lumpkin, R., S. Grodsky, M.-H. Rio, L. Centurioni, J. Carton and D. Lee, 2012: Removing spurious low-frequency variability in surface drifter velocities. *J. Atmos. Oceanic Techn.*, submitted July 2012.
- Lumpkin R., G. Goni and K. Dohan, 2012: State of the Ocean in 2011: Surface Currents. In "State of the Climate in 2011", M. Gregg and J. Levy (eds), *Bulletin of the American Meteorological Society* **93** (7), S75-S78.
- Lumpkin, R., N. Maximenko and M. Pazos, 2012: Evaluating where and why drifters die. *J. Atmos. Ocean. Techn.*, **29** (2), 300—308, doi: 10.1175/JTECH-D-11-00100.1.
- Maximenko, N., R. Lumpkin and L. Centurioni, 2012: Ocean Surface Circulation. Chapter 4.2 of "Ocean Circulation and Climate (Second edition)", ed. G. Siedler, J. Church, J. Gould and S. Griffies, Academic Press (Elsevier).
- Maximenko, N., J. Hafner, and P. Niiler, 2012: Pathways of marine debris derived from trajectories of Lagrangian drifters, *Marine Pollution Bulletin*, 65(1-3), 51-62.
- McPhaden, M. J., 2012: A 21st Century Shift in the Relationship between ENSO SST and Warm Water Volume Anomalies. *Geophys. Res. Lett.*, 39, L09706, doi:10.1029/2012GL051826.
- Monzon-Arguello, C., F. DellAmico, P. Moriniere, A. Maro, L. F. Lopez-Jurado, Graeme C. Hays, Rebecca Scott, Robert Marsh and Patricia L. M. Lee, 2012: Lost at sea: genetic, oceanographic and meteorological evidence for storm-forced dispersal, *J. R. Soc. Interface*, published on line 8 February 2012, doi:10.1098/rsif.2011.0788.
- Morrissey, M. L., H. J. Diamond, M. J. McPhaden, H. P. Freitag, and J. S. Greene, 2012: An Investigation of the Consistency of TAO/TRITON Buoy-mounted Capacitance Rain Gauges. *J. Atmos. Ocean. Tech.*, in press.
- Perez, R. C., R. Lumpkin, W. E. Johns, G. R. Foltz and V. Hormann, 2012: Interannual variations of Atlantic tropical instability waves. *J. Geophys. Res.*, **117**, C03011, doi: 10.1029/JC007584.
- Praveen Kumar, B., J. Vialard, M. Lengaigne, V.S.N. Murty and M.J. McPhaden, 2012: TropFlux: Air-Sea Fluxes for the Global Tropical Oceans: Description and evaluation. *Clim. Dynamics*, 38, 1521-1543, doi:10.1007/s00382-011-1115-0.

- Praveen Kumar, B., J. Vialard, M. Lengaigne, V.S.N. Murty, M.J. McPhaden, M.F. Cronin, F. Pinsard and K. Gopala Reddy, 2012: TropFlux wind stresses over the tropical oceans: evaluation and comparison with other products. *Clim. Dynamics*, in press.
- Renner, A. H. H., S. E. Thorpe, K. J. Heywood, E. J. Murphy, J. L. Watkins, and M. P. Meredith, 2012: Advective pathways near the tip of the Antarctic Peninsula: Trends, variability and ecosystem implications, *Deep-Sea Research Part I-Oceanographic Research Papers*, 63, 91-101.
- Reverdin, G., S. Morisset, J. Boutin, and N. Martin, 2012: Rain-induced variability of near sea-surface T and S from drifter data, *Journal of Geophysical Research-Oceans*, 117.
- Volkov, D. L., and M. I. Pujol, 2012: Quality assessment of a satellite altimetry data product in the Nordic, Barents, and Kara seas, *Journal of Geophysical Research-Oceans*, 117.
- Wang, G. H., D. X. Wang, and T. J. Zhou, 2012: Upper layer circulation in the Luzon Strait, *Aquatic Ecosystem Health & Management*, 15(1), 39-45.
- Zedler, S. E., G. Kanschä, R. Korty, and I. Hoteit, 2012: A new approach for the determination of the drag coefficient from the upper ocean response to a tropical cyclone: a feasibility study, *Journal of Oceanography*, 68(2), 227-241.

**SPECIAL COMMENTS (if any):**

(a) Quality of buoy data:

During the 2011-2012 inter-sessional period the GDP at AOML did not deploy any new clusters of drifters for inter-comparison and evaluation due to delays in acquisition and recalls of drifters from two manufacturers. Instead the GDP/DAC has been focusing on lifetimes of drifters (see below) across the entire global array since 2005, by manufacturer and buoy type (SVP vs SVPB).

(b) Communications:

(c) Buoy lifetimes:

As reported at last year's DBCP meeting, battery problems with Clearwater and recent Technocean drifters, and manufacturing problems with Technocean drifters, have greatly reduced their lifetimes. More recent problems were found in Pacific Gyre and Clearwater PMT-bearing drifters operating in PTT mode, where higher power consumption was inferred from abbreviated lifetimes (typically ~180 days). The AOML/DAC is also conducting a re-evaluation of drogue presence in drifters from 1992 to the present. Recent findings have shown that a significant number of drifters lost their drogues sooner than originally diagnosed. A new methodology based on anomalous downwind ageostrophic motion has been applied to the data to reanalyze drogue presence that, together with information from submergence or tether strain and transmission frequency variations, will lead to a more accurate determination of when drifters lost their drogues. More information on the drogue reanalysis can be found in a paper submitted to the *Journal of Atmospheric and Oceanic Technology* by Lumpkin et al (manuscript available at: [http://www.aoml.noaa.gov/phod/dac/drogue\\_reassess.pdf](http://www.aoml.noaa.gov/phod/dac/drogue_reassess.pdf)). A complete report will be presented during the DBCP-28 Technical Workshop and submitted as a separate document.

The engineering aspects of the drifter drogues are being evaluated at Scripps Institution of Oceanography by Luca Centurioni and his group. They have redesigned the tether attachment to make it more resistant to stress, and have also enhanced the waterproofing seal. SIO is also evaluating the use of synthetic rope since the wire rope is most likely the weakest aspect of the design. SIO is building 20 drifters with the alternate material, and it is expected that this pilot array will be deployed soon. It has been recommended to manufacturers to use the SIO drifter as a reference design.

(d) Other:

**VANDALISM**

The DBCP Task Team on Data Buoy Vandalism, which includes US experts (Shannon MacArthur, Mike McPhaden and Robert Weller) is working on developing a methodology to assess damaged platform and report vandalism. It is also conducting a cost-benefit assessment and risk-value analyses that will be discussed at the upcoming DPBC session. These activities meet some of the recommended actions approved by the WMO and IOC executive bodies. There are other activities from the recommendations below that have yet to be completed. The USA would like to further discuss and promote these recommendations with other participants at the DBCP.

The United States has played a leading role at the United Nations and at regional fisheries management organizations (RFMOs) towards the adoption of resolutions, and conservation and management measures to protect data buoys.

At the UN, the United States supported adoption in December 2011 of General Assembly Resolution [A/66/L.22 - Sustainable Fisheries](#) and Resolution [A/66/L.21 - Oceans and the Law of the Sea](#) - Calling upon States and regional fisheries management organizations to adopt measures to protect data buoy systems in areas that are beyond national jurisdiction, and to take necessary action needed to cooperate with relevant organizations seeking to protect such data buoys. At RFMOs, the United States played a leading role in the adoption of the following measures: in December 2009, the Western and Central Pacific Fisheries Commission (WCPFC) adopted a [binding measure](#) to protect moored data buoys; in March 2011, the Indian Ocean Tuna Commission (IOTC) adopted [Resolution 11/02](#), prohibiting fishing vessels within the convention area from intentionally fishing within one nautical mile of or interacting with a data buoy; and in July 2011, [the Inter-American Tropical Tuna Commission \(IATTC\) adopted](#) measures to protect moored data buoys such as prohibiting fishing vessels within the convention area from interacting with data buoys and prohibiting longline and purse-seine fishing vessels from deploying fishing gear within one nautical mile of an anchored data buoy.

