

# DATA BUOY COOPERATION PANEL Twenty-eighth Session

Fremantle, Australia  
2-6 October 2012

JCOMM Meeting Report No. 93



## NOTES

### WMO Regulation 42

Recommendations of working groups shall have no status within the Organization until they have been approved by the responsible constituent body. In the case of joint working groups the recommendations must be concurred with by the presidents of the constituent bodies concerned before being submitted to the designated constituent body.

### WMO Regulation 43

In the case of a recommendation made by a working group between sessions of the responsible constituent body, either in a session of a working group or by correspondence, the president of the body may, as an exceptional measure, approve the recommendation on behalf of the constituent body when the matter is, in his opinion, urgent, and does not appear to imply new obligations for Members. He may then submit this recommendation for adoption by the Executive Council or to the President of the Organization for action in accordance with Regulation 9(5).

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WORLD METEOROLOGICAL ORGANIZATION

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INTERGOVERNMENTAL OCEANOGRAPHIC  
COMMISSION (OF UNESCO)

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**DATA BUOY CO-OPERATION PANEL**  
***TWENTY-EIGHTH SESSION***

Fremantle, Australia  
2-6 October 2012

**FINAL REPORT**

JCOMM Meeting Report No. 93

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Note: The following information is provided in the accompanying CD-ROM:

- Full report by the Technical Coordinator;
  - Reports by the Task Teams;
  - National reports;
  - Full reports by the Action Groups;
  - Data Management Centre reports;
  - The current status and development of satellite communications;
  - GTS status report;
  - DBCP Implementation Strategy;
  - Other financial and administrative papers;
  - DBCP Technical Document list, including available electronic versions.
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*(Group picture)*

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## EXECUTIVE SUMMARY

The twenty-eighth session of the Data Buoy Co-operation Panel (DBCP-28) was held in the conference room of the *Esplanade Hotel Fremantle* in Fremantle, Australia, from 2 to 6 October 2012, at the kind invitation of the Australian Bureau of Meteorology (BoM).

A technical and scientific workshop was organized during the first day of the session. Seventeen presentations were delivered under the themes of *Technical development for marine observation systems, Operational practices and enhancements, and Applications of collected data*. Approximately 70 participants from 14 countries attended the meetings. The Panel concurred with the six resolutions proposed by the workshop, and adopted them.

The Chairperson, vice-Chairpersons and the DBCP Technical Coordinator (TC), reported on their respective activities on behalf of the Panel during the last intersessional periods. The Panel thanked the Technical Coordinator for her rapid progress in the past year, for improving the reporting process and bringing greater clarity to the distribution of platforms. The Panel noted that advances in the percentage of buoys reporting on the GTS have been successful activities of DBCP and its Technical Coordinator and show the value added to the buoy network by the JCOMM-OPS.

Reports were provided by the Executive Board, the DBCP Task Teams, the Action Groups and the Pilot Projects, and decisions were taken according to their recommendations.

The Panel reviewed the status of drifting and moored buoy programmes. During the past 12 months, the number of drifting buoys reporting onto the GTS has decreased over 20%. While we have seen the number of operational drifters go up in the past couple of months, this statistic is of great concern to the community. The current number of operational drifters on the GTS for July, 2012 was 1186, with about half of those reporting atmospheric pressure. The cause for the decrease is due to a number of factors that were discussed during the session of DBCP. The Panel recommended to put in place a concerted set of measures in order to re-establish confidence in the buoy supply chain and to avoid episodes of network degradation in the future.

Noting the successful outcome of the Third "DBCP In-Region Western Indian Ocean Capacity Building Workshop", held in Mombasa, Kenya, 16-20 April 2012, the Panel agreed to organize and convene a Fourth Workshop (in Tanzania, in May 2013) and to commit resources from its Trust Fund to support this activity. The Panel endorsed plans to organize the Second "North Pacific Ocean and Marginal Seas" (NPOMS-2) Workshop, likely in Qingdao, China or Okinawa, Japan. The Panel noted that a "Regional Workshop on Best Practices for Instruments and Methods of Ocean Observation" will be held in Chennai, India, in November 2012.

Regarding migration to table driven codes, the Panel reaffirmed that separate BUFR templates should be defined for drifting and moored buoys. It tasked the Task Team on Moored Buoys and the Task Team on Data Management to finalize the proposal and submit it to CBS through the JCOMM Task Team on Table Driven Codes.

The Panel, in recognizing that the Iridium Pilot Project (IPP) had outlived its initial two-year lifespan, agreed that it should formally be disbanded, but that a small number of legacy actions should be followed-up by its chair, Mr David Meldrum (United Kingdom), aided by the TC and others as required.

The Panel noted the outcome of the Workshop that had been organized by the Pilot Project on the impact of sea level pressure from drifters on NWP. The Panel strongly supported the recommendations from the Pilot Project, and tasked the Pilot Project Chair to lead these actions and report on the outcome at the next Panel Session. In particular, the Panel agreed to move

forward by commissioning, with the pilot funds, an OSE study or the analysis of cyclogenesis episodes with concurrent SLP drifter data (e.g. by partially supporting a post-doc at ECMWF).

The Panel agreed that the Pilot Project on Wave Measurement Evaluation and Testing (PP-WET) was progressing well, and decided to retain the project in its current form for another year, with no additional financial support.

The Panel was pleased to confirm the appointment of Mr Meldrum as chair of the Pilot Project for High Resolution SST (PP-HRSST) and asked him to proceed with the recruitment of additional members in the Steering Group representing all interests as soon as possible. The Pilot Project Steering Group was asked to continue to develop its workplan for the next two years and to report back to the next Panel session on its progress.

The Panel reviewed its website, the monitoring tools provided by the JCOMM *in situ* Observations Programme Support Centre (JCOMMOPS), and the status of DBCP Technical Documents.

The Panel noted that JCOMMOPS will soon welcome a new technical coordinator dedicated to ship coordination. This third coordinator at JCOMMOPS will act as a focal point and will work essentially on the SOT program coordination, GO-SHIP program coordination, metadata management of ship based information (cruise plans in advance), and "JCOMMOPS ship time service" development. JCOMMOPS thanked the Panel for its participation in the funding of the position.

During the year, the majority of drifting buoys (over 80% each month) are reporting on the GTS in less than 120 minutes. Efforts remain to be made to improve timeliness through actions such as the increased use of Iridium, and improvements in the Argos network of regional receiving stations.

The Panel noted a number of actions undertaken during the last intersessional period to address the issue of vandalism on data buoys. In particular, the working group has been addressing issues such as (i) sharing lessons learned in counter vandalism efforts among buoy network operators; (ii) facilitating a conversation among buoy operators on counter vandalism approaches; including technical, educational, operational, and enforcement approaches; (iii) facilitating a conversation on the development of best practices to mature the various methodologies used to quantify the impacts of buoy vandalism; and (iv) serving as a communication channel within the DBCP for further information requests on the subject of vandalism following the release of the WMO vandalism report.

The Panel made recommendations in order to improve the collection of buoy metadata. In particular, it encouraged all buoy operators to provide a website of plans and deployment information for drifting and moored buoys similar to AOML, NDBC, and Canada as well as continuing e-mail notifications as necessary.

The Panel recognized that the problems of the drifter drogue loss and drifter life-time are critical issues for the DBCP. It also noted that the GDP is actively investigating the problems and that it is committed to find and propose solutions to resolve them. The Panel decided to establish a working group within the Task Team on Best Practices and Drifter Technology Development (TT-IBP) to address data buoy life-time improvement. The Panel then requested the new working group to act as soon as established, and to report on its findings and subsequent actions at the next Panel Session.

The Panel discussed its contribution to the implementation of the WMO Integrated Global Observing System (WIGOS), and agreed on a DBCP response to some of the activities detailed in the WIGOS Implementation Plan.

The Panel recognized the considerable importance of the developing Global Framework for Climate Services (GFCS) to WMO and UNESCO/IOC, and to their Members/Member States, as well as the potential role of JCOMM in climate services. It updated its implementation strategy accordingly. The Panel also updated its operating principles and approved them.

The Panel discussed DBCP/SOT Trust Fund contributions, future commitments and budget related matters. The Panel agreed on its budget for the next year with the clear understanding that any budgetary figures attributed should be regarded as upper limits. Because of increased DBCP activities, the Panel invited its members not currently contributing to the Trust Fund to discuss nationally whether a contribution could be made in the future. It also took the opportunity to invite contributing members to consider increasing their contributions. The Panel recognizes the value of in-kind contributions and will in the future highlight these.

The Panel reviewed a proposal from Mr Meldrum and CLS for an Iridium One Stop Shop Proposal. The goal is to ensure data processing, quality control, and encoding of buoy data for GTS distribution purposes according to DBCP and WMO requirements. The Panel invited its members to review the proposal, provide comments and feedback to Mr Meldrum, and requested Mr Meldrum to then refine the proposal for further discussion, analysis, and guidance by the Executive Board.

The Panel noted with regret Mrs Kelly Stroker's decision to return to the USA by January 2013. The Panel was indeed satisfied with the services provided by Ms Stroker for the last 13 months in accordance with the TC's Terms of Reference. The Panel noted with appreciation Ms Stroker's offer of service to smoothen the transition to the new Technical Coordinator, and thanked her for her work on behalf of the Panel so far. The Panel agreed to give authority to the Executive Board to act and decide on behalf of the Panel regarding options concerning the recruitment of a new Technical Coordinator in consultation with the Secretariat.

The Panel re-elected Mr Al Wallace (Canada) as its Chairperson, Mr Johan Stander (South Africa) as Vice-chairperson for the Southern Hemisphere, and Dr R. Venkatesan (India) as the Vice-chairperson for Asia. The Panel elected Mr Jon Turton (United Kingdom) as Vice-chairperson for Europe. Mr Jean Rolland of France was thanked for his contributions as the previous Vice-chair for Europe. The Panel agreed to organize its Twenty-ninth session in Paris, France, provisionally from 23 to 27 September 2013.

The Panel noted that Ms Julie Fletcher of New Zealand was unable to attend the session due to serious illness, and reflected on her contributions to the work of the Panel throughout many years.

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## **GENERAL SUMMARY OF THE WORK OF THE DBCP-28 SESSION**

### **1 OPENING AND WELCOME OF THE DBCP SESSION**

1.1 The Chairperson of the Panel, Mr Al Wallace (Canada), opened the Twenty-eighth session of the Data Buoy Co-operation Panel (DBCP) and its associated Scientific and Technical Workshop at 0845 hours on Monday, 2 October 2012, in Fremantle, Australia.

1.2 On behalf of the Panel, Mr Wallace welcomed all participants to the session and to the workshop, and expressed his appreciation for the commitment of the Panel Members. He then thanked the Bureau of Meteorology (BoM) for hosting the session and workshop.

1.3 The Hon. Mr John Day (MLA - Member of the Legislative Assembly, and Western Australian Minister for Planning, Culture and the Arts, Science and Innovation) welcomed all participants to the session, to Western Australia, and to Fremantle, on behalf of the Government and people of Western Australia. He acknowledged the value of the waters adjacent to Western Australia for their biodiversity, resources and social amenity and the value of oceanographic monitoring and modelling to facilitate improved understanding and management. He applauded the Data Buoy Cooperation Panel for its work and noted the links of the Western Australian Government to the Perth Regional Programme Office of the Intergovernmental Oceanographic Commission (IOC) of UNESCO as a co-sponsor. He warmly welcomed the participants to Fremantle and to Western Australia.

1.4 Ms Melissa Parke (Member for Fremantle in the Australian Federal Government), welcomed participants to Australia and to Fremantle. She acknowledged the importance of data buoy information and science and the value of the work undertaken by the Panel in relation to cooperation between governments, operational agencies, universities and new technology enterprises. She acknowledged the extent of the data buoy network and recognised the challenges that the Panel faces in maintaining and improving upon the network's coverage and monitoring outputs. She also acknowledged Fremantle's maritime history and warmly welcomed all participants to the city.

1.5 On behalf of the host agency, the Australian Bureau of Meteorology, the Bureau's Regional Director for Western Australia, Mr Mike Bergin welcomed participants to the meeting. He noted the importance of the Panel's cooperation agenda and the value of the buoy meteorological data, in particular from the Indian and Southern Oceans, that are critical to meteorological and climate analyses and forecasting in Western Australia, as well as in Australia in general.

1.6 Dr Nick D'Adamo, Officer-in-Charge of the Perth Regional Programme Office (PRPO), a support facility for the IOC, welcomed participants on behalf of his Office, which had contributed substantially to the logistic organization of the session. He acknowledged the real value to Western Australia of the work that the DBCP undertakes, and underlined the ongoing support of the PRPO to the Panel and its work.

1.7 A "Welcome to Country" was provided to the meeting by Mr Shaun Noongah, on behalf of the Noongar people, the traditional custodians of the land upon which the DBCP meetings are being held.

1.8 On behalf of Mr Michel Jarraud, Secretary-General of the World Meteorological Organization (WMO), and of Dr Wendy Watson-Wright, Executive Secretary of the Intergovernmental Oceanographic Commission (IOC), the Secretariat representatives also welcomed participants to the workshop and to the DBCP session and conveyed their sincere appreciation to the Australian Government and the Bureau of Meteorology, and particularly to Dr Peter Dexter (Australia) for hosting the session and for the continuous support given to the

Panel's activities. The Secretariat representative concluded by assuring the continued commitment of WMO and IOC to support and strengthen the work of DBCP through the Observations Programme Area of the Joint WMO-IOC Technical Commission for Oceanography and Marine Meteorology (JCOMM).

1.9 The local organizer for the session outlined various local arrangements. The session agreed its hours of work and other logistic arrangements. The Secretariat introduced the session documentation.

1.10 Mr Wallace then introduced the co-chairs for the Scientific and Technical Workshop, Mr Johan Stander (South Africa) and Dr Boris Kelly-Gerreyn (Australia), to lead that session.

## **2 SCIENTIFIC AND TECHNICAL WORKSHOP**

2.1 Under this agenda item, the Panel briefly reviewed the results of the preceding scientific and technical workshop. The workshop had opened at 1000 on Monday, 2 October 2012 in the conference room of the *Esplanade Hotel Fremantle* in Fremantle, Australia, and ended on the same day at 1800 hours. The themes of the workshop covered (i) technical development for marine observation systems; (ii) operational practices and enhancements, and; (iii) applications of collected data. In addition to the regular themes, this year's workshop had a major focus on "Impact of drifter and moored platform data on operational and research applications". Topics of interest covered:

- Impact of Sea Level Pressure from drifters on Numerical Weather Prediction;
- Impact of Tsunameter data in Tsunami monitoring;
- Impact of buoy data on ENSO prediction;
- Impact of buoy data on ocean forecasting models;
- Recent ocean research findings thanks to buoy data;
- Applications of Southern Ocean buoy data.

2.2 Seventeen presentations were delivered to approximately 70 participants from 14 countries; with each presentation covering one of the four areas given below:

2.2.1 The first Session covered Operational Practices and Enhancements. The following presentations were made:

- (1) Dr R. Venkatesan (India) reported on salient features of Indian deep sea instrumented buoy network in the Bay of Bengal
- (2) Dr Diana Greenslade (Australia) reported on the Use of Tsunameter Observations within the Australian Tsunami Warning System

2.2.2 The second session covered Technical Development for Marine Observation Systems. The following presentations were made:

- (3) Dr Sidney Thurston (USA) provided an update on Indian Ocean Observing System (IndOOS)
- (4) Mr Chris Marshall (Canada) reported on the evaluation of MINIMET drifting buoy with sonic wind sensor for Arctic weather monitoring application
- (5) Dr Richard Crout (USA) Progress in Refreshing the Tropical Ocean Atmosphere Array
- (6) Mr Jamie Griffith (USA) Long Term Autonomous Ocean Remote Sensing Utilizing the Wave Glider

- (7) Dr Robert Jensen (USA) reported on wave Measurement Evaluation and Testing Phase II
- (8) Dr Crout provided an overview of emerging unmanned systems technologies for marine monitoring on behalf of Walt McCall (USA)

2.2.3 The third session covered Applications of Collected Data. The following presentations were made:

- (9) Dr Rick Lumpkin (USA) reported on removing spurious low-frequency variability in drifter velocities
- (10) Mr Lance Braasch (USA) provided an analysis of Argos 3 Viability for Buoy Platforms
- (11) Dr Sergey Motyzhev (Ukraine) reported on increasing effectiveness and reliability of data from drifting buoys
- (12) Ms Mayra Pazos (USA) reported on drifter lifetimes by manufacturer and buoy type
- (13) Mr Shaun Dolk (USA) reported on drifter drogue evaluation and analysis

2.2.4 The fourth session covered Requirements for Climate Applications. The following presentations were made:

- (14) Dr Luca Centurioni (USA) reported on the evaluation of the impact on NWP of sea level atmospheric pressure data over the ocean from drifting boys
- (15) Dr I Dongkyu Lee (USA) reported on the influence of warm SST anomalies formed in the eastern Pacific subduction zone on recent El Niño events
- (16) Dr Greenslade reported on behalf of Eric W. Schulz (Australia) on the Southern Ocean Time Series moored observatory: A technical and scientific review
- (17) Mr Andy Sybrandy (USA) reported on using an Argos PMT in a Drifting Buoy

2.3 Presentations stimulated enthusiastic discussions. The Panel concurred with the six resolutions proposed by the workshop, and adopted them:

*Resolution 1*

With the rapid advancement of new marine and ocean monitoring platforms, and various new sensors integrated on them, there is a requirement to consider more comprehensive analysis and intercomparisons to fully understand performance of various sensors of different platforms (**action OP/a86; TT-IBP; ongoing**).

*Resolution 2*

The DBCP recommends adherence to the GCOS Monitoring Principles to manage change as ocean observing systems evolve. Surface and profiling gliders are candidates to become integral parts of ocean observing systems. The DBCP should recommend data format, calibration, and transmission standards for all sensors and types of systems especially humidity and precipitation. DBCP further suggests to investigate the possible future inclusion of netCDF as an acceptable format for GTS transmission, from these observing platforms as well as guidelines for operations. The Panel requested the TT-DM to refer the issue to the JCOMM Task Team on Table Driven Codes and then the JCOMM Management Committee (MAN) for possible further consideration by CBS (**action; TT-DM; DBCP-29**).

*Resolution 3*

The Panel noted that due to lessons learned with regard to the evaluation of the performance and life-time of the drifters and their drogues, the DBCP Technical Document No. 8 – SVPB Design Reference needed to be updated to take into account the latest design changes. The

Panel requested the Technical Coordinator to follow up this issue, and coordinate the updating of the DBCP Technical Document (**action; TC; DBCP-29**).

*Resolution 4*

The Panel recognises the continuing importance of deep ocean tsunameters for tsunami forecasting and warning services.

*Resolution 5*

The Executive board of the DBCP to consider at least one OSE study to address the effect of thinning the drifter barometer array (**action; PP-SLP; DBCP-29**).

*Resolution 6*

To re-establish confidence in the buoy supply chain and to avoid episodes of network degradation in the future, the DBCP recommends to put in place a concerted set of measures (see agenda items 6.2 and 9.7).

2.4 The Panel expressed its appreciation to all presenters for their contributions to the workshop, and the workshop co-chairpersons, Mr Stander, and Dr Boris Kelly-Gerrey (Australia) for their excellent work in organizing and chairing the workshop. As in previous years, all 17 presentations will be published in a DBCP Technical Document series, on CD-ROM, and will also be available on the DBCP website. All authors were invited to submit their papers via e-mail or CD-ROM to the Workshop Chairperson, via electronic format (MS Office compatible format only), by 30 November 2012 (**action; S&T workshop authors; 30 November 2012**).

2.5 The Panel noted with appreciation that Mr Stander would continue to act as the Workshop Co-chairperson for 2013. The Panel also welcomed the offer from Jean Rolland (France) to act as Co-chairperson for the Workshop and assist with its organization from a regional perspective (**action; J. Stander & J. Rolland; DBCP-29**).

### **3 OPENING OF THE DBCP BUSINESS SESSION**

#### **3.1 Adoption of the agenda**

3.1.1 Following the Workshop on 2 October 2012, and side meetings of the DBCP Task Teams, Pilot Projects, and some of the Action Groups on 3 October, the Twenty-eighth Session of the Data Buoy Co-operation Panel (DBCP) was opened by the Panel Chairperson, Mr Al Wallace, at 0930 on Thursday 4 October 2012, in the conference room of the Esplanade Hotel in Fremantle. The Chairperson welcomed participants to the session and once more thanked the Bureau of Meteorology (BoM) for hosting it and providing excellent facilities.

3.1.2 The Panel adopted its agenda, as reproduced in **Annex I**.

#### **3.2 Working arrangements**

3.2.1 The Panel decided on its working hours and other arrangements for conducting the session, noting that meetings of the Task Teams, Pilot Project steering groups, and some of the Action Groups were organized on the second day of the Session (3 October 2012). The Joint Secretariat then introduced the documentation in accordance with the provisional agenda.

3.2.2 The list of participants to the session is reproduced in **Annex II**.



## **4 REPORTS BY THE CHAIRPERSON, VICE-CHAIRPERSONS, AND THE EXECUTIVE BOARD**

### **4.1 Report by the Chairperson of the DBCP**

4.1.1 The DBCP Chairperson, Mr. Wallace, reported on his activities on behalf of the Panel during the last intersessional period. The Chairperson noted that during the past year the Panel had to address several challenges. The number of drifting buoys reporting in the global array had fallen below the target of 1250. Thanks to the efforts of a number of members, and in particular, the Global Drifting Program, the number of buoys currently reporting again meets and indeed exceeds the target. The Chairperson also noted the ongoing efforts to address gaps in the global array, and to increase the number of barometer buoys. The other significant issue was a financial one associated with contributions through the Intergovernmental Oceanographic Commission. It is expected that this issue will be addressed in the near future.

4.1.2 The Chair recognized the excellent ongoing support provided to the DBCP by the WMO Secretariat, which rose to all challenges, assisted in the familiarization and training of the new Technical Coordinator, and ensured there were no gaps as IOC worked to complete staffing of their Secretariat. The Panel's Technical Coordinator, Ms Kelly Stroker (JCOMMOPS), was congratulated on her ready and quick adaptation to the duties and for restoring products such as the monthly maps. Kelly undertook a number of missions during the intersessional period with the dual goals of enhancing her learning and supporting the work to DBCP. The Panel acknowledged with great appreciation the contribution of Mr Mathieu Belbeoch of JCOMMOPS in helping Kelly assume her new role, and ensuring the continuity of many JCOMMOPS services when there was no DBCP Technical Coordinator. The Chair expressed his appreciation of the appointment of Thomas Gross to fulfil the role of IOC Secretariat. In the continuing effort to ensure the sustainability of the work of the Panel and its partners such as SOT and Argo, the Chairperson noted that a process was underway to recruit a Ship Logistics Coordinator.

4.1.3 The fourth Session of the Joint WMO-IOC Technical Commission for Oceanography and Marine Meteorology (JCOMM) took place in Yeosu, Republic of Korea from 23 to 31 May 2012. The Chairperson attended as the Alternate Head of the Canadian delegation, and took the occasion to represent and make interventions in the interests of the DBCP. The Coordinator of the JCOMM Observations Programme Area, Ms Candyce Clark (USA) noted during the session the issues related to the buoy array and finances. The Chairperson congratulated our colleague, and Vice-Chairperson for the Southern Hemisphere – Mr Stander – on his election as the JCOMM Co-president for meteorology. A number of Executive Board members were at JCOMM representing their institutions, so an informal ad hoc meeting was held to discuss intersessional issues such as finance, Chairs/Vice-Chairs of Task Teams, Operating Principles, Board Members and terms, and outstanding action items (see outcome under item 4.3 below). The Chairperson noted that JCOMM had now formally approved the updated Terms of Reference for the DBCP as proposed in Annex IX of DBCP-27 final report.

4.1.4 The Chairperson recognized, in particular, the efforts of the Task Team on Capacity Building, which is led by Dr Thurston. There were two successful workshops during the intersessional period. The 3<sup>rd</sup> Western Indian Ocean In-Region Workshop was held in Mombasa, Kenya from 16 to 20 April 2012, and the Panel thanks the Kenya Meteorological Department (KMD) for their support. Capacity building efforts were expanded to Asia with the first DBCP Capacity Building for the North Pacific Ocean and Marginal Seas (NPOMS) workshop in Jeju, Republic of Korea from 9 to 13 July 2012. The DBCP thanks Professor Lee for this efforts in developing and hosting this workshop. The Vice-Chairperson for Asia, Dr. Venkatesan, is organizing an additional DBCP/NIOT/BOBP-IGO Regional Workshop on Best Practices for Instruments and Methods of Ocean Observation that will take place in Chennai, India from 19 to 21 November 2012. We will hear more on each of these during the Panel session.

4.1.5 The Chairperson noted the efforts of the pilot project on sea level pressure measurements from buoys, especially the DBCP workshop on the Evaluation of the Impact of Sea Level Atmospheric Pressure (SLP) Data Over the Ocean from Drifting Buoys on Numerical Weather Prediction (NWP), which took place in Sedona, Arizona, USA on 21 May 2012. Dr Centurioni, the project leader, will be reporting on the outcome of the workshop during this Panel Session under item 8.2.