While 3 (of the 4) key RFMOs have adopted measures that cover the Pacific and Indian Oceans and generally prohibit fishing within 1 mile of buoys, the absence of on-scene enforcement unfortunately is the Achilles heel to making further real progress. As most buoys are located in remote areas it is unlikely that enforcement platforms can monitor the buoys. There is always the possibility that a crew member could report an alleged infraction but this often does not occur. The legal and regulatory framework that has been established is valuable, but so far it has made (as far as we can tell) no impact on the problem in a practical sense. We should not expect the situation to change over night but we need to consider how best to use of these new mechanisms to make measurable progress.

**Recommendations from the report adopted by WMO Congress and IOC Assembly:**

- [1] Improve the ocean observing platform design to make more impervious to damage and install other mechanisms to prevent access to individual buoys
- [2] Redesign networks and their operations to promote avoidance
- [3] Upgrade network operations to improve their availability
- [4] Promote improved data exchange and network optimization in the Indian Ocean Tsunami Warning System that will establish enough redundancy to provide warnings even with outages
- [5] Encourage nations to recognize the issue of marine platform vandalism and develop, harmonize, and coordinate statutes to protect ocean observing systems
- [6] Call on Fisheries Management and Regulatory Bodies to develop measures and strategies to help mitigate the damage to ocean observing systems
- [7] Develop more reliable and consistent methods of maintaining records about vandalism that can be cross-referenced and analyzed to understand the global costs of the problem
- [8] Encourage States party to the Law of the Sea Convention to use this legal instrument to promote protection of ocean observing networks
- [9] Expand international education and outreach to both emphasize the importance of ocean observing systems and how everyone can help protect these systems from vandalism and negligent damage.

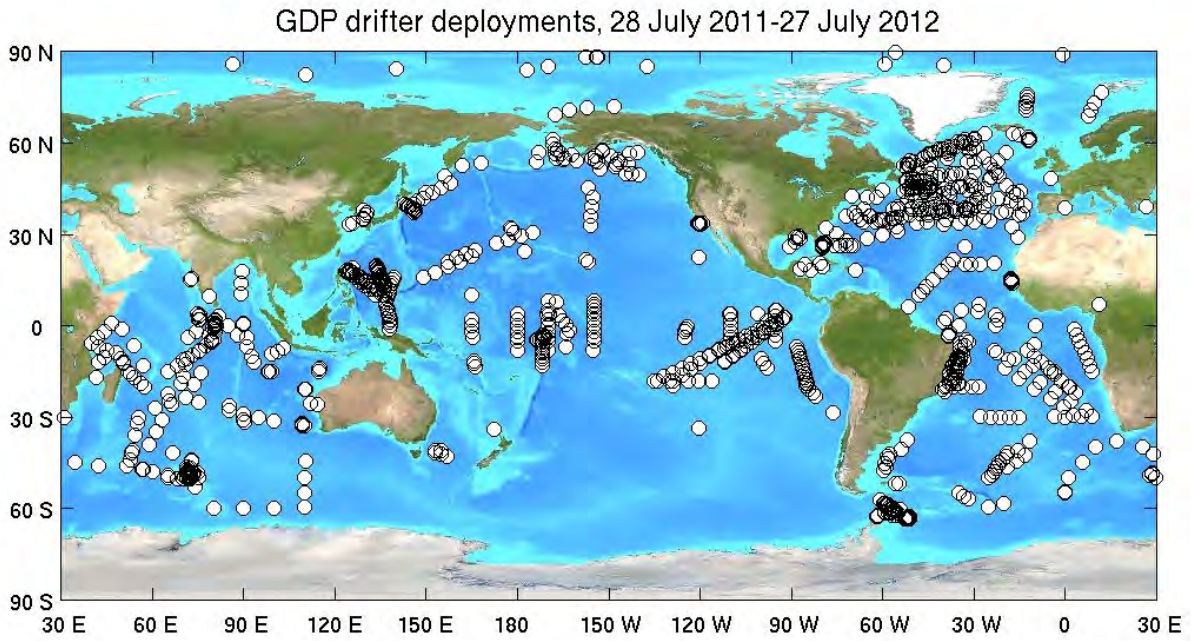


Fig. 1: Global Drifter Program deployment locations during the year.

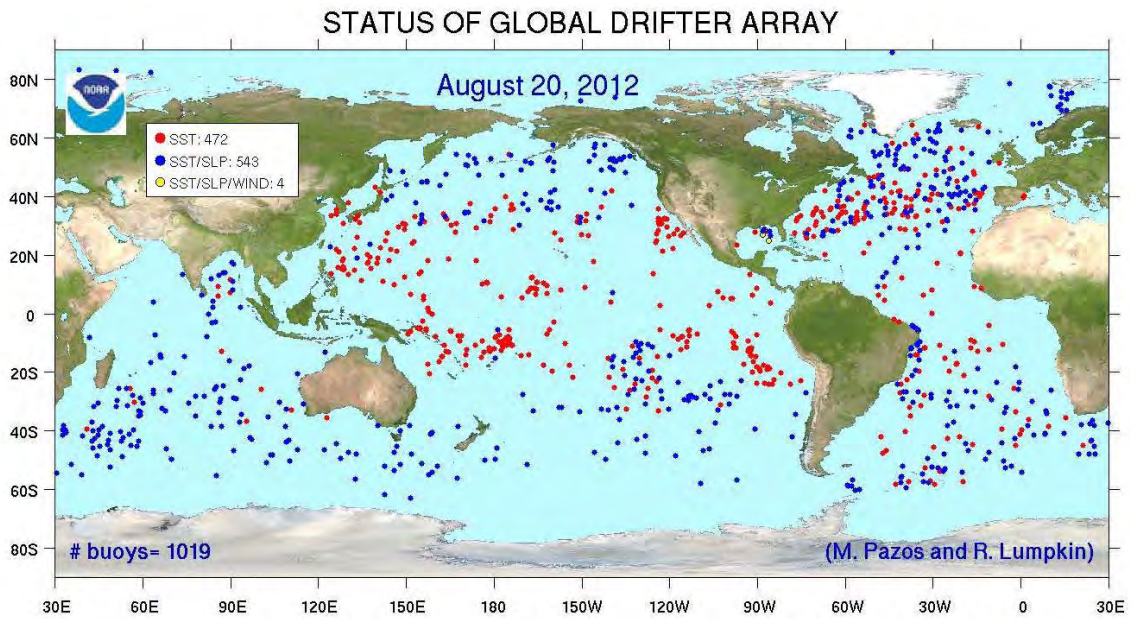


Fig. 2: Global drifter array status as of 20 August 2012.

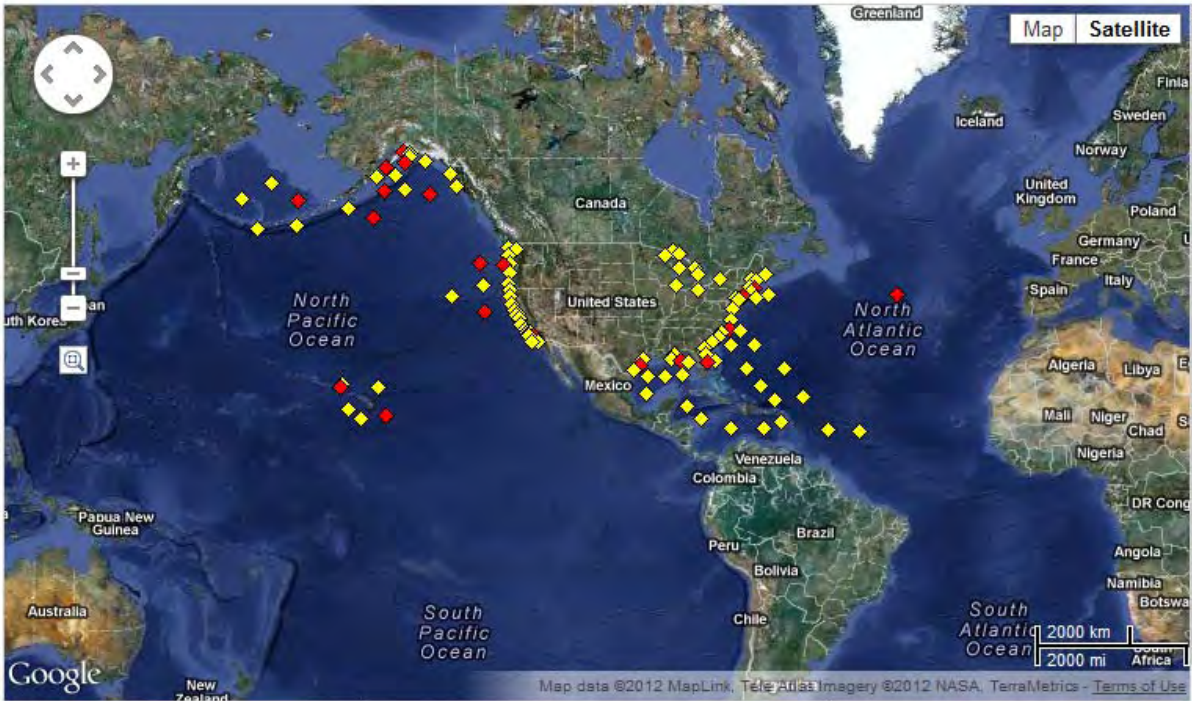


Fig. 3: NDBC Moored Buoys

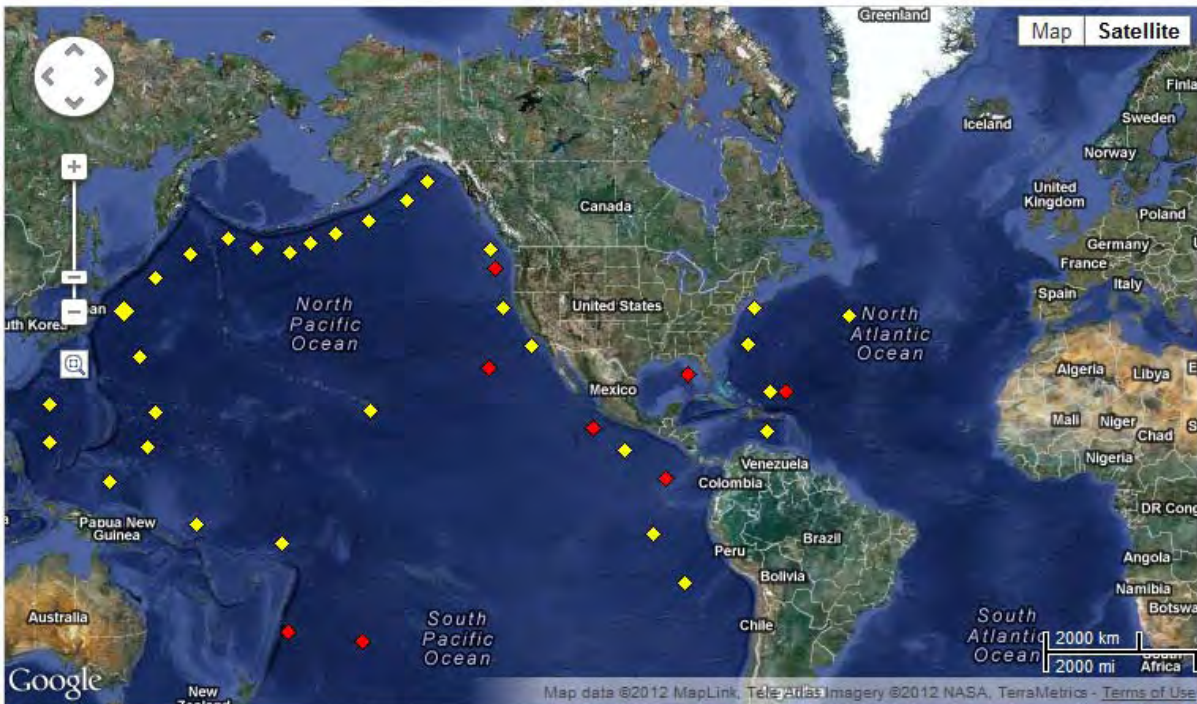


Fig. 4: NDBC Tsunami Network

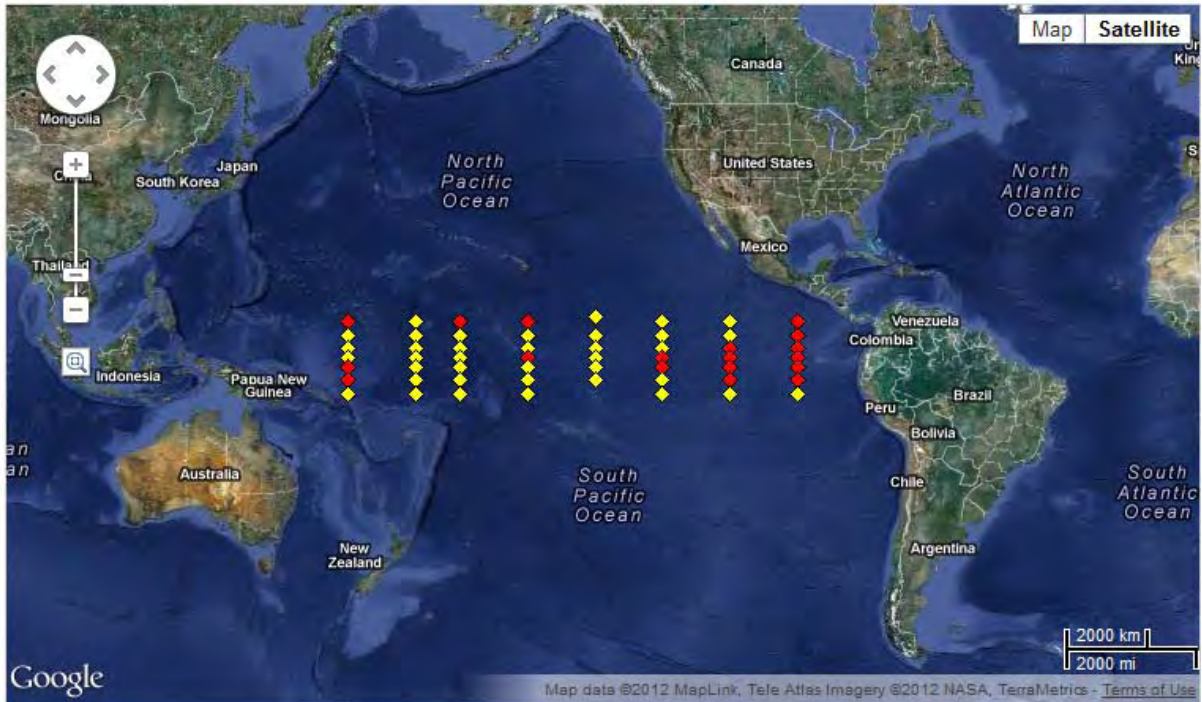


Fig. 5: NDBC Tropical Atmosphere Ocean Array



Fig. 6: PIRATA Array including PMEL/AOML Northeast Extension

### Research Moored Array for African–Asian–Australian Monsoon Analysis and Prediction (RAMA)

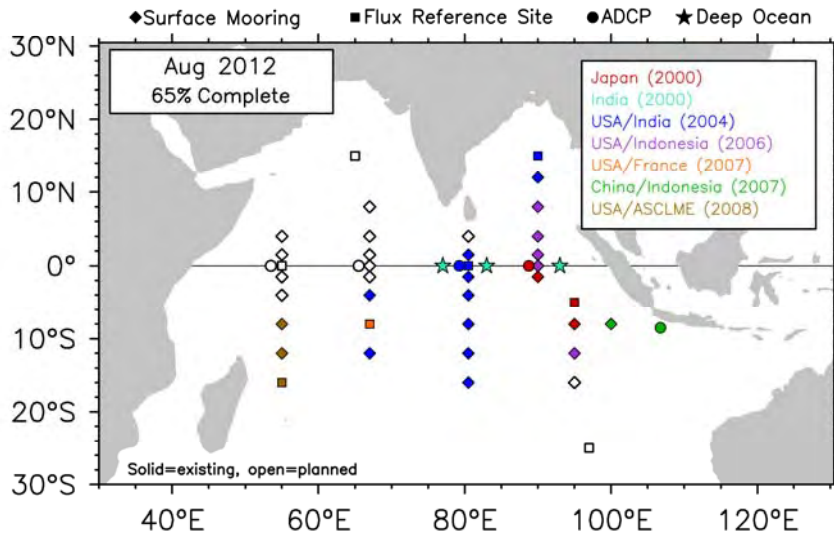


Fig. 7: PMEL RAMA Array





**DATA BUOY CO-OPERATION PANEL : SURVEY ON BUOY VANDALISM**

Please send your reply to [dr.r.venkatesan@gmail.com](mailto:dr.r.venkatesan@gmail.com)/[venkat@niot.res.in](mailto:venkat@niot.res.in)

United States				Contact person & email id		Date		
Year	Buoy Location		Type of Buoy Tsunami / Met-Ocean Buoy/Drifter/A RGO floats/ Anyother buoy	Type of damage to buoy	Buoy id/WMO id	Last Transmitted	Replacement	Remarks
	Latitude	Longitude				dd/mm/yy	dd/mm/yy	
2010	8°0'0"N	155°0'0"W	TAO	Large blue paint scrapes on buoy.	51301	9-Jan-10	9-May-10	
	2°0'0"S	170°0'0"W	TAO	Tower underwater, line attached to tower, 3 holes in the hull.	51306	1-Feb-10	4-Feb-11	
	40°36'35"N	124°35'20"W	Weather	Station went adrift on 2/2/10. Upon recovery, frayed nylon was sent out for analysis of a grease like substance on the severed nylon section.	46022	2-Feb-10	12-Aug-10	
	2°0'0"N	170°0'0"W	TAO	Long liner gear wrapped in Nilspin, with multiple cuts.	51305	3-Feb-10	22-Sep-10	
	0°0'0"	170°0'0"W	TAO	Long liner gear and many broken sub surface mounts.	51010	NA	4-Feb-10	
	0°0'0"	165°0'0"E	TAO	Broken sensors and cut in nil spin, 3/4"line attached to buoy.	52321	4-Feb-10	23-Feb-10	
	5°0'0"S	165°0'0"E	TAO	Several miles of long line gear with 4 ball floats wrapped around nylon until half way down the 3rd spool.. Abrasions in the nil-spin. Lost	52004	NA	24-Feb-10	

				inductive sensors.				
	5°0'0"S	180°0'0"W	TAO	Long liner gear at 100m.	52313	NA	4-Mar-10	
	5°0'0"N	180°0'0"W	TAO	One fishing float attached to buoy, long liner gear wrapped around several sensors. Two inductive sensors lost at sea.	52309	19-Oct-09	9-Mar-10	
	5°0'0"N	110°0'0"W	TAO	Tower unbolted & missing; Long liner gear present.	32315	17-Dec-09	12-Mar-10	
	2°0'0"N	110°0'0"W	TAO	Fishing line and net attached. Buoy was off station and release vertical.	32316	NA	14-Mar-10	
	0°0'0"	110°0'0"W	TAO	Tower missing.	32323	3-Nov-09	15-Mar-10	
	2°0'0"S	110°0'0"W	TAO	Tower leg had towing pendant attached; tower ring was cracked on unbolted leg.	32317	NA	16-Mar-10	
	5°0'0"S	110°0'0"W	TAO	Tow rope attached to the buoy.	32318	NA	24-Jul-10	