4.1.6 The Chairperson expressed his appreciation and acknowledged the hard work done by all other actions groups, task teams, and pilot projects during the last intersessional period. The leaders of these groups ensured that the Executive Board was kept informed of activities, with guidance being requested on an as required basis. The Chairperson thanked Dr Crout for taking on the role of Vice-Chair of the Instrument Best Practices Task Team part way through the intersessional period, and welcomed him to his first Panel meeting. The Chair also thanked Mr Stander and Dr Kelly-Gerrey for assuming the essential role of Co-Chairs of the Scientific and Technical Workshop. He noted that they had assembled a full day of information and exciting presentations.

4.1.7 The Chairperson noted the diligence of the Executive Board and the Secretariat in the prudent financial management of the DBCP/SOT Trust Fund during the intersessional period.

4.1.8 The Chairperson acknowledged the extraordinary contributions of Bill Burnett (USA) over many years. Bill has taken a new position, and can not support the activities of the DBCP. Bill worked tirelessly to achieve the objectives of the Panel. He served on task teams, action groups and as Co-Chair of the Workshop. His wit and humour often brightened our sessions. Congratulations to Bill on his new work.

## **4.2 Report by the vice-Chairpersons of the DBCP**

### *4.2.1 Report by the vice-Chairperson for Europe*

4.2.1.1 The DBCP vice-Chairperson for Europe, Mr Rolland reported on his activities during the last intersessional period. His activities were mainly conducted through the Executive Board in providing guidance to actions and issues within the recommendations established at DBCP-27. He takes a proactive role in developing links with GHRSSST and Iridium activities.

4.2.1.2 He reported that more than one hundred drifters (so called HRSST1) equipped to report SST with a resolution of 0.01K and accuracy of 0.05K to meet GHRSSST requirements have been deployed in the Atlantic Ocean and the Indian Ocean. The data are reported in BUFR code on to the GTS. The next step consisted in building drifters called HRSST2 equipped with digital SST probes which may be pre-and post calibrated. The first HRSST2 prototypes were deployed and seem promising. The accuracy of digital probes may reach 0.02K (standard deviation of measurement differences at night with a Seabird sensor on 4 SVP-BS).

4.2.1.3 As decided at last DBCP session, 10 drifters upgraded to Iridium, were deployed in the South Pacific Ocean where the average transmission delays through Argos are too high.

### *4.2.2 Report by the vice-Chairperson for Asia*

4.2.2.1 The DBCP Vice-Chairperson for Asia, Dr. Venkatesan, reported on his activities during the last intersessional period. He noted that India is spearheading and continuing to contribute to ocean observations through a gamut of activities. During 2011-2012, under the moored buoy programme, 61 moored met ocean buoy operations were carried out with 12 cruises of 225 ship days involving 2500 person days in Bay of Bengal, Arabian Sea & Indian Ocean. This enabled the successful maintenance of the Moored Buoy Network. A network of 6 next generation moored

buoys was established in deep water in the Bay of Bengal and Andaman Sea to measure and transmit in real time, sub surface data in depths up to 500m, along with met - ocean data. These data will be used for monsoon studies. The buoys were deployed before the onset of North-East Monsoon could capture JAL cyclone with the onset of low pressure and its effects of atmosphere and ocean, which gave a new insight into this phenomenon during 2011. Coral Reef Buoy was deployed in Mahatma Gandhi Marine National Park, Wandoor, Andaman & Nicobar Island during February 2011 to study the global warming and coral bleaching. The buoy was fitted with meteorological sensors, and a water quality sensor to monitor the coral reef environment. Data sets are available in GTS. In addition, Argo floats, drifters, ADCP moorings, equatorial moorings, and XBT ship based observations were continued. The Government of India has a five-year work plan for ocean observation and proposed new activities. Coastal HF Radars are working at five locations providing valuable information. Under INDO US collaboration the "Monsoon Desk" at NOAA's National Centers for Environmental Prediction (NCEP) serves as the modality to coordinate numerical model simulations and diagnostics between NCEP and MoES parties in India

4.2.2.2 Important factors that decide the most appropriate satellite communication link to be used for tsunami buoy systems are: (a) power consumption of the transceiver electronics, (b) high data rate and (c) low latency. The IRIDIUM satellite terminal supports 2400bps with a very low power consumption of 250mW in standby mode, and around 2.5W in transmit mode. Compared to this, INMARSAT terminal operates at a low data rate of 600bps with high power consumption of 2W in standby mode and 23W in transmit mode. Hence IRIDIUM communication is used in more than 90 % of the tsunami buoys operating globally.

4.2.2.3 Dr Venkatesan reported that China's First Institute of Oceanography (FIO) is collaborating closely with NOAA as a new emerging player in the Global Tropical Moored Buoy Array (GT MBA), with its first *Bailong* buoy deployment at 8°S, 100°E in the tropical Southeastern Indian Ocean on 25 February 2010. Indian Ocean Panel IOP-8 MEETING was organized by Ministry of Earth Sciences from 25 to 26 July 2011, Chennai, India, followed by SIBER from 26 to 28 July and Indian Ocean Research Forum IRF – 29. Recognizing the importance of capacity a workshop was successfully conducted in Jeju, South Korea July 2012. Another workshop will be organized in Chennai India in November 2012 and Okinawa Japan in June 2013. Industry will contribute to a DBCP NIOT Workshop on best practices in Chennai India November 2012. These workshops will continue to build capacity and establish Resource Sharing Partnerships.

### *Challenges*

4.2.2.4 In recent days, piracy in the Arabian Sea is affecting the servicing and deployment. Cruises were undertaken for Indian and RAMA buoy programme with assistance of armed guards. Another major challenge is 'vandalism of surface buoys', including destruction of solar Panels, destruction of transmission units, destruction of sensors mounted on a 3 m tall mast on met-ocean data buoys, etc. Vandalism of these valuable ocean data buoys has been, and remains, a significant problem in many ocean areas. To address the issue of safety of data buoys and tsunami buoys, there is an urgent need for regional cooperation and regionally coordinated effort. India has evolved a working mechanism in South Asia. Recent act of vandalism by fishermen from neighbouring country was tracked and immediate action was taken with joint efforts by both countries

### 4.2.3 *Report by the vice-Chairperson for the Southern Hemisphere*

4.2.3.1 The DBCP vice-Chairperson for the Southern Hemisphere, Mr Stander reported on his activities during the last intersessional period.

4.2.3.2 Mr Stander expressed his sincere appreciation for the fact that his learning of marine meteorology and oceanography sky rocketed since he first joined the DBCP and JTA at the session held in his home town Cape Town South African in 2008. It was at that meeting where he

met various experts and individuals who took him under their arm and guided him through the extremely difficult life of JCOMM/WMO. Mr Stander expressed his personal thanks to Dr Boram Lee (IOC and the WMO Secretariat), Mr Etienne Charpentier (WMO Secretariat), Mr David Meldrum (United Kingdom), Mr Al Wallace (Canada), Mr Frank Grooters (the Netherlands), Mr Bill Woodward (USA), Mr Rolland, Dr Bill Burnett (USA), Dr Thurston, Ms Julie Fletcher (New Zealand) and not but least, Mr Graeme Ball (Australia) as well as the experts who work in the background like Mr Shaun Dolk (USA), Ms Pazos, Mr Belbeoch, Mr Eric Locklear (USA), and Mr Joe Linguanti (Canada) from which he has learned a lot. He explained that it was due to their assistance that we can today be proud that we are well represented at JCOMM level and all the praise must go to them.

4.2.3.3 The vice-chair for the Southern Hemisphere also thanked the chair, secretariat and Executive Board members for the excellent work and support especially prior, during and after the JCOMM session.

4.2.3.4 During the intersessional period, the Vice-Chair undertook the following missions:

1. WMO Executive Council Expert Team on Polar Observations, Research and Services (EC-PORS) - Sodankylä, Finland, 6–8 February 2012;
2. Third In-Region Western Indian Ocean Capacity Building Workshop of the WMO/IOC Data Buoy Cooperation Panel (DBCP) and Partners, Mombasa, Kenya, 16-20 April 2012;
3. The preparatory workshop for the establishment of an International Forum of users of satellite data telecommunication systems (Satcom Forum) – Toulouse, France, 23-24 April 2012;
4. Joint Tariff Agreement (JTA) Executive Committee Meeting – Toulouse, France, 25-27 April 2012;
5. Joint WMO/IOC Technical Commission for Oceanography and Marine Meteorology (JCOMM) – Yeosu, Republic of Korea, 23-31 May 2012;
6. Reduced DBCP Executive Board meeting, Yeosu, Republic of Korea, 25 May 2012;
7. Sixty-Fourth WMO Executive Council (EC) – Geneva, Switzerland, 25 June – 3 July 2012.

4.2.3.5 During the JTA meeting and Satcom Forum workshop in Toulouse, Mr Stander visited the JCOMMOPS office and thanked the staff for their excellent work. He made some recommendations with regards to the projection of Global buoys array distributions on JCOMMOPS maps especially in the projection from Africa for Africa/Europe and agreed that it will probably be good to have two views ensuring that all our clients will be happy.

4.2.3.6 It was with great excitement that a new HRPC antenna was donated and installed by CLS in Cape Town. This will certainly reduce the time delay in receiving observations from the South Atlantic and we are looking forward to studies to document the change, as well as the installation of the second antenna at Ascension Island.

4.2.3.7 Mr Stander discussed the lack of communication between the scientific community, especially concerning WCRP-SCAR International Programme for Antarctic Buoys (IPAB) activities, as expressed during the EC-PORS session. He was informed and invited to attend a joint IPAB and International Arctic Buoy Programme (IABP) meeting to be held in Geneva in June 2012, however he could not attend and communicated the DBCP frustrations to the WMO secretariats who discussed this with the Chair of IPAB. Recommendations from DBCP as well as EC-PORS were sent to the chair and to date Mr Stander has not yet received any feedback in this regard. In the mean time Southern Hemisphere Panel members were requested to provide IPAB reports and hopefully this will be solved soon.

4.2.3.8 Telephone and e-mail communication continued between the vice-Chair for the Southern Hemisphere and various DBCP Task Team members especially for work done during the intersessional period by various teams and/or programmes.

4.2.3.9 Within Africa, especially Southern Africa, Mr Stander also expanded the services of DBCP to all other oceanography institutions/organizations ensuring that the region becomes more actively involved by making use of the upcoming African Ministerial Conference on Meteorology (AMCOMET) meeting where data buoys and research work of Africa is high on the agenda.

4.2.3.10 Mr Stander reported that he has reviewed the DBCP operating principles and proposed substantial changes. In particular, many of the ongoing action items from the DBCP Action Plan were incorporated in the operating principles. All Panel members are requested to regularly review these principles, as these principles are key to the strength and effectiveness of the Panel. No wonder this Panel frequently gets the high praise of JCOMM and WMO.

4.2.3.11 The Vice-chair also proposed a template for the report by the DBCP Chair and Vice-chairs to the session of the DBCP. The Panel agreed with this template (**Annex XIV**), and requested the Chair and the vice-Chairs to comply with it for their report to the next Panel Session (**action OP/a12; Chair & vice-Chairs; ongoing**).

4.2.3.12 Mr Stander expressed once again his thanks to Panel members for all their assistance during the last year and explained that he was sure that we will work even closer during the next intersession period.

### **4.3 Report by the Executive Board**

4.3.1 The DBCP Chairperson, Mr Wallace, reported on the activities of the DBCP Executive Board during the last intersessional period...

4.3.2 An informal reduced Executive Board meeting was held on side of JCOMM-4 in Yeosu, Republic of Korea, on 25 May 2012. Attending the meeting were Mr Wallace, Mr Stander, Dr Thurston, Ms Candyce Clark (USA), Mr Meldrum, and Mr Charpentier (WMO Secretariat). The meeting discussed implications of the departure of Bill Burnett (USA) from the DBCP as he has been involved in many Task Teams and Pilot. The meeting agreed to approach Dr Crout and ask him whether he had agreed to chair the Task Team on Instrument Best Practices and Drifter Technology Development (TT-IBP). The full Executive Board has then been consulted by email to seek concurrence. The meeting also agreed that the DBCP Operating Principles should be updated to make sure that there is no conflict of interest for the Chairs/Co-Chairs positions (Panel, EB, Task Teams). It was also agreed to shift the ongoing actions from the DBCP workplan into the operating principles. The meeting agreed that the Task Team on Capacity Building should develop a Capacity Building Strategy applicable to all regions.

4.3.3 The Board has also been consulted and decided on the following:

- Agreed to transfer USD 90,000 from the DBCP/SOT Trust Fund at the WMO Secretariat to the IOC in order to allow continuity of the TC position;
- As discussed at DBCP 27, the formal merging of the Pilot Projects on Wave Measurement Evaluation and Test, and Wave Measurements from Drifters was approved.
- Mr Meldrum has accepted to be the Chair of the Pilot Project on High Resolution Sea Surface Temperature (PP-HRSST).