	8°0'0"S	110°0'0"W	TAO	Fishing line in nilspin bent tower with blue paint scrapes.	43001	15-Mar-10	18-Mar-10	
	2°0'0"S	95°0'0"W	TAO	Towing Pendent attached to leg.	32322	NA	31-Jul-10	
	0°0'0"	95°0'0"W	TAO	Tow line on buoy with fishing net on bridle.	32321	8-Oct-09	25-Mar-10	
	2°0'0"N	95°0'0"W	TAO	Towing line attached.	32320	NA	26-Mar-10	
	2°0'0"S	140°0'0"W	TAO	Paint scrapes; damaged AT/RH & rain sensor.	51009	NA	11-Apr-10	
	2°0'0"S	110°0'0"W	TAO	No buoy found on station; no communications with the acoustic release.	32317	13-Apr-10	22-Jun-10	
	39°29'14"N	70°35'80"W	Tsunami	Station went adrift on 7/5/10. Remaining nylon had monofilament wrapped around it upon retrieval.	44402	5-Jul-10	25-Sep-10	
	5°0'0"N	110°0'0"W	TAO	Tower, payload, and met sensors were missing from the buoy upon arrival.	32315	14-Jun-10	18-Jul-10	

	0°0'0"	110°0'0"W	TAO	Tower was ripped off. Top section cables cut. CO2 hoses ripped and equilibrator missing.	32323	3-Nov-09	21-Jul-10	
	5°0'0"S	95°0'0"W	TAO	Line tangled in bridle.	32304	NA	30-Jul-10	
	2°0'0"S	95°0'0"W	TAO	Tow line was found attached to the base of the tower.	32322	NA	31-Jul-10	
	0°0'0"	95°0'0"W	TAO	No buoy on station; the release was enabled and ranged but was on it side.	32321	10-May-10	2-Aug-10	
	5°0'0"N	95°0'0"W	TAO	Tower missing.	32303	17-Jul-10	4-Aug-10	
	8°0'0"N	95°0'0"W	TAO	Tower missing.	43301	9-May-10	6-Aug-10	
	8°0'0"N	155°0'0"W	TAO	Fishing Line in 4th spool of nylon.	51301	NA	5-Sep-10	
	2°0'0"N	155°0'0"W	TAO	Bird cage bent; AT/RH bent mast bent and cuts in Nilspin.	51021	NA	7-Sep-10	
	2°0'0"S	155°0'0"W	TAO	Cuts in Nilspin Broken sensor mounts.	51022	NA	10-Sep-10	
	8°0'0"S	155°0'0"W	TAO	Fishing float attached cuts in nilspin.	51302	NA	12-Sep-10	
	5°0'0"S	170°0'0"W	TAO	Two cans of fishing line, cuts in nilspin and missing sub-surface sensors.	51304	9-Jul-10	17-Sep-10	
	2°0'0"S	170°0'0"W	TAO	Fishing line and cuts in nilspin.	51306	NA	19-Sep-10	
	2°0'0"N	125°0'0"W	TAO	Station flagged outside of watch circle. Buoy speed has averaged 4.3 knots since moving. Wind sensor data reporting, all other sensors failed.	51016	6-Aug-11	9-Dec-10	
	8°0'0"N	165°0'0"E	TAO	Tower removed from buoy all sensors lost.	52006	19-May-10	6-Oct-10	
	2°0'0"S	165°0'0"E	TAO	Damaged sensors and tow line wrapped on the buoy.	52002	NA	12-Oct-10	
	8°0'0"S	165°0'0"E	TAO Experimental Refresh	Buoy had fishing gear throughout the mooring.	52007	NA	18-Oct-10	
	8°0'0"S	165°0'0"E	TAO	Fishing gear throughout the entire mooring.	52007	NA	19-Oct-10	

	5°0'0"S	110°0'0"W	TAO	Buoy moved 2 nautical miles within its watch circle.Moved 2.5 nm in 50 minutes. Winds failed, RH and inductive line data when missing after movement.	32318	NA	24-Jul-10	
	2°0'0"N	110°0'0"W	TAO	Buoy moved 20 nautical miles off station. No subsurface sensor data .	32316	NA	1-Aug-11	
	2°0'0"S	125°0'0"W	TAO	Buoy moved 7.5 nm off-station.	51017	NA	6-Dec-10	
	0°0'0"	125°0'0"W	TAO	Station went adrift 11/6/10. Buoy abruptly moved westward, then started drifting slowly to the north with the ocean current.	51011	NA	7-Dec-10	
	0°0'0"	140°0'0"W	TAO	Cuts in nilspin and nylon.	51311	NA	26-Nov-10	
	9°0'0"N	140°0'0"W	TAO	Long liner gear on buoy.	51006	NA	22-Nov-10	
	2°0'0"S	170°0'0"W	TAO	Buoy moved 1.3 nm off-station. No loss in sensor data.	51306	NA	20-Sep-11	
	5°0'0"S	140°0'0"W	TAO	Fishing line cuts in Nilspin; missing sensors.	51007	NA	29-Nov-11	
	2°0'0"S	95°0'0"W	TAO	Buoy moved off station.	32317	29-Jul-11	Pending KA-12-01	
<b>2011</b>	2°0'0"S	110°0'0"W	TAO	Buoy was being pulled on within it's watch circle.	32322	NA	Pending KA-12-02	
	2°0'0"S	95°0'0"W	TAO	Buoy was being pulled on within it's watch circle. Winds data also concurrently failed.	32317	29-Jul-11	Pending KA-12-01	
	8°0'0"N	95°0'0"W	TAO	The buoy stopped transmitting suddenly. Prior to its final transmission, the winds data failed.	43301	5-Mar-11	18-May-11	
	2°0'0"S	165°0'0"E	TAO Experimental Refresh	Buoy appears to have been struck by a passing vessel.	52002	26-Aug-11	14-Nov-11	
	0°0'0"	95°0'0"W	TAO	Buoy moved NE about 1.9 nm twice on two separate occassions. Presently 5.666 nm off-station.	32321	NA	10-May-11	
	2°0'0"S	95°0'0"W	TAO	Buoy moved about 1.9 nm off station.	32322	29-Jul-11	Pending KA-12-01	

	2°0'0"N	170°0'0"W	TAO	Buoy appears to have moved 1.9nm in a half hour. Inductive & winds data have also been missing since that time.	51305	NA	20-Oct-11	
	5°0'0"N	180°0'0"W	TAO	Wind direction jumped to the west instead of the east, and remained reporting 180 off. Buoy appears to have been pulled.	52309	NA	29-Nov-11	
	2°0'0"S	95°0'0"W	TAO	Buoy moved off station.	32322	29-Jul-11	Pending KA-12-01	
	5°0'0"S	110°0'0"W	TAO	Buoy adrift and moving between 0.9-1.0 knots. All inductive sensors failed.	32318	NA	4-Aug-11	
	2°0'0"S	95°0'0"W	TAO	Buoy moved off station. Inductive sensors, rain gauge and winds failed.	32322	29-Jul-11	Pending KA-12-01	
	0°0'0"	95°0'0"W	TAO	On 8/3/11 1041z, the QCC received notification that 095w was off station and 7.69nm from its mooring. The same time the following day, the buoy was 8.28nm from its mooring. Data indicates a significant jump in the P500 sensor, inductive line is now sporadic, and the rain sensor began reporting erroneous values.	32321	NA	Pending KA-12-01	
	2°0'0"S	165°0'0"E	TAO Experimental Refresh	Buoy lost communications and is 838 nm off station. Subsequent position messages has it located in the island region north of Papua New Guinea.	52002	26-Aug-11	14-Nov-11	
<b>Efforts taken against vandalism</b>			Pursuit of Regulatory Statutes; UNGA Resolution					

<b>Awareness meeting Organised</b>	N/A
<b>Suggestions (if any)</b>	N/A
<b>Photos on Vandalism</b>	

---

## APPENDIX M

### NATIONAL REPORTS ON CURRENT AND PLANNED BUOY PROGRAMMES

Country	GERMANY
Year	2012

#### CURRENT PROGRAMMES:

**A. Agency or programme:** Sea Ice Buoys, Processes in polar regions (ARGOS-No. 919), Stiftung Alfred-Wegener-Institut für Polar- und Meeresforschung in der Helmholtz-Gemeinschaft, Bremerhaven

Number and type of buoys: (a) deployed during 2012: 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), Stiftung Alfred-Wegener-Institut für Polar- und Meeresforschung in der Helmholtz-Gemeinschaft, Bremerhaven

Number and type of buoys: (a) deployed during 2012: 24  
(b) operational as of 31 August: 24  
(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), Stiftung Alfred-Wegener-Institut für Polar- und Meeresforschung in der Helmholtz-Gemeinschaft, Bremerhaven

Number and type of buoys: (a) deployed during 2012: 0  
(b) operational as of 31 August: 5  
(c) reporting on GTS as of 31 August: 5 (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**

**D. Agency or programme:** Gravimetric measurements on ice floes (ARGOS-No. 12919), Stiftung Alfred-Wegener-Institut für Polar- und Meeresforschung in der Helmholtz-Gemeinschaft, Bremerhaven

Number and type of buoys: (a) deployed during 2012: 0  
(b) operational as of 31 August: 0  
(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 2012: 2  
(b) operational as of 31 August: 2  
(c) reporting on GTS as of 31 August: 0

Purpose of programme: (a) operational:



(b) met / ocean research: yes

(c) developmental:

Main deployment areas: **Marion Island (Indian Ocean)**

**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 2012: 0  
(b) operational as of 31 August: 31: 0  
(c) reporting on GTS as of 31 August: 31: 0

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 2012 : 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: **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 2012: 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 interactions in the tropical ocean (ARGOS-No. 8165)

Number and type of buoys: (a) deployed during 2012: 9  
(b) operational as of 31 August: 26  
(c) reporting on GTS as of 31 August: 21

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 2012: 50  
(b) operational as of 31 August: 163  
(c) reporting on GTS as of 31 August: 163

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 (Federal Maritime and Hydrographic Agency), Hamburg Germany

Number and type of buoys: (a) deployed during 2012: 2  
(b) operational as of 31 August: 8  
(c) reporting on GTS as of 31 August: 8

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. 9981), Bundesamt für Seeschifffahrt und Hydrographie, Hamburg Germany

Number and type of buoys: (a) deployed during 2012: 6 (replacement of stations after repairs)  
(b) operational as of 31 August: 6  
(c) reporting on GTS as of 31 August: 6

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

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

**N. Agency or programme:** IFM-GEOMAR Kiel, Moored buoy, EU FP7 EuroSITES project.

Number and type of buoys: (a) deployed during 2012: 2  
(b) operational as of 31 August: 1  
(c) reporting on GTS as of 31 August: 1

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

Main deployment areas: **Subpolar North Atlantic**

**O. Agency or programme:** IFM-GEOMAR Kiel, Glider surveys, BMBF North Atlantic, SFB 754

Number and type of buoys: (a) deployed during 2012: 11  
(b) operational as of 31 August: 0