## 5 REPORT BY THE TECHNICAL COORDINATOR

5.1 During the period 1 September 2011 to 31 August 2012, Ms Stroker worked as Technical Coordinator (TC) of the Data Buoy Cooperation Panel (DBCP). Ms Stroker worked in Toulouse, France, at CLS, and was employed by the United Nations Educational, Scientific, and Cultural Organization (UNESCO). On average, the TC spends 70% of her time on DBCP-related matters and 30% of her time as OceanSITES Project Office.

5.2 During the previous year, Ms Stroker's time was spent on the following:

- Familiarizing herself with the JCOMMOPS Database and tools;
- Familiarizing herself with DBCP community, platforms, operators, and networks;
- Travelling to meet with various DBCP Members, Action Groups, and Teams;
- User assistance as needed;
- Assisting Panel members with technical and programmatic issues;
- Maintaining metadata in the JCOMMOPS database;
- Updating and maintaining DBCP and OceanSITES websites;
- Maintaining mailing lists, contact details and user groups on DBCP, JCOMMOPS, and OceanSITES website (including coordination with JCOMM site);
- Monitoring the Quality-Control Relay traffic;
- Investigating deployment opportunities;
- Producing monthly maps;
- Tracking all buoy deployments, and mooring maintenance/installations;
- JCOMMOPS – reviewing database design, metadata loading and reporting;
- Preparing for and attending meetings;
- Monitoring Global Telecommunication System (GTS) data flow and timeliness;
- Working with JCOMMOPS student on updates to the DBCP and OceanSITES Google Earth layer.

5.3 The TC outlined the current status of the data buoy network. During the past 12 months, the number of drifting buoys reporting onto the GTS has decreased over 20%. While we have seen the number of operational drifters go up in the past couple of months, this statistic is of great concern to the community. The current number of operational drifters on the GTS for July 2012 was 1186, with about ½ of those reporting atmospheric pressure. The cause for the decrease is due to a number of factors that will be discussed during the session of DBCP and manufacturers are aware and taking action. The GDP has investigated this and determined it was due to

- (1) leaking battery packs for drifters from two manufacturers,
- (2) unconventional design changes in drifters from one manufacturer, and
- (3) higher energy consumption by the new Argos transmitter designed for Argos 3 (PMT) when used in Argos 2 mode.

The GDP has responded to these issues by

- (1) issuing a recommendation to the manufacturers to use only high quality batteries and
- (2) requiring higher standardization across the manufacturers to address water infiltration.

Solutions to address problem (3), which was discovered more recently, are now being addressed.

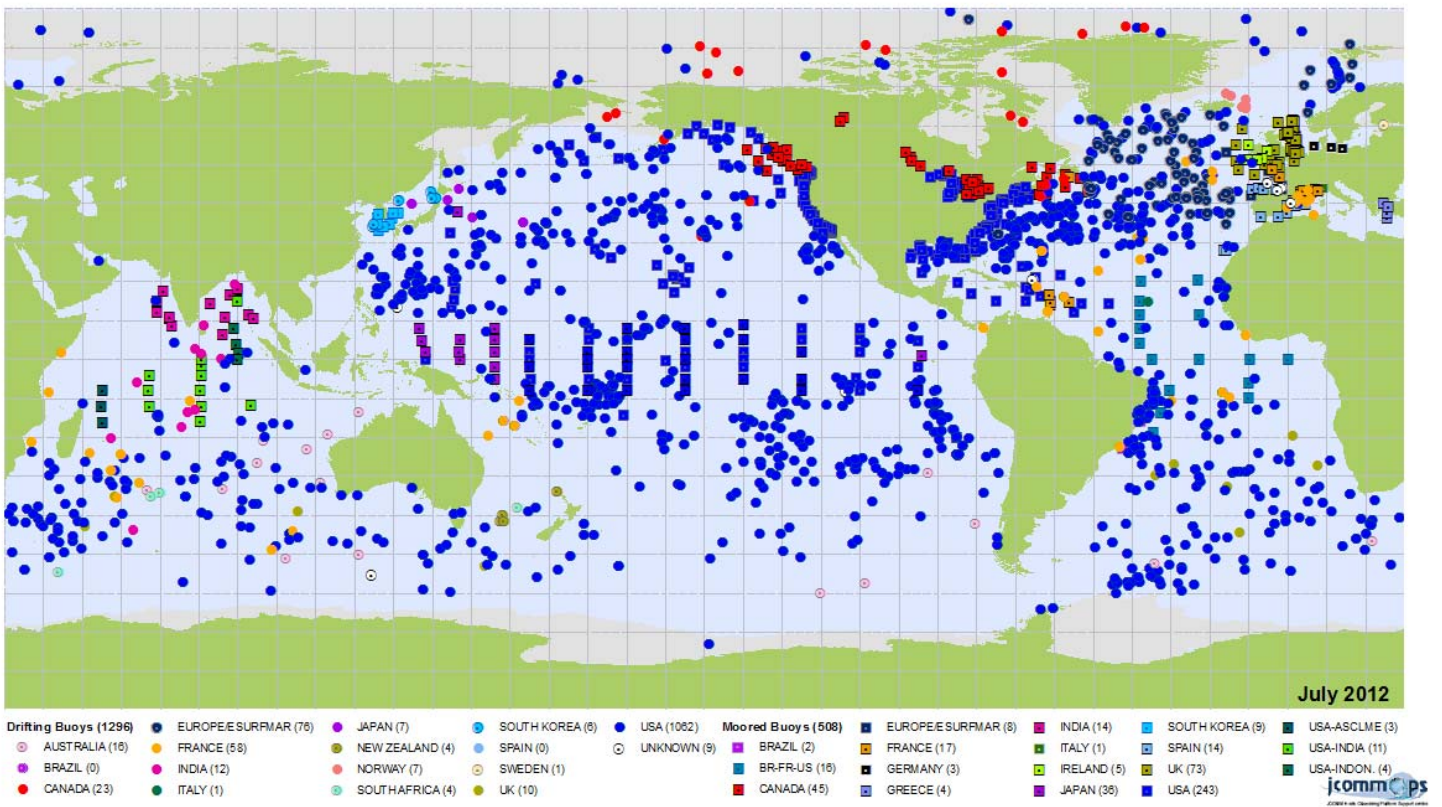


Figure 1- Drifting and Moored buoy monthly status map for July 2012. (GTS information received from Météo-France)

Chart of Buoy numbers over time

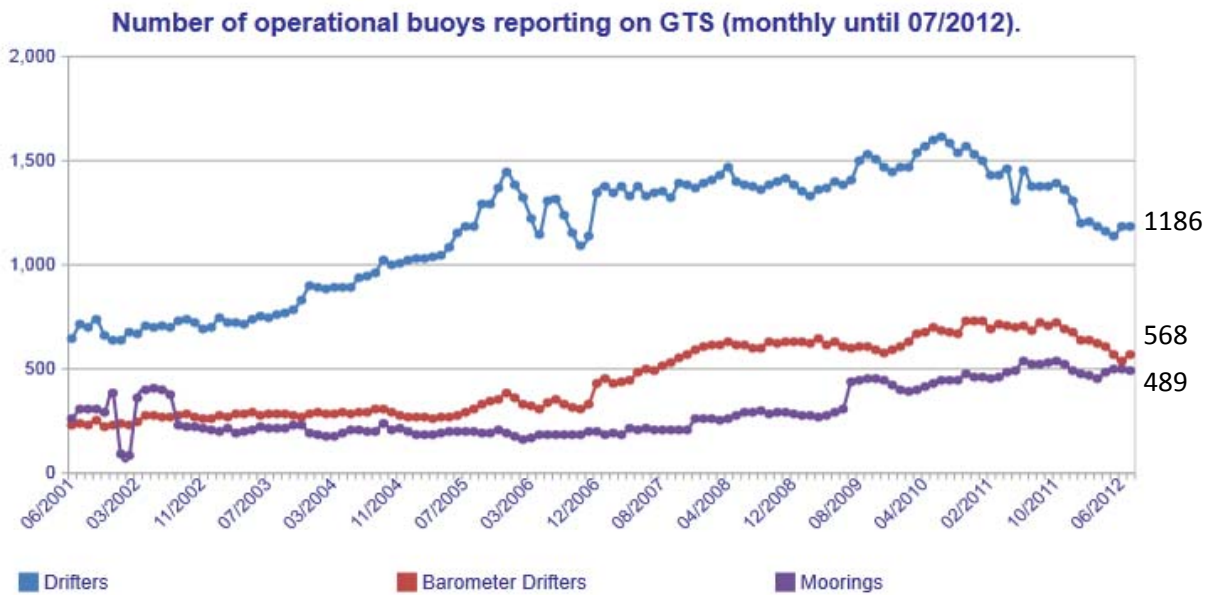


Figure 2 - Number of operational buoys reporting on the GTS since 2001.



5.4 The Technical Coordinator reported that among the drifting and moored buoys reporting on the GTS in BUOY (or BUFR) format, the following variables were measured in July 2012.

Variable	Any	Air P	P Tend	SST	Air T	Hum	Wind	Waves	Sub/T
Drifting Buoys	1186	568	519	1085	18	2	4	10	38
Moorings	489	347	265	375	400	214	387	343	118

**Table 1 - Drifting and Moored buoy variables being reported on the GTS during July 2012.**

5.5 She also reported that during the last intersessional period the Deep-Ocean Assessment and Reporting of Tsunami (DART) Buoys had been added to the JCOMMOPS database. The locations of these buoys will be included in future monthly maps and reporting. The data for these buoys does not come through the normal GTS chains and is not collected by Météo-France nor the Integrated Science Data Management (ISDM, Canada).

5.6 A comparison of GTS Data was done between ISDM and Météo-France in both April and July, 2012. The comparison proved generally good. For most of the "TTAAii CCCC" GTS bulletin headers, the magnitude of the number of available messages is the same. One critical issue that needs to be addressed concerns the TAO Refresh buoys. At present 24 TAO Buoys in the Pacific have been refreshed to use Iridium communication and these buoys are reporting under the GTS Header of "SXPA01 KWNB". This format does not follow the WMO specifications for bulletin headers and thus the data are not processed at Météo-France. The GTS header should be modified to follow WMO specifications as the entire TAO array has plans to be refreshed by 2014. (*action; NDBC; asap*).

5.7 The Southern Ocean Buoy Programme, as part of the DBCP Implementation Strategy, aims to have 300 operational drifting buoys with barometers distributed across the Seas south of 40°S. During July 2012, the number was 169, which means this number has not yet been achieved. Plans for the period August 2012 to July 2013 are detailed in the table below.

Country	Buoys purchased or planned	Additional Upgrades	Total	Comment
Australia	3	4	7	
France	0	46	46	Total includes 16 which were planned for 2011-2012 rolled over.
Germany	0	0	0	
New Zealand	6	10	16	
South Africa	0	0	0	70 deployments for the GDP.
UK	6	0	6	
USA	190		190	US/IPAB (10) GDP: • South Indian (60) • South Pacific (40) • South Atlantic (80) • All deployments will be conducted in cooperation with global partnerships
<b>Total</b>	<b>221</b>	<b>44</b>	<b>265</b>	



5.8 The Technical Coordinator discussed the DBCP Label (to stick on drifters) that has been before the Panel for a number of years. This label would primarily announce an association to the UN of the buoy, through programmes of the WMO and IOC. The label would also assist in recovering beached instruments, and could help to combat the vandalism issue that is so prominent in certain parts of the world's oceans. The Vice-Chair for Asia agreed to work with the TC to explore options.

5.9 The TC then discussed her work during the intersessional period, highlighting certain key tasks completed during the intersessional period. Updates to the website, Google Earth layer, brochure and technical documents were all undertaken in the intersessional period. She then highlighted some of the issues that required action by the Panel which were to be discussed further in agenda item 12.3. Some future plans were presented and the Panel was invited to comment on priority tasks for the TC Workplan.

5.10 The Panel was pleased to see good progress with regard to the monitoring of moored buoys, as well as with the percentage of buoys reporting through the GTS and regional initiative to control vandalism of data buoys. It noted with appreciation that India has plans to substantially increase the ocean observation network.

5.11 The Panel thanked the Technical Coordinator for her rapid progress in the past year, for improving the reporting process and bringing greater clarity to the distribution of platforms. The Panel noted that advances in the percentage of buoys reporting on the GTS have been successful activities of DBCP and Technical Coordinator and show the value added to the buoy network by the JCOMM-OPS.

5.12 The Panel agreed on the following:

- (i) The DBCP community should adopt an international sticker, similar to that developed for the Argo Program; and requested the Technical Coordinator to work with the Vice-Chair for Asia to develop options for consideration by the Executive Board (**action; TC; DBCP-29**);
- (ii) The DBCP community is encouraged to provide any information on planned deployments to JCOMMOPS as soon as it is available, and to work with the soon to be hired Ship Coordinator to increase drifter deployments (**recommendation OP/r18**);
- (iii) Manufacturers are encouraged to provide information to JCOMMOPS on models, formats, and shipments (**recommendation OP/r19**);
- (iv) The Panel requested the Technical Coordinator to work with Iridium VARs to obtain drifting and moored buoy data (**action; TC; DBCP-29**);
- (v) The GTS header should be modified to follow WMO specifications as the entire TAO array has plans to be refreshed by 2014. (**action; NDBC; asap**);
- (vi) The Panel requested the Technical Coordinator to make a distinction between Rigs & Platforms and Moored Buoys on JCOMMOPS status maps (**action; TC; DBCP-29**);

## 6 REPORTS BY THE TASK TEAMS

### 6.1 Task Team on Data Management (TT-DM)

6.1.1 Ms Pazos, Chairperson of the Task Team on Data Management (TT-DM) reported on the progress during the intersessional period. The Task Team promoted discussion between its members, revised the recommendations proposed last year to assess actions taken, and proposed new recommendations.

6.1.2 Regarding DBCP-28 action item No. 49 (i.e. to have a methodology to compare non-GTS buoy data with Ocean models, open to anyone via the web, be eliminated from the action list), the Panel noted that Meteo-France has internal tools that are working and can provide results of occasional queries sent by e-mail. However, for technical reasons it is not planned to make these tools available on the web.

6.1.3 The meeting agreed on the following:

- (i) The conversion to use 7-digits numbers instead of the 5-digit numbers must continue until all cross-reference lists are changed;
- (ii) A new column should be added to the GDP/DAC: List and Details of all Buoys in Database on the web<sup>1</sup> to show latitude and longitude of where drifters lost their drogues (**action; GDP; ASAP**);
- (iii) Experts for each unfinished section of the “Oceanographer’s and Marine Meteorologists Cookbook for submitting data in real time and in delayed mode” should be identified so the existing draft can be completed, and submitted for publication (**action; TC; TTDM**);
- (iv) Submit the proposed BUFR templates for drifting buoys and for moored buoys to the TT on Table driven Codes for approval.

6.1.4 The Panel thanked Ms Pazos and members of the Task Team for their efforts. It was agreed that Ms Pazos would continue as chairperson of the Task Team for the intersessional period. The full report of the Task Team is provided in Appendix A of DBCP-28 preparatory document No. 6.1 as well as in the CD-ROM accompanying the DBCP Session final report.

## **6.2 Task Team on Instrument Best Practices and Drifter Technology Development (TT-IBPD)**

6.2.1 Dr Crout, interim co-Chairperson of the Task Team on Instrument Best Practices and Drifter Technology Development (TT-IBPD), reported on the progress during the intersessional period. The Panel noted that he had been nominated to act as interim co-Chairperson following the resignation of Dr Bill Burnett (USA) as Chair of the Team. The Panel used that opportunity to thank Bill Burnett for his contributions in the past years to the work of the Task Team, and wished him every success in his new position.

6.2.2 Dr Crout particularly reported on the outcome of evaluation studies conducted by (i) the Global Drifter Program and its Data Assembly Center at AOML; (ii) the UK Met Office; (iii) Météo France; (iv) Environment Canada; and (v) the Marine Hydrophysical Institute of Ukraine and Marlin-Yug Ltd. In particular, the following findings were reported:

1. 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).
2. Per a GDP study on 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.

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

3. The engineering aspects of the drifter drogues are being evaluated at Scripps Institution of Oceanography by Dr 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. The Panel recommended to manufacturers to use the SIO drifter as a reference design (**recommendation OP/r24; Manufacturers; ongoing**).
4. There is clear evidence that fitting lithium batteries to drifting buoys does give extended operating lifetime. For Argos drifters ~ x1.75 and for Iridium drifters ~ x1.77 (based on expired drifters excluding early failures <100 days and omitting the drifter that ran aground). However, Lithium batteries will introduce additional challenges for international shipping and safety, and environmental impact.
5. The excellent data availability and timeliness of Iridium buoys are confirmed.
6. Results are globally satisfactory for the SVP-BS (barometer+salinity) tested by Météo France.
7. Buoy lifetimes of buoys deployed by Environment Canada have ranged from a high of 1209 for a ICEX buoy from CMR, to failures on deployment or within only 30 days of deployment for some recent SVP-B deployments (MetOcean buoys). The network wide average lifetime (for all buoy types) over the past three years is 393 days. Lifetimes for SVP-B buoys from **MetOcean** (with mix of Iridium and ARGOS communications) have been in the range of 200-230 days, with a maximum of 553 days (based on sample of 10 buoys).
8. Initial results based on 3 month of data suggest that the observed wind speeds from sonic anemometers on 2 Minimet buoys manufactured by **Pacific Gyre** are likely useful for use in operational forecasting. However they may need to be corrected for height above the surface, especially at higher wind speeds.
9. Initial results from Marlin Yug study suggests that the quality of pressure reports from standard SVP-B drifter with 41-cm hull and alkaline batteries can remain reliable for 3 years at least under any weather conditions. The Panel noted that long-living drifters with 41-cm hulls and reliable AP measurements could be deployed in high latitudes, while the mini drifters with smaller hull diameter and shorter lifetime could be used in low latitudes.
10. Successful testing of new “micro” drifter (ice marker) with 20-cm float.

6.2.3 The Panel recalled its decision at the previous Session that the manufacturers should play a strong role in the Task Team, and had nominated Mr Andy Sybrandy (Pacific Gyre, USA) as co-Chairperson of the Task Team (on a rotating basis). At the same time, while discussing again the issue, the Panel acknowledged that the Chair and Co-Chair of the Task Teams should not be in a situation of conflict of interest. The Panel, warmly thanked Mr Sybrandy for his substantial contributions to the work of the Task Team during the last intersessional period.

6.2.4 Following discussions under item 2.3, and particularly to Resolution 6, the Panel recommended to put in place the following concerted set of measures in order to re-establish confidence in the buoy supply chain and to avoid episodes of network degradation in the future:

- a) urgent collaboration with all suppliers to clarify any remaining sources of buoy unreliability, and to formulate action plans to address them;
- b) update and promulgate best practices for buoy design and construction; and promote minimum standards;

- c) attention by suppliers to product assurance processes, with particular attention to product change management;
- d) attention to acquisition practices, especially by the major buoy purchasers, to ensure that supply contracts incorporate clear requirements for life-time performance standards, including reliability, with appropriate commercial remedies for large-scale product deficiencies;
- e) attention to network monitoring practices (by GDC and/or suppliers) to aid the early recognition and diagnosis of potential product deficiencies, especially during the immediate period of remedial action.

6.2.5 In particular, the Panel agreed with the following recommendations:

- (i) Update and promulgate the "Global Drifter Programme: Barometer Drifter Design Reference Document", last revised July 2009 [addresses DBCP-27 on-going action item #133];
- (ii) Utilize the specifications list, based on existing metadata located at AOML, to develop Best Practices [addresses DBCP-27 on-going action item #137];
- (iii) Ensure the recommended standard document to be delivered with each drifting buoy;
- (iv) Continue to specify clear labeling in buoy packaging;
- (v) Define procedures to insure product change management;
- (vi) Continue investigations into buoy performance (network monitoring) to identify and diagnose sources of buoy deficiencies and formulate action plans to address them [partially addresses on-going action item #116].

6.2.6 Noting that according to the new draft operating principles of the Panel (to be discussed and approved under agenda item 12.2), Chairs and vice-Chairs of the Task Teams should not be in a position of conflict of interest, the Panel concurred with the Task Team's proposal to nominate Mr Andy Sybrandy (Pacific Gyre, USA) as vice-Chair of the Task Team provided this proposal receives concurrence from the major drifter manufacturers. It requested the Chair of the Task Team to verify this requirements, and to report to the Executive Board for confirming the decision (**action; Chair TT-IBP;ASAP**).

6.2.7 The Panel thanked Dr Crout and the members of the Task Team for their efforts. The Panel formally elected Dr Crout to Chair the Task Team during the next intersessional period. The full report of the Task Team is provided in Appendix A of DBCP-28 preparatory document No. 6.2 as well as in the CD-ROM accompanying the DBCP Session final report.

### 6.3 Task Team on Moored Buoys (TT-MB)

6.3.1 Mr Jon Turton (United Kingdom), Chairperson of the Task Team on Moored Buoys reported on the progress during the intersessional period.

6.3.2 The Panel noted that during the year the metadata content needing to be collected was agreed and has subsequently been published on the DBCP web-site<sup>2</sup>. Recalling that DBCP-27 had agreed that the metadata should be submitted to JCOMMOPS in NetCDF for consistency with OceanSITES and tsunami buoys, the Panel noted with appreciation that NDBC had offered to lead on developing the SIF (standard input format) for the moored buoy metadata NetCDF. Once the SIF is agreed then metadata submission collection could begin. However most operators compile

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2 <http://www.jcommops.org/dbcp/data/metadata.html>

their metadata in different formats, so will need to convert these into the agreed format(s) for submission.

6.3.3 The Panel reaffirmed that separate BUFR templates should be defined for drifting and moored buoys. For moored buoys the approach suggested is to split the message into a series of sequences for various aspects (e.g. identification/position/time, standard surface met measurements, ancillary met measurements, basic wave measurements, detailed spectral wave measurements etc.). This will allow to reduce the size of GTS reports when some measurements are not being reported.

6.3.4 Mr Turton reported on the technical developments undertaken by a few DBCP members involved in moored buoy operations, including:

- Environment Canada Moored Buoy Network
- US National Data Buoy Centre (NDBC)
- PMEL Tropical Moored Buoy Array
- PMEL Ocean Climate Stations (OCS)
- Indian Moored Data Buoy Programme
- Met Office moored buoy network

6.3.5 The Panel thanked Mr Turton and members of the Task Team for their efforts in maintaining and improving their moored buoy networks and exchanging their data, and for the inputs provided for this report. It was agreed that Mr Turton would continue as chairperson of the Task Team for the intersessional period. The full report of the Task Team is provided in Appendix A of DBCP-27 doc. 6.3 as well as in the CD-ROM accompanying the DBCP Session final report.

## 6.4 Task Team on Capacity-Building (TT-CB)

6.4.1 Dr Thurston, Chairperson of the Task Team on Capacity Building reported on the progress during the intersessional period. In particular, he provided comprehensive information on: 1) the preparation and outcome of the Third in-region Capacity Building workshop for Countries of the Western Indian Ocean Region, Mombasa, Kenya; 16-20 April 2012, 2) Capacity Building Workshop for the “North Pacific Ocean and Marginal Seas (NPOMS)”, Jeju South Korea 9-13 July 2012 and 3) preparations underway for the “Regional Workshop on Best Practices for Instruments and Methods of Ocean Observation”, Chennai India 19-21 November 2012.

6.4.2 After discussion, the Panel agreed with the following action items:

- (i) To convene the Fourth "DBCP In-Region Western Indian Ocean Capacity Building Workshop" (WIO-4), May 2013, Zanzibar, Tanzania. The goals for the workshop are detailed in **Annex XIII (action; TT-CB; Spring 2013)**;
- (ii) To coordinate WIO-4 preparations with the DBCP, Tanzania Meteorological Agency, the NOAA Office of Climate Observation (OCO), the Agulhas-Somali Current Large Marine Ecosystem (ASCLME), and Western Indian Ocean Marine Science Association (WIOMSA) (**action; S. Thurston & Secretariat; until WIO-4**);
- (iii) To continue to build Observation Development Team (ODT) and Modelling Development Team (MDT) with Met/Ocean Institutes in the Western Indian Ocean Region (**action; TT-CB; WIO-4**);

- (iv) To Assemble a Team to explore recent advances in Information and Communication Technology (ICT) to help facilitate more effective DBCP TT-CB Outreach and Capacity Building Activities on a larger scale (**action; TT-CB; until DBCP-29**);
- (v) To Enhance Coordination and Cooperation between TT-CB, WMO Regional Associations, GOOS Regional Alliances, and other IOC regional bodies (**action; TT-CB; DBCP-29**);
- (vi) To endorse and provide coordination support, through TT-CB, for the organization of the Second “North Pacific Ocean and Marginal Seas” (NPOMS-2) Workshop likely in Qingdao China or Okinawa Japan, and the “Regional Workshop on Best Practices for Instruments and Methods of Ocean Observation” in Chennai India. The Panel emphasized that the regional activities should create synergies and avoid duplication, at all cost, therefore requested the TT to develop with representatives for the CB workshops specialized activities that will meet the regional interests. To ensure this and for smooth coordination among regional activities, the Panel decided to invite the leaders of the regional workshop organization to become members of the TT-CB. (**action; TT-CB; continuous**).

6.4.3 The Panel nominated Ms Louise Wicks (IOC Perth office) as new member of the Task Team. It was agreed that Dr Thurston would continue as chairperson of the Task Team for the intersessional period.