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

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

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

**PLANNED PROGRAMMES:**

**A. Agency or programme:** Sea Ice Buoys, Processes in polar regions (ARGOS-No. 919), Stiftung Alfred-Wegener-Institut für Polar- und Meeresforschung in der Helmholtz-Gemeinschaft, 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), Stiftung Alfred-Wegener-Institut für Polar- und Meeresforschung in der Helmholtz-Gemeinschaft, Bremerhaven

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

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), Stiftung Alfred-Wegener-Institut für Polar- und Meeresforschung in der Helmholtz-Gemeinschaft, 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**

**D. Agency or programme:** Gravimetric measurements on ice floes (ARGOS-No. 12919), Stiftung Alfred-Wegener-Institut für Polar- und Meeresforschung in der Helmholtz-Gemeinschaft, 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), Stiftung Alfred-Wegener-Institut für Polar- und Meeresforschung in der Helmholtz-Gemeinschaft, Bremerhaven

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

Purpose of programme: (a) operational:

(b) met / ocean research: yes

(c) developmental:

Main deployment areas: **Indian sector of the Southern Ocean**

**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 planned for deployment in next 12 months: None

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 interactions 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: 9, but maintenance 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 maintenance 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**

**N. Agency or programme:** IFM-GEOMAR Kiel, Moored buoy, EU FP7 EuroSITES project.

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: **Subpolar North Atlantic**

**O. Agency or programme:** IFM-GEOMAR Kiel, Glider surveys, BMBF North Atlantic, SFB 754

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: **Tropical Atlantic**

**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:

#### **I. TECHNICAL DEVELOPMENTS:**

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

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

#### **I. SPECIAL COMMENTS (if any):**

- (a) Quality of buoy data:
- (b) Communications: every 7 days
- (c) Buoy lifetimes: > 3 year
- (d) Other: Data is distributed as TESAC

#### **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). MARNET
- (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 are inserted in the GTS by DWD. Identifiers comply GTS standards.
- (c) Buoy lifetimes: Buoys will continuously be serviced and replaced if necessary.
- (d) Other:

**N. TECHNICAL DEVELOPMENTS:**

- (a) Buoy design: custom design IFM-GEOMAR based on 17" glass sphere for housing
- (c) Instrumentation:
- (c) Others:

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

*J. Karstensen<sup>7</sup>, R. Bozzano, F. Brunetti, J. Campell, V. Cardin, A. Cianca, L. Coppola, A. Medina, K. Nittis, S. Osterhus, S. Pensieri, A. Pinck, Report on the existing platforms and telemetry used at each station, EuroSITES deliverable report D112, Sept. 2009*

**N. SPECIAL COMMENTS (if any):**

- (a) Quality of buoy data: good until April 2011, reason for degraded quality unknown (not investigated yet)
- (b) Communications: every 4 hours
- (c) Buoy lifetimes: > 1 year

---

<sup>7</sup> Responsible for compilation of this report

- (d) Other: Data is distributed as TESAC (via DAC at NOCS/GDAC at Coriolis)

**O. TECHNICAL DEVELOPMENTS:**

- (a) Buoy design: no
- (d) Instrumentation: no
- (c) Others: no

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

**O. SPECIAL COMMENTS (if any):**

- (a) Quality of buoy data: good for real time;
- (b) Communications: variable, but less than 6 hours
- (c) Buoy lifetimes: from weeks up to 3 month
- (d) Other: Data is distributed as TESAC

**CONTACT POINTS:**

**A.**

Dr. Gerd Rohardt, Alfred Wegener Institute, P.O.Box 120161, 27515 Bremerhaven, Germany  
Email: [Gerd.Rohardt@awi.de](mailto:Gerd.Rohardt@awi.de)

**B.**

Dr. Gerd Rohardt, Alfred Wegener Institute, P.O.Box 120161, 27515 Bremerhaven, Germany  
Email: [Gerd.Rohardt@awi.de](mailto:Gerd.Rohardt@awi.de)

**C.**

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

**D.**

Dr. Gerd Rohardt, Alfred Wegener Institute, P.O.Box 120161, 27515 Bremerhaven, Germany  
Email: [Gerd.Rohardt@awi.de](mailto:Gerd.Rohardt@awi.de)

**E.**

Dr. Joachim Plötz, Alfred Wegener Institute, P.O.Box 120161, 27515 Bremerhaven, Germany  
Email: [Joachim.Pluetz@awi.de](mailto:Joachim.Pluetz@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](mailto:quadfasel@zmaw.de)

**G.**

Dr. Gerd Mueller, Meteorological Institute, ZMAW, University of Hamburg, Bundesstrasse 55, 20146 Hamburg; Germany  
Email: [gerd.mueller@zmaw.de](mailto:gerd.mueller@zmaw.de)

**H.**

Dr. Klaus Ricklefs, Forschungs- und Technologiezentrum Westküste (FTZ), Hafentörn, 25761 Büsum, Germany.  
Email: [ricklefs@ftz-west.uni-kiel.de](mailto: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](mailto:jfischer@ifm-geomar.de), [lstramma@ifm-geomar.de](mailto: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](mailto:Birgit.Klein@bsh.de)

**K.**

Kai Herklotz, Bundesamt für Seeschifffahrt und Hydrographie, Bernhard-Nocht-Str. 78, 20359 Hamburg, Germany,  
Email: [Kai.Herklotz@bsh.de](mailto:Kai.Herklotz@bsh.de)

**L.**

Kai Herklotz, Bundesamt für Seeschifffahrt und Hydrographie, Bernhard-Nocht-Str. 78, 20359 Hamburg, Germany,  
Email: [Kai.Herklotz@bsh.de](mailto:Kai.Herklotz@bsh.de)

**N.**

Dr. Johannes Karstensen, Leibniz-Institut für Meereswissenschaften, IFM-GEOMAR, Düsternbrooker Weg 20, 24105 Kiel, Germany, Email: [jkarstensen@ifm-geomar.de](mailto:jkarstensen@ifm-geomar.de)

**O.**

Dr. Gerd Krahnemann, Leibniz-Institut für Meereswissenschaften, IFM-GEOMAR, Düsternbrooker Weg 20, 24105 Kiel, Germany, Email: [gkrahmann@ifm-geomar.de](mailto:gkrahmann@ifm-geomar.de)

---

## APPENDIX N

### NATIONAL REPORTS ON CURRENT AND PLANNED BUOY PROGRAMMES

Country	UNITED KINGDOM
Year	2012

#### CURRENT PROGRAMMES:

##### A. Met Office: Marine Automated Weather Station Network

- Number and type of buoys:
- (a) No new operational moored buoys deployed during the year. K7 has been off-station (recovered in January as it went adrift) and should be redeployed by September (in a new position under UK jurisdiction).
  - (b) 7 moored buoys anticipated operational as of 31 August.
  - (c) All moored buoys reporting hourly on GTS (FM-13 SHIP) as of 31 August. Spectral wave data from 2 buoys (K5 and Brittany) also reported to GTS in FM-94 BUFR.

Purpose of programme: Operational, data also available for met/ocean research.

Main deployment areas: North-east Atlantic

[http://www.metoffice.gov.uk/weather/marine/observations/gathering\\_data/MAWS.htm](http://www.metoffice.gov.uk/weather/marine/observations/gathering_data/MAWS.htm)

[ml](#)

##### B. Met Office: Other Moored buoys

- Number and type of buoys:
- (a) 2 moored buoys operated off south-west Wales for QinetiQ and the Milford Haven Port Authority. 1 moored buoy in Weymouth Bay operated for the London Organising Committee of the Olympic and Paralympic Games ( LOCOG).
  - (b) All 3 moored buoys anticipated operational as of 31 August.
  - (c) All 3 moored buoys reporting hourly data to GTS in FM-13 SHIP as of 31 August. 15-minute met data (and half hourly wave data) from the Olympics buoy available but not reported to GTS due to limitations of the FM-13 format.

Purpose of programme: Operational, data also available for met/ocean research.