6.4.4 The goals of DBCP Capacity Building workshops are detailed in **Annex XIII**.

## **7 REPORTS BY THE ACTION GROUPS**

7.0.1 Under this agenda item, the Panel was presented with reports by its action groups. Summaries of the Action Groups reports are provided in **Annex V**. The full reports of the Action Groups will be reproduced in the Panel’s Annual Report.

### **7.1 EUMETNET<sup>3</sup> Surface Marine programme (E-SURFMAR)**

7.1.1 The Chairperson of the EUMETNET Surface Marine programme of the grouping of European Meteorological Services (E-SURFMAR) Data Buoy Technical Advisory Group (DB-TAG), Mr Turton reported on the activities of E-SURFMAR during the last intersessional period.

### **7.2 Global Drifter Program (GDP)**

7.2.1 The Global Drifter Program (GDP) Chairperson, Dr Rick Lumpkin, reported that the global drifter array size diminished to a minimum of 875 drifters in mid-April 2012, and has subsequently been increasing at an average of 35-40 drifters per month. Its current size (as of 1 October 2012) is 1068, larger than at last year’s DBCP meeting but not yet at the goal of 1250 drifters. During the period 27 July 2011-28 July 2012, the GDP coordinated the deployment of 1203 drifters. Highlighted deployments included large numbers from some particular research cruises, and an air-dropped deployment in the Gulf of Mexico in front of Hurricane Isaac in August 2012. In the coming intersessional period, the GDP is planning to coordinate approximately 1000 deployments, or more if needed to reach the goal of 1250 drifters. The Panel commended the GDP for its efforts to maintain the drifter array. It concurred with the GDP approach that before increasing the number of barometer drifters in lower latitudes, an objective assessment of their impact on NWP should be conducted (see item 8.2).

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3 Grouping of European Meteorological Services

### **7.3 International Arctic Buoy Programme (IABP)**

7.3.1 Dr Ignatius Rigor (USA) reported on the activities of the International Arctic Buoy Programme (IABP) during the last intersessional period, on behalf of its Chairperson, Ms Christine Best (Canada).

7.3.2 The Panel recognized the challenges of deploying and maintaining instruments in the Arctic environment. It noted that buoys deployed in the open ocean have drogues on, while those deployed on the ice have no drogue.

7.3.3 The Panel urged the IABP to communicate the value of urging scientists to distribute data from research programme buoys that are deployed in the Arctic (**action OP/a31; IABP; ongoing**).

7.3.4 The Panel thanked all IABP participants for their substantial efforts to make sure that the data are reported on GTS.

### **7.4 International Buoy Programme for the Indian Ocean (IBPIO)**

7.4.1 The Chairperson of the International Buoy Programme for the Indian Ocean (IBPIO), Mr Graeme Ball (Australia) reported on the activities of the IBPIO during the last intersessional period.

7.4.2 Mr Ball reported that the plans for next year is to operate 43 moored buoys, and deploy 212 drifting buoys (total 255 units) in the IBPIO area of interest. The Panel noted with appreciation the improved timeliness of buoy data reported on real-time from the Indian Ocean due to the increased use of Iridium satellite data telecommunication and the improvement of the Argos network of local receiving stations. Mr Ball explained that the IBPIO is expecting that this improvement trend will continue thanks to the increased use of Iridium.

### **7.5 WCRP-SCAR International Programme for Antarctic Buoys (IPAB)**

7.5.1 Dr Rigor presented a report on the recent activities of the WCRP<sup>4</sup>-SCAR<sup>5</sup> International Programme for Antarctic Buoys (IPAB) on behalf of the recently elected Chair of the Programme, Dr Petra Heil (Australia).

7.5.2 The Panel congratulated Dr Rigor for his report. It noted with appreciation that some of the changes to the IPAB operating principles that had been previously proposed by the Panel have been accepted by the IPAB. The Panel requested the Executive Board to review these new Terms of Reference (ToR), and make further recommendations to the IPAB during the next intersessional period if necessary (**action; EB; DBCP-29**).

### **7.6 International South Atlantic Buoy Programme (ISABP)**

7.6.1 The ISABP Coordinator, Ms Pazos reported on the activities of the International South Atlantic Buoy Programme (ISABP) during the last intersessional period on behalf of its Chairperson, Mr Ariel Troisi (Argentina).

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4: WCRP : World Climate Research Programme

5: SCAR : Scientific Committee on Antarctic Research

7.6.2 Ms Sonia Cavalcante (Brazil) also provided an overview of Brazil activities in support of the ISABP. The Panel recommended that Brazil participates in the Task Team on Moored Buoys, and also contributes to the DBCP/ETWCH Pilot Project on Wave measurement Evaluation and Test (PP-WET) for the inter-comparison of the new Brazilian wave observation buoy with other wave buoys.

## **7.7 DBCP-PICES North Pacific Data Buoy Advisory Panel (NPDBAP)**

7.7.1 Mr Shaun Dolk (USA), Technical Coordinator of the NPDBAP, reported on the activities of the DBCP-PICES<sup>6</sup> North Pacific Data Buoy Advisory Panel during the last intersessional period. The goals for next year include (i) to deploy about 70 SVP-Bs in the NPDBAP area of interest; (ii) utilize the Deep-ocean assessment and reporting of Tsunami (DART) Cruise for the deployment of drifters; (iii) manage the NPDBAP website through the DBCP website; and (iv) increase intersessional participation of members.

7.7.2 The Panel noted that meteorological services have expressed concern that a lack of measurements in Bering Sea impact their mission, and therefore the Panel encourages additional SVP deployments in the Bering Sea. Nevertheless, the Panel requested the PP-SLP to investigate the impact of pressure observations from this area on NWP, and provide guidance regarding the density of drifters to be maintained there (**action; PP-SLP; DBCP-29**).

## **7.8 OCEAN Sustained Interdisciplinary Timeseries Environment observation System (OceanSITES)**

7.8.1 The Technical Coordinator reported on the activities of the OCEAN Sustained Interdisciplinary Timeseries Environment observation System (OceanSITES<sup>7</sup>) during the last intersessional period. The Panel noted good progress with regard to the deep ocean strategy.

## **7.9 Tropical Moored Buoys Implementation Panel (TIP)**

7.9.1 Dr Crout, Chair of the TIP, reported on the activities of the Tropical Moored Buoys Implementation Panel (TIP) during the last intersessional period.

## **7.10 International Tsunameter Partnership (ITP)**

7.10.1 The chair of the International Tsunameter Partnership (ITP), Dr Venkatesan reported on the activities ITP during the last intersessional period.

7.10.2 The Panel noted the growth in membership and activity of the ITP and enhanced sharing of resources with other partner groups, notably the UNESCO-IOC Tsunami Warning System. Yet, the Panel encouraged the ITP to attract new partners.

7.10.3 The Panel welcomed the initiation or extension of tsunameter networks by countries such as Ecuador, Russia, Chile and Japan as an important contribution to national and regional tsunami capability, and the increase in the number of stations reporting in real time on the GTS, but strongly urged a wider commitment to real time data sharing by all national operators (**action OP/a32; ITP; ongoing**). This commitment is needed to increase the observation network's

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6: PICES: North Pacific Marine Science Organization ( <http://www.pices.int> )

7: <http://www.oceansites.org/>



coverage and resilience during tsunami events and to strengthen scientific understanding and modelling of tsunamis.

7.10.4 The Panel noted the predominance of representation from Pacific and Indian Ocean regions, and strongly encouraged greater engagement with countries working on tsunameters and herein the DBCP 29<sup>th</sup> Session in 2013 may present a natural opportunity for improving this interaction.

7.10.5 The Panel recommended that the data format need to be standardized (BUFR) and ITP would take efforts to coordinate with Members/Member States and the industry.

7.10.6 Regarding data availability, the Panel urged that Tsunameter data should be made freely available on the GTS in accordance with the IOC Oceanographic Data Exchange Policy (**action OP/a32; ITP; ongoing**).

7.10.7 The Panel noted that the ITP agrees to evolve an updated version of Tsunameter equipment performance standards and guidelines. Efforts should be made so that these standards and guidelines are followed.

7.10.8 The Panel recommended that the ITP should continue to build synergies with data buoy operators regarding the implementation on Tsunameter networks, and promote standards, especially by contributing to relevant WMO and IOC applications. It should continue to report on its activities as Action Group of the DBCP. In order to interface with the other groups through UNESCO or regional tsunami groups and at ICG level, the ITP need to liaise with the relevant Working Group.

7.10.9 The Panel also noted that constraints existed in operating Tsunameters in Piracy prone areas in the Arabian Sea.

7.10.10 The Panel acknowledges the significant efforts taken to reduce the incidence and impact of vandalism, and notes India's initiative to engage with regional governments and fishermen. It welcomes some encouraging early indications of the fruits of that effort, but notes the continuing toll experienced by many global networks, and specifically the reports of high levels of vandalism in the oceans and seas of concern to Korea, China and Japan. It invites those and other countries to consider the Indian initiative as one approach that could deliver benefits.

7.10.11 The Panel noted and concurred that Mr Steve Cuculu (USA) will serve as vice-Chair of the ITP.

## **8 PILOT PROJECTS**

### **8.1 Drifter Iridium Pilot Project**

8.1.1 Although the deployment phase of the IPP, initiated in 2007, had effectively terminated in 2010, there had nonetheless been continuing activity in two main areas:

- a) The Panel had decided at its session in 2010 to use remaining funds to upgrade GDP drifters with Iridium for deployment in the S Pacific in the area that continued to suffer from poor timeliness via Argos. As a result, 10 drifters were deployed in early 2012, and were reporting timely data onto the GTS.
- b) A number of operational agencies, notably ESURFMAR, Environment Canada, Météo France, MetService NZ, the UKMO, the GDP, SAWS and the Australian BoM, were increasingly deploying Iridium-equipped drifters and making their data available to the IPP to assist with its longer-term evaluation activities.

8.1.2 The Panel thanked these agencies for their involvement, which had done much to help evaluate the performance of Iridium drifters and to ensure the success of the IPP.

8.1.3 As a result, the original IPP target of 50 drifters had been vastly exceeded, and nearly 600 had been deployed, with a total of 188 drifters active and participating in the IPP during August 2012. Of particular note this year is the first significant activity by the US in deploying Iridium-equipped drifters with data being circulated on the GTS.

8.1.4 The Panel noted that data timeliness issues were to be further discussed under item 9.3, but agreed that Iridium drifters did apparently offer a number of advantages, not only in timeliness, but also with regard to eventual life-cycle costs. Buoy half-lifetimes, which had peaked at >500 days early in the IPP, had subsequently decreased to <200 days, as had also been noted for Argos equipped platforms. Manufacturers were urged to further investigate ways of improving buoy lifetimes and to examine ways of increasing energy efficiency by implementing improved power management schemes and new low-power GPS receivers.

8.1.5 The Panel expressed concerns about the life-time of Iridium drifters and negative trends noticed in the last few years in this regard.

8.1.6 The Panel, in recognizing that the IPP had outlived its initial two-year lifespan, agreed that it should formally be disbanded, but that a small number of legacy actions should be followed up by its chair, Mr Meldrum, aided by the TC and others as required.

8.1.7 Some members of the Panel noted with concern that multiple agencies were now inserting Iridium data onto the GTS, in contrast to the situation that existed for Argos data, and that the potential for poor quality to be distributed without the Panel's control now existed. This issue is further discussed under item 10.5.

8.1.8 The Panel was concerned that it still had ongoing financial obligations to fund the airtime of a number of active IPP drifters. This is further discussed under item 11.

8.1.9 The Panel closed this item by thanking the IPP, participating agencies and manufacturers for leading the way in establishing Pilot Projects as a key component of the Panel's activities, and for greatly assisting the rollout of Iridium technology in the data buoy community.

8.1.10 The meeting decided on the following action items:

- (i) The Panel agreed that the IPP steering team should disband forthwith, but that its chair, Mr Meldrum, in consultation with the TC and other experts, be tasked with completing the analysis, the publication of a final report, and the compilation of a best-practices guide for the use of Iridium in drifters. (**action; D Meldrum & TC; asap**)
- (ii) Buoy manufacturers were urged to continue seeking improvements in Iridium buoy energy efficiency through the implementation of improved power management schemes and the latest low-power GPS receivers. (**action; Buoy Manufacturers; asap**)

8.1.11 The Panel agreed that DBCP/SOT Trust Fund could be used for Iridium airtime of legacy drifters, including for the recent South Pacific deployments.

8.1.12 The full report of the Iridium Pilot Project is given in **Annex XI**.

## 8.2 Pilot Project on the impact of SLP from drifters on NWP

8.2.1 The Chair of the DBCP Pilot Project on the Impact of Sea Level Pressure Observations from Drifters on Numerical Weather Prediction (NWP) (PP-SLP), Dr Centurioni, reported on the recent developments of the Pilot Project.