Main deployment areas: Inshore (2 off south-west Wales and 1 in the English Channel)

**C. Met Office/National Oceanography Centre: Porcupine Abyssal Plain OceanSITES station**

- Number and type of buoys:
- (a) 1 moored buoy at the PAP site together with the deep ocean mooring.
  - (b) Expected to be operating 31 August.
  - (c) Met data not yet going to GTS since a modified buoy was deployed in May with a different transmission format. Oceanographic data not currently going to GTS (FM-64 TESAC). Met and oceanographic data are available via the PAP website and OceanSITES GDACs.

Purpose of programme: Pre-operational, primary purpose is sustained observations for met/ocean research.

Main deployment areas: North-east Atlantic (49N, 16.5W)

<http://www.noc.soton.ac.uk/pap/index.php>

**D. Plymouth Marine Laboratory: Western Channel Observatory**

- Number and type of buoys:
- (a) 2 moored buoys (L4 and E1) in the Western Channel.
  - (b) L4 expected to be operating as at 31 August. E1 has been off-station (went adrift in December 2011) and a replacement is expected to be deployed in 2013 in collaboration with the Met Office.
  - (c) 3-hourly met data reported to GTS in FM-13 SHIP format. Hourly met data and oceanographic data available via the WCO website.

Purpose of programme: Sustained observations for marine research.

Main deployment areas: Western English Channel

<http://www.westernchannelobservatory.org.uk/buoys.php>

**E. Centre for Environment, Fisheries and Aquatic Science (Cefas): SmartBuoy monitoring sites**

- Number and type of buoys:
- (a) 6 SmartBuoys currently operated. Buoys presently have oceanographic (no met) capability only.
  - (b) All expected to be operating on 31<sup>st</sup> August.

- (c) No data reported to GTS, real-time and archived data are available from the Cefas website.

Purpose of programme: Statutory marine monitoring.

Main deployment areas: North Sea (4 buoys), Celtic Sea and Liverpool Bay

<http://www.cefas.defra.gov.uk/our-science/observing-and-modelling/monitoring-programmes/monitoring-sites.aspx>

#### **F. Centre for Environment, Fisheries and Aquatic Science (Cefas): WaveNet**

Number and type of buoys: (a) 21 waverider buoys currently operated around the coastline of England and Scotland.

(b) All expected to be operating on 31<sup>st</sup> August.

(c) No data reported to GTS, real-time and archived data are available from the Cefas WaveNet website.

Purpose of programme: Coastal flood management.

Main deployment areas: Around the coastline of England and Scotland

<http://www.cefas.defra.gov.uk/our-science/observing-and-modelling/monitoring-programmes/wavenet.aspx>

#### **G. Met Office: Drifting buoys**

Number and type of buoys: (a) none deployed during the year as at 10 June, 12 MetOcean Iridium SVP drifters with barometers available for deployment (9 with HRSST-2 upgrades).

(b) 9 drifters operational as of end July.

(c) all operational drifters reporting data to GTS as at end June.

Purpose of programme: operational, data also available for met/ocean research.

Main deployment areas: Normally the South Atlantic and adjacent Southern Ocean sector, although the first 6 HRSST-2 drifters will be deployed in the sub-tropical North Atlantic.

In addition the Met Office contributes (part-funds) the E-SURFMAR programme and arranged 34 deployments of E-SURFMAR funded drifters in the North Atlantic in the 12 months (July 2011 to June 2012).

## H. Scottish Marine Institute: Drifting buoys

- Number and type of buoys: (a) 20 Metocean Iridium SVP drifter buoys were deployed in June during the first cruise for the NERC FASTNET consortium (more will be deployed next year). The buoys are drogued at 50 metres and supply positional information together with sea surface temperature.
- (b) 19 drifters operational as of end July.
- (c) data expected to start going to GTS shortly.
- Purpose of programme: met/ocean research.
- Main deployment areas: North-east Atlantic.

### **TECHNICAL DEVELOPMENTS:**

#### **Met Office**

- (a) Funding has been approved for the replacement of all our ageing operational moored buoys with new design systems based on 3m Hydrosphere/Mobilis hulls with Axys Watchman 500 electronics. A 3m Hydrosphere/Mobilis hull is presently on test adjacent to the Turbot Bank moored buoy off south-west Wales.
- (b) The replacement buoy for the K7 site to the north of Scotland is planned to be a 3m Hydrosphere/Mobilis buoy with an Axys Watchman 500 and Triaxys spectral wave system.
- (c) The operational buoy at Turbot Bank (operated for the Milford Haven Port Authority) will be replaced with a Planet Ocean DB-300 system using an Axys Watchman 500.
- (d) Comparison of wave measurements (including spectral wave data) from our various larger buoys continues. A Datawell waverider buoy has been purchased to facilitate wave measurement comparisons against the 'industry standard'. This work will be a contribution to the JCOMM Pilot Project on Wave measurement Evaluation and Testing (PP-WET).

#### **Met Office/NOCS**

- (a) During August it is planned to deploy an instrumented 1.9m Hydrosphere/Mobilis buoy in place of one of the experimental area guard buoys adjacent to the PAP site to provide half-hourly met data in support of the NERC Ocean Surface Boundary Layer programme. The measurement campaign (moored buoy and moorings) is expected to last for 12 months to summer 2013.
- (b) In the longer term it is envisaged to replace the surface moored buoy at the PAP OceanSITES station with a 3m Hydrosphere/Mobilis buoy with Axys Watchman 500s. This should deliver improved reliability and greater power for driving the oceanographic sensors.

#### **Met Office/PML**

- (a) It is planned to jointly build up a 3m Hydrosphere/Mobilis buoy with dual Axys Watchman 500s as replacement for the Western Channel Observatory E1 buoy. The new system will have both meteorological and oceanographic capability.



**Met Office/Cefas**

(a) It is planned to collaborate investigate the possibility of installing a stand-alone Met Office designed marine AWS on the Cefas SmartBuoys.

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

Hartman, S. E., Lampitt, R. S., Larkin, K. E., Pagnani, M., Campbell, J., Gkritzalis, T., Jiang, Z.-P., Pebody, C. A., Ruhl, H. A., Gooday, A. J., Bett, B. J., Billett, D. S. M., Provost, P., McLachlan, R., Turton, J. D., and Lankester, S. The Porcupine Abyssal Plain fixed-point sustained observatory (PAPSO): variations and trends from the Northeast Atlantic fixed-point time-series. – ICES Journal of Marine Science, doi:10.1093/icesjms/fss077.

Blockley, E. W., Martin, M. J., and Hyder, P.: Validation of FOAM near-surface ocean current forecasts using Lagrangian drifting buoys, Ocean Sci. Discuss., 9, 1705-1740, doi:10.5194/osd-9-1705-2012, 2012.

---

## APPENDIX O

### NATIONAL REPORTS ON CURRENT AND PLANNED BUOY PROGRAMMES

<b>Country</b>	<b>NEW ZEALAND</b>
<b>Year</b>	<b>2012</b>

#### **CURRENT PROGRAMMES**

*(for period 1 Sept 2011 – 1Sept 2012)*

- 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: **6**  
 (c) Reporting on GTS at 31 August: **6**
- Purpose of programme: Real-time buoy data for MetService Weather Forecasting activities
- Main deployment area: Tasman Sea including 2 buoys on remote Islands
- 
- B Agency or programme:** MSNZ Barometer Upgrade Programme for SOBP
- Number and type of buoys: (a) Deployed during the year: **0 SVPB**  
 (b) Operational at 31 August: **0**  
 (c) Reporting on GTS at 31 August: **0**
- 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: **5 SVPB**  
 (b) Operational at 31 August: **0**  
 (c) Reporting on GTS at 31 August: **0**
- 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 – **Marlin-Yug** Buoys
- Number and type of buoys: (a) Deployed during the year: **2 ARGOS3 PMT redeployed**  
 (b) Transmitting at 31 August: **2**  
 (c) Reporting on GTS at 31 August: **2**

Purpose of programme: To participate in the Argos3 Pilot Project by deploying 6 Marlin-Yug buoys provided by Argos, in the sea around NZ to trial the two-way communications.