8.2.2 The Panel recalled its decision a DBCP-27 to start a pilot project on the impact of SLP measurements from drifters on NWP chaired by Dr Centurioni. To this end, the Pilot Project organized a workshop to assess the state of the art and establish a robust background to support the pilot project operations. The workshop was held in Sedona, Arizona, on 21 May 2012, in conjunction with the fifth WMO Workshop on the Impact of Various Observing Systems on NWP. Workshop attendees : Carla Cardinali (ECMWF), Dr Centurioni (SIO, USA), Ronald Errico (NASA, USA), John Eyre (UKMO, UK), Ron Gelaro (NASA, USA), Rick Lumpkin (co-Chair, AOML, USA), Jean-Francois Mahfouf (Météo France, France), Wenjian Zhang (WMO Secretariat). Several participants gave a presentation. A full report of the workshop and the presentations are available on the web<sup>8</sup>. The questions posed to the attendees were:

- 1) What is our understanding of the impact of SLP from drifters on NWP and are further investigations needed for a quantitative assessment?
- 2) What are the correct metrics to assess the impact?
- 3) Are we ready to summarize the state of the art on the subject in a manuscript that could be submitted to a peer-reviewed journal such as BAMS?

8.2.3 The Panel noted the main conclusions, also available in the workshop report, as listed below:

- One repeated theme was the value of the adjoint approach (i.e. impact studies) vs. Observing System Experiments (OSEs), and Observing System Simulation Experiments (OSSEs) (the latter require much bigger efforts than OSEs). Using the adjoint approach, the value of observations can be quantified quickly, with little extra effort. Some OSE efforts are underway and OSSEs can answer questions that can't be fully addressed with the adjoint and OSE approaches, such as what would be the effect of doubling the number of Southern Ocean barometer drifters.
- Several studies presented in this workshop and in the fifth WMO workshop grouped all buoys (drifting and moored) or all buoy and all ship measurements together. From the pilot project perspective, there is still the need to isolate drifter SLP data from other data buoys. This could also be done for subsets of the drifting buoy data, for example for low-latitude observations to evaluate the NWP value for following the DBCP recommendation that all drifters be outfitted with barometers.
- All studies are based on dry or wet total energy metrics, i.e. integrated over the full depth of the atmosphere. The best metrics to evaluate impact of the drifter data should be identified or at least further discussed. Should they focus on lower troposphere? It was suggested that the most straightforward approach would be to focus on surface energy: surface wind (kinetic energy), and perhaps temperature (potential energy).
- A North Atlantic case study (ECMWF) demonstrates that the drifter data makes particularly significant impacts during cyclogenesis. This result emphasizes the need to examine particular cases in other regions: globally averaged metrics don't emphasize peak events during cyclogenesis, but rather average these intermittent events with long periods of relatively quiescent weather.
- Degraded wind forecasts would also degrade wave nowcasts/forecasts, something not considered in the various presentations.

<sup>8</sup> [http://www.wmo.int/pages/prog/www/OSY/Meetings/Wshop-Impact-NWP-5/dbcp/dbcp\\_slp1.html](http://www.wmo.int/pages/prog/www/OSY/Meetings/Wshop-Impact-NWP-5/dbcp/dbcp_slp1.html)

- There was an overall consensus among the attendees that the results presented at this workshop are sufficient in novelty and scope to be adaptable to a BAMS paper on this subject. A lead author, preferably from the NWP community, needs to be identified and Dr Centurioni is talking to possible candidates. A good goal for the time scale of submission would be by the end of 2012 for a variety of practical reasons associated with funding cycles and hardware procurement.
- Even if no further progress is made by next year, the results presented at this workshop already present considerable evidence of the value of SLP data from buoys, particularly high-latitude open-ocean buoys (predominantly drifters), even using a metric that doesn't focus on surface observation forecasts.

8.2.4 The Panel strongly supported the following actions, and tasked the Pilot Project Chair to lead these actions and report on the outcome at the next Panel Session (**action; L. Centurioni; DBCP-29**):

- To compile and submit the BAMS paper before the end of 2012 and use pilot funds to pay for the publications fees;
- To invite colleagues from the Naval Postgraduate schools in Monterey (California) to join the discussion;
- To invite colleagues from the Meteorological community to publish online, routinely, the results of their impact studies (adjoint) for drifters only, and link such information to the DBCP web page;
- To continue the discussion with colleagues from the Meteorological community on whether it is more valuable entertain a new OSE data denial experiment targeting drifters only or investigate specific cyclogenesis episodes for which SLP from drifters had a particularly significant impact and compile a comprehensive list of such cases;
- Based on the results of 8.2.4, to move forward by commissioning, with the pilot funds, an OSE study or the analysis of cyclogenesis episodes with concurrent SLP drifter data (e.g. by partially supporting a post-doc at ECMWF). The Panel stressed that the Pilot Project should be part of the discussion on how to conduct the OSE.

### 8.3 Pilot Project on Wave Measurement from Drifters (PP-WMD)

8.3.1 The Panel recalled its decision at the previous Session to review the Pilot Project on Wave Measurement from Drifters (PP-WMD) chair and membership, and consider incorporating PP-WMD within PP-WET. The Executive Board has reviewed this requirement during the last intersessional period, and decided on behalf of the Panel to effectively merge PP-WMD into PP-WET. The Panel noted that SIO has been conducting developments and tests of GPS wave sensors; and that their evaluation is ongoing. The next step will be to inter-compare the data from such sensors mounted on drifters with other types of wave measurements.

### 8.4 DBCP/ETWCH Pilot Project on Wave measurement Evaluation and Test (PP-WET)

8.4.1 Mr Val Swail (Canada) reported on the development and current status of the joint DBCP<sup>9</sup>-ETWCH<sup>10</sup> Pilot Project on wave measurement evaluation and test (PP-WET). The full report is included as a presentation in the CD-ROM for the DBCP-28 meeting report.

8.4.2 Mr Swail noted that, following the recommendation from DBCP-27, the Pilot Project on Wave Measurements from Drifters (PP-WMD) had been subsumed within the PP-WET pilot project

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9 DBCP: Data Buoy Cooperation Panel

10 ETWCH:JCOMM Expert Team on Waves and Coastal Hazard Forecast Systems

per DBCP Executive Board decision on behalf of the Panel. The first step identified was to evaluate the Scripps GPS wave sensor, in an existing hull if possible, and also in both drogued and undrogued drifting buoys. Initial comparisons of the sensor were carried out off the Scripps pier, and also in the vicinity of the Environment Canada buoy at East Dellwood, off Vancouver Island; preliminary results were presented during the DBCP-28 Scientific and Technical workshop.

8.4.3 Mr. Swail reported that the workshop hosted by the US Alliance for Coastal Technologies in St. Petersburg, Florida, 22-24 February 2011, which sought to integrate US wave evaluation activities with the Pilot Project, had developed Test and Evaluation Protocols for Wave Measurement Systems in support of the National Operation Wave Observing Plan<sup>11</sup>. Mr Swail also noted that a special session on wave measurement (Session E) was held as part of the 12th International Workshop on Wave Hindcasting and Forecasting (November 2011, Kona, Hawaii) to present preliminary results to the scientific community and further develop guidelines and participation in the Pilot Project<sup>12</sup>. A Pilot Project side meeting was also held for Steering Committee members attending the workshop as well as any other interested people, to review progress and future plans.

8.4.4 The Panel expressed its appreciation to several national agencies (Canada, US, Korea, India, Norway, United Kingdom) and international programmes for their participation in the intercomparison projects. In particular, the Panel welcomed the continued contribution from Canada in providing financial support for the Coastal Data Information Program (CDIP) at the Scripps Institution of Oceanography, in setting up the intercomparison methodology, web site and metadata criteria, and in carrying out individual intercomparisons. The Panel encouraged its member countries to participate in the intercomparison activities that were led by this pilot project, and also encouraged WMO-IOC Regional Marine Instrument Centres (RMIC) who have wave measurement responsibilities to take a more active role in the project (**recommendation OP/r25**).

8.4.5 The Panel noted that evaluation results continue to be routinely added to the intercomparison web site<sup>13</sup> in near real time, if **spectral** data are routinely transmitted via satellite; if data must be retrieved from logging systems on the platforms, the analysis may be delayed by a year or more. Additional intercomparisons will be added to the web site once the information has been retrieved from the data storage systems on the buoys.

8.4.6 The Panel recognized that the pilot project would contribute to JCOMM in developing standards and best practice, as well as to the relevant WIGOS exercise, and encouraged the co-chairs and SC members to actively outreach these relevant activities with the progress in the inter-comparison exercise (**recommendation OP/r26**).

8.4.7 The Panel agreed that this pilot project was progressing well, and decided to retain the project in its current form for another year, with no additional financial support. The revised work plan for the project is given in **Annex XII** and is available at the pilot project website<sup>14</sup>. The Panel thanked the PP-WET SC co-chairs, Mr Swail and Dr. Robert Jensen, and SC members for their work to make progress.

8.4.8 **The meeting made the following recommendations:**

- (i) Continue the Pilot Project for the next year, with no funding support;
- (ii) Encourage the co-chairs and SC members to contribute the results of the intercomparison exercise to JCOMM and WIGOS in developing standards and best practice;

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11 [www.act-us.info/Download/Workshops/2012/USFUM\\_Wave\\_Measurement/](http://www.act-us.info/Download/Workshops/2012/USFUM_Wave_Measurement/)

12 <http://www.waveworkshop.org>

13 <http://www.jcomm.info/wet>

14 <http://www.jcommops.org/dbcp/overview/pilots.html>

- (iii) Encourage its member countries, and RMICs with marine responsibilities, to participate in the Pilot Project intercomparison activities;

#### 8.4.9 The meeting decided on the following action items:

- (i) The membership of the Pilot Project Steering Committee will be reviewed in late 2012, and plans will be discussed for a possible follow up technical workshop on results to date (**action; PP-WET co-chairs, Secretariat; ASAP**)
- (ii) Guidelines on the best practices for measurement of reliable, high-quality spectral wave measurements, including directional spectra, will be developed, possibly as an outcome of the technical workshop (**action; PP-WET co-chairs; DBCP-29**).
- (iii) Plan follow up technical workshop on results to date (**action; co-Chairs, Secretariat; DBCP-29**).

8.4.10 The updated work plan for the Pilot Project is provided in **Annex XII**.

### 8.5 DBCP/GHRSSST Pilot Project for High Resolution SST (PP-HRSST)

8.5.1 Mr Meldrum reported on the Pilot Project for High Resolution SST (PP-HRSST). The PP-HRSST had been established at the previous DBCP session as the outcome of a dialogue between the Group on High Resolution Sea Surface Temperature (GHRSSST) and the DBCP, resulting in a proposal for a joint PP<sup>15</sup>. GHRSSST is concerned to improve the quality of SST retrievals from satellites, and relies heavily on drifter SST as a validation mechanism, by comparing selected drifter SST values with co-located satellite estimates, so-called 'matchups'. Despite the best efforts of GHRSSST, progress is severely hampered both by the resolution (0.1C) and by the accuracy (~0.2C) of the SST reported by drifters. As a result of the dialogue, a basic set of standards was agreed for HRSST drifters, in the hope that they would eventually lead to a universal standard applicable to all new drifters. The aim of PP-HRSST is to evaluate and develop this standard through the deployment of pilot drifters conforming to the standard, in the expectation that such drifters will in due course demonstrably improve the quality of satellite SST retrievals.

8.5.2 Noting with approval the progress that had already been made by ESURFMAR, Météo France, the UK Met Office and MetOcean in implementing HRSST (~300 deployments of higher resolution, but standard accuracy, HRSST-1 drifters made to date), the Panel was also pleased to hear that progress was being made in soliciting support from the space sector, as a result of active DBCP participation in GHRSSST and ESA science meetings. In particular, it noted that a proposal to deploy significant numbers of HRSST drifters in support of the upcoming Sentinel-3 mission was now circulating within ESA. It urged the PP-HRSST Steering Group (SG) to pursue and promote this proposal as a matter of urgency. (**action; Chair, PP-HRSST; asap**).

8.5.3 The Panel noted with approval the proactive work by MetOcean in developing a new 'smart' demountable sensor which would allow the full accuracy and resolution requirements of GHRSSST to be met. In particular, the new digital sensor would greatly facilitate the calibration process. A number of deployments of HRSST-2 drifters, some incorporating this sensor through support from the Panel, were now being made.

8.5.4 The Panel listened with interest to a preliminary analysis by GHRSSST of the HRSST-1 deployments and their impact on satellite SST retrievals. Three independent studies of North Atlantic deployments had shown that SST values from the new drifters were consistently 0.2C warmer than values from the older drifters. There was no obvious explanation for this anomaly, and

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15 : [http://www.jcomm.info/index.php?option=com\\_oa&task=viewDocumentRecord&docID=6044](http://www.jcomm.info/index.php?option=com_oa&task=viewDocumentRecord&docID=6044)

the Panel asked the PP-HRSST membership to take all reasonable steps to diagnose the source of the problem. (**action; PP-HRSST SG; asap**)

8.5.5 The Panel was aware that a number of drifters equipped with high quality SeaBird CT sensors were being deployed as part of the SPURS campaign to validate salinity estimates from the Aquarius and SMOS satellites, and asked participants in this programme to ensure that HRSST from their drifters was distributed on the GTS in support of PP-HRSST objectives. (**action; SPURS participants; asap**).