Main deployment area: Tasman Sea

**PLANNED PROGRAMMES** (for period 1 Sept 2012 – 1 Sept 2013)

- 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: **12 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: **unknown**  
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: South Pacific Ocean.

**TECHNICAL DEVELOPMENTS**

- (a) Buoy design:  
(b) Instrumentation:  
(c) Others:In early 2008, MetService placed a SVPB buoy on each of two remote islands to act as basic, autonomous AWS. The locations are:ThreeKingsIsland to the North of NZ, and AntipodesIsland to the SE of NZ. The pressure data has been corrected for height above MSL and the SST data is not disseminated on GTS. The buoy on Antipodes Island was first replaced in December 2009, then again in February 2012, and the Three Kings buoy was replaced in October 2010 and again in April 2012. The current 'Island' buoys are now communicating via Iridium which is providing more timely data.

## **SPECIAL COMMENTS**

(a) Quality of buoy data:

(b) Communications:

MetService participated in both the Iridium Pilot Project and the Argos3 Pilot Project by deploying buoys to trial these new communications methods. The Iridium Buoy data is being processed by Joubeh Technologies and Scotia Weather Services and inserted on to the GTS through an Environment Canada portal. Typically the hourly Iridium data is received via GTS at about H + 12minutes, so delivery is very timely.

(b) Buoy Lifetimes:

The network of buoys in the oceans surrounding NZ in mid 2012, is greatly depleted compared with previous years. This situation has occurred due to the premature failure of many Technocean Upgrade and GDC buoys. Thirty buoys were deployed over southern summer 2010/2011, 18 of these failed in less than 3 months, only 3 buoys lasted 12months, and one of these is still operational. Over southern summer 2011/2012, only 5 Technocean GDC buoys were deployed, three of which failed immediately with the other two lasting 6 and 9 months respectively. Due to the problems at Technocean and their subsequent demise, there were no more GDC or Upgrade buoys available for deployment.

### Marlin-Yug Buoys

As part of the Argos3 PP, MetService deployed 6 Marlin-Yug Argos3 SVPB buoys with 34cm hulls, in the period Sept – Nov 2010. Pre-deployment testing indicated that the pressures sensors on this batch of buoys were all 1.2hPa high, so an offset of -1.2hPa was applied to all GTS pressure data. One original buoy is still operational after 23months with AP on GTS. Three of the six buoys beached and were recovered, and two of these were redeployed into the Tasman Sea. One buoy was redeployed as a SST-only buoy, because the barometer breathing membrane had been damaged at beaching. The other buoy was re-drogued and redeployed with all sensors operational.

Three Marlin-Yug SVPB Argos buoys with 41cm hull, purchased by MetService were deployed into the Tasman Sea in June and August 2012. An offset of +0.7hPa has been applied to the pressure data in the GTS processing after pre-deployment tests indicated the pressure sensors were uniformly 0.7hPa low. As at 1 September 2012, these buoys are providing good AP and SST data.

### MetOcean Buoys

2 SVPB Iridium buoys were deployed in July 2011, both operated well but only for relatively short life-times of 9.3 and 6.6 months respectively. MetService purchased 4 MetOceanSVPB Iridium buoys with 40cm hulls and increased battery capacity in late 2011. 3 buoys were deployed in February, and 1 in April 2012. One buoy failed suddenly after 32 days, while the other 3 are still fully operational at 1 September 2012.

(d) Others:Nil.

---

## APPENDIX P

### NATIONAL REPORTS ON CURRENT AND PLANNED BUOY PROGRAMMES

<b>Country</b>	<b>IRAN</b>
<b>Year</b>	<b>2012</b>

#### 1. CURRENT PROGRAMME:

Agency or programme		
Number and type of buoys	(a) deployed during the year	5
	(b) operational as of 31 August	
	(c) reporting on GTS as of 31 August	
Purpose of programme <i>(check/uncheck boxes using [ ] or [x] as appropriate)</i>	(a) operational	<input checked="" type="checkbox"/>
	(b) met / ocean research	<input checked="" type="checkbox"/>
	(c) developmental	<input checked="" type="checkbox"/>
Main deployment areas	Caspian Sea, Persian Gulf, Oman Sea	
Vandalism incidents	(a) Number of incidents If vandalism incidents have occurred during the year, please provide the details using the form in the annex.	

*(repeat table above as often as necessary)*

#### 2. PLANNED PROGRAMMES:

Agency or programme		
Number and type of buoys	planned for deployment in the next 12 months	5
Purpose of programme <i>(check/uncheck boxes using [ ] or [x] as appropriate)</i>	(a) operational	<input checked="" type="checkbox"/>
	(b) met / ocean research	<input checked="" type="checkbox"/>
	(c) developmental	<input checked="" type="checkbox"/>
Main deployment areas	Caspian Sea, Persian Gulf, Oman Sea	

*(repeat table above as often as necessary)*

#### 3. TECHNICAL DEVELOPMENTS:

(a) Buoy design	<ul style="list-style-type: none"> <li>• Designing a Coastal Station near Chabahar</li> <li>• Producing buoy body in Isfahan university</li> <li>•</li> <li>•</li> </ul>
(b) Instrumentation	<ul style="list-style-type: none"> <li>•</li> <li>•</li> <li>•</li> </ul>
(c) Others	<ul style="list-style-type: none"> <li>•</li> <li>•</li> <li>•</li> </ul>

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

<b>Ref</b>	<b>Title</b>	<b>Type<sup>1</sup></b>
1	Proposed marine met network in northern and southern coasts of Iran	
2		
3		
4		

(repeat rows in the table above as necessary)

**5. SPECIAL COMMENTS (if any):**

(a) Quality of buoy data	<ul style="list-style-type: none"> <li>• Integrating the standard of data coding buoys</li> <li>•</li> <li>•</li> </ul>
(b) Communications	<ul style="list-style-type: none"> <li>• Preparing satellite communications on exchange and gathering data buoys</li> <li>•</li> <li>•</li> </ul>
(c) Buoy lifetimes	<ul style="list-style-type: none"> <li>• Using stand-by buoys during periodic usage in each station</li> <li>•</li> <li>•</li> </ul>
(d) Other	<ul style="list-style-type: none"> <li>•</li> <li>•</li> <li>•</li> </ul>

**Note:** It is recommended that this form is filled in electronically and returned also electronically to the Secretariat. A template of the form can be downloaded from the following ftp site:

<ftp://ftp.wmo.int/Documents/PublicWeb/amp/mmop/documents/dbcp/templates/Format-DBCP-National-Reports.doc>

<sup>1</sup>: Types of publications: (1) Implementation, (2) Operations, (3) Instrumentation, (4) Quality Management, (5) Data Management, (6) Data collection and/or location, (7) Data use, (8) Other

ANNEX - FORM FOR REPORTING INCIDENTS OF VANDALISM ON DATA BUOYS

Country								
Contact person e-mail								
Year	Buoy Location		Type of Buoy (e.g. Tsunami / Met-Ocean Buoy/Drifter/ARGO floats/ Other)	Type of damage to buoy	Buoy id/MMO id	Number of days of transmission lost	Cost of replacement	Remarks (e.g. whether photos have been taken)
	Latitude	Longitude						
<b>Efforts taken against vandalism</b>								
<b>Awareness meeting Organised</b>								
<b>Suggestions (if any)</b>								
<b>Photos on Vandalism</b>			(please include pictures if available; and email electronic versions to <a href="mailto:support@icommops.org">support@icommops.org</a> )					

\_\_\_\_\_

\_\_\_\_\_