8.5.6 The PP-HRSST SG was asked to continue to develop its workplan for the next two years and to report back to the next Panel session on its progress. In this context, the Panel was pleased to confirm the appointment of Mr Meldrum as the PP-HRSST chair and asked him to proceed with the recruitment of additional members representing all interests as soon as possible. (**action; Chair, PP-HRSST; asap**).

8.5.7 The Terms of Reference, draft workplan and initial membership of the PP-HRSST SG are attached as **Annex XVI**.

## **9 ISSUES FOR THE PANEL**

### **9.1 Information Exchange**

#### *9.1.1 Websites*

9.1.1.1 The Technical Coordinator reported on website developments during the last intersessional period. The Panel was reminded of the official address for the DBCP website<sup>16</sup>.

9.1.1.2 It was noted that JCOMMOPS also normally maintains some JCOMM Observations Programme Area content on the JCOMM web site<sup>17</sup> for the DBCP and OceanSITES.

9.1.1.3 The Technical Coordinator reported that the following has been achieved:

- Reviewed the content of the DBCP and OceanSITES web pages to fix broken links and outdated content;
- Added new links on the Pilot Project page to include the Pilot Project on Sea Level Atmospheric Pressure (PP-SLP) as approved at DBCP-27.

9.1.1.4 The Panel invited its members to review the content of the DBCP web page on best practices<sup>18</sup> and to provide feedback to the Technical Coordinator as appropriate. (**action; Panel members; DBCP-29**).

#### *9.1.2 News*

9.1.2.1 The Technical Coordinator informed the Panel on "News items" posted on the JCOMMOPS website<sup>19</sup> during the intersessional period, including:

- 1000 Days for Iridium SVPB/RTC/GPS drifter (published 28/08/2012);
- Waymouth Bay Buoy Supports the 2012 Olympic Games (published 10/08/2012);

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16: <http://www.jcommops.org/DBCP/> - the following alias can also be used: <http://dbcp.jcommops.org>

17: <http://www.jcomm.info>

18: <http://www.jcommops.org/dbcp/bestpractice.html>

19: <http://wo.jcommops.org/cgi-bin/WebObjects/JCOMMOPS.woa/wa/news?prog=DBC>

- JCOMMOPS - Recruiting a Ship Logistics Coordinator (published 10/05/2012);
- 27th Session of the Data Buoy Cooperation Panel (published 04/10/2011).

9.1.2.2 The Panel invited its members to submit news items for posting on the website. The Technical Coordinator would like to update this monthly at a minimum and will send an announcement to the DBCP email list.

### 9.1.3 *DBCP Publications*

9.1.3.1 The Technical Coordinator reported on new or updated DBCP Technical Documents, and JCOMM Meeting and Technical Reports of interest to the Panel. The following ones of interest to the DBCP have been published during the last intersessional period:

- Updated list of GTS bulletin Headers used for buoys based on the JCOMMOPS database (information from ISDM, CLS, and MeteoFrance)<sup>20</sup>
- Updates to the DBCP Implementation Strategy – DBCP Technical Document #15<sup>21</sup>
- DBCP-27 Scientific and Technical Workshop Proceedings – DBCP Technical Document #43<sup>22</sup>
- Sea Surface Salinity Quality Control Processes for potential use on Data Buoy Observations – DBCP Technical Document #42<sup>23</sup>
- DBCP Operating Principles<sup>24</sup>
- JCOMM Meeting Reports:
  - JCOMM MR #88 – JCOMM Management Committee 9<sup>th</sup> Session, Geneva, Switzerland<sup>25</sup>
  - JCOMM MR #86 – Twenty-seventh Session of the Data Buoy Cooperation Panel, Geneva, Switzerland, 26-30 September 2011<sup>26</sup>

9.1.3.2 The Panel noted that the Technical Coordinator is actively working with Panel members on updating the JCOMM Document “An Oceanographer’s and Marine Meteorologist’s Cookbook for Submitting Data in Real Time and Delayed Mode”. The document has been reviewed by the TT-DM and several members have submitted comments to the TC. Experts need to review the document are currently being identified. The goal is to have this report published during the next intersessional period (**action; TC; DBCP-29**).

### 9.1.4 *Information Products*

9.1.4.1 The Technical Coordinator provided details about new or updated information products of interest to the Panel and provided through JCOMMOPS:

- Resumed the WMO/Platform ID cross reference list hosted on the JCOMMOPS website<sup>27</sup>
- Added a document to the DBCP Metadata page on “Draft Metadata requirements for Moored Buoys” as submitted by Mr Turton and the TT-MB<sup>28</sup>

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20: <http://www.jcommops.org/DBCP/doc/List%20of%20GTS%20bulletin%20headers%20for%20buoy%20data.pdf>  
21: [http://www.jcommops.org/doc/DBCP/DBCP\\_Impl\\_Strategy.pdf](http://www.jcommops.org/doc/DBCP/DBCP_Impl_Strategy.pdf)  
22: <ftp://ftp.wmo.int/Documents/PublicWeb/amp/mmpop/documents/dbcp/Dhcp43-Workshop-2011/index.html>  
23: <http://www.jcommops.org/doc/DBCP/DBCP42-Salinity-QC.pdf>  
24: <http://www.jcommops.org/FTPRoot/DBCP/meetings/2011/dbcp/DBCP-Operating-Principles-2011.pdf>  
25: [http://jcomm.info/components/com\\_oe/oe.php?task=download&id=14245&version=1.0&lang=1&format=1](http://jcomm.info/components/com_oe/oe.php?task=download&id=14245&version=1.0&lang=1&format=1)  
26: [http://jcomm.info/components/com\\_oe/oe.php?task=download&id=14982&version=1.0&lang=1&format=1](http://jcomm.info/components/com_oe/oe.php?task=download&id=14982&version=1.0&lang=1&format=1)  
27: [ftp://ftp.jcommops.org/JCOMMOPS/GTS/wmo/wmo\\_list.txt](ftp://ftp.jcommops.org/JCOMMOPS/GTS/wmo/wmo_list.txt)  
28: [http://www.jcommops.org/dbcp/doc/metadata/20120214\\_DBCP\\_MB%20METADATA\\_LIST\\_v0.1.xls](http://www.jcommops.org/dbcp/doc/metadata/20120214_DBCP_MB%20METADATA_LIST_v0.1.xls)



- Added the Quarterly NOAA Equivalent Buoy Density Maps to the DBCP Website<sup>29</sup>
- OceanSITES Data Management and Steering Team Reports<sup>30</sup>
- Photos:
  - Added photos to the DBCP Picasa photo album<sup>31</sup>
  - Added photos to the OceanSITES Picasa photo album<sup>32</sup>
- Email lists and communications:
  - Added a new list for the DBCP Task Team on Data Management: tt-dm@jcommops.org
  - Added a new list for the DBCP Task Team on Moored Buoys: tt-mb@jcommops.org
  - Maintained all DBCP and OceanSITES email communications lists.

#### 9.1.5 *Scanning and preservation of past DBCP reports*

9.1.5.1 The Panel noted that the 29 DBCP documents (13 early DBCP Session/Meeting Reports, 2 Additional Meeting reports, 13 DBCP Technical Documents) shipped to NOAA for imaging through the NOAA Climate Database Modernization Programme (CDMP) for preservation purposes, have not been processed yet due to budgetary constraints.

## 9.2 **Deployment opportunities and strategies**

9.2.1 The Technical Coordinator reported on activities and developments in JCOMMOPS regarding opportunities for the deployment of measuring instruments in the ocean (drifters, floats, servicing of moored buoys, etc.) and highlighted several items that may be of interest to the Panel.

9.2.2 The Technical Coordinator mentioned the importance of providing deployment opportunities to the DBCP community. JCOMMOPS has been doing this on an *ad-hoc* basis for a number of years. During the last intersessional period there was very little activity and feedback in this regard. The TC will work closer with the community and logistic managers and other appropriate programs to obtain this information. This task will be facilitated by the new Ship Logistics Coordinator.

9.2.3 The Panel noted that JCOMMOPS will soon welcome a new technical coordinator dedicated to ship coordination. This third coordinator at JCOMMOPS will act as a focal point and will work essentially on the SOT program coordination, GO-SHIP program coordination, metadata management of ship based information (cruise plans in advance), and “JCOMMOPS ship time service” development. JCOMMOPS thanked the Panel for its participation in the funding of the position.

9.2.4 The Technical Coordinator presented a table indicating the number of drifting buoys available in the Global Drifter Program warehouses. This was provided in case new or existing Panel members are able to assist in deploying these buoys in their region.

9.2.5 The Panel acknowledged the success of the Lady Amber, having deployed over 60 Argo floats and recently drifters, during the last year. The Panel thanked JCOMMOPS for initiating these opportunities and noted with interest that the GDP has provided drifters to the Lady Amber to be deployed on her upcoming cruise in the South Atlantic. JCOMMOPS encourages the DBCP community to continue to use cost-sharing opportunities such as these in the future.

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29: <http://wo.jcommops.org/cgi-bin/WebObjects/JCOMMOPS.woa/wa/map?type=EBD>

30: <http://www.oceansites.org/meetings/index.html>

31: <http://picasaweb.google.com/JCOMMOPS/DBCP>

32: <http://picasaweb.google.com/JCOMMOPS/OceanSITES>

9.2.6 The Panel was asked to consider using unique sailing vessel opportunities on a cost-sharing basis with the Argo programme to enhance deployment opportunities in the southern Indian and Atlantic Oceans, or other areas (**recommendation OP/r20**).

9.2.7 The Panel agreed on the following action items related to this issue:

- (i) The DBCP community should provide planned deployment metadata as requested by JCOMMOPS. See also DBCP Doc 9.5. (**action OP/a49; Panel members; ongoing**)
- (ii) The GDP will work with the Technical Coordinator to establish a link with the JCOMMOPS site for Panel members who wish to request drifters for deployment opportunities (**action; GDP; June 2013**).
- (iii) Panel members should utilize the ships@jcommops.org email list to provide deployment opportunities to the community (**action OP/a57; Panel members; ongoing**)

9.2.8 The Panel noted that the new ship Coordinator's position will provide assistance to the data buoy community for the deployment of instruments at sea. The Panel encouraged its members to communicate routinely with the new Coordinator once in place, in the view to exchange information on deployment opportunities, seek his/her assistance for identifying opportunities, and develop further synergies between the different ocean observing systems in this regard (**action OP/a57; DBCP members; ongoing**).

### 9.3 GTS data buoy reports timeliness

9.3.1 The Technical Coordinator presented an overview of the pattern of delays for the last year. She reported that she produced JCOMMOPS monthly maps focusing on delays. These maps are posted on the DBCP Website. They show that during the year, the majority of drifting buoys (over 80% each month) are reporting on the GTS in less than 120 minutes. An anomaly in this pattern was noticed in July. During the month of July, 2012 this percentage dropped to between 50-60%. The technical coordinator worked with CLS America and CLS France to determine the cause for these delays. The root cause occurred when CLS was in backup mode. The data was pushed to the GTS twice and the state date/time was changed introducing longer delays than actual. These need to be ignored when publishing the maps. The Technical Coordinator has removed them and new maps were published.

9.3.2 The Panel recalled some of its recommendations at its previous session, and noted the following related actions:

- Starting in July 2012, the moored buoys were removed from the timeliness maps and the TC is working on a method to better represent the timeliness of the moored buoy array<sup>33</sup>.
- The WMO/ID cross reference list has been updated and is published on a daily basis from the JCOMMOPS website.
- The Technical Coordinator has created delay maps to fill in the gap for the 2010-2011 period. These maps are now posted to the DBCP website.
- In order to improve timeliness in the South Pacific and South Atlantic Oceans, the Panel agreed at the last DBCP Session to allocated funds to deploy Iridium drifting buoys where delays are greater than 120 minutes. In April, 2012 10 iridium drifters were

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<sup>33</sup> The Panel had recommended that the moored buoys should not be included in the same map and scale as the drifting buoys as it does not show an accurate image of timeliness, as the subsurface oceanographic data skews the statistics, and that they should be represented in a different way.

deployed as part of the Global Drifter Program (GDP) in the South Pacific. However, in the South Atlantic, only 1 drifting buoy with Iridium communication was deployed in the area of interest.

9.3.3 The Panel noted that the Argos Real-Time Antenna Upgrade Project is in progress and is expected to be completed in late 2013. The last Mean Data Disposal Map (Appendix B, DBCP-28, Doc. No. 9.3) illustrates the projected global disposal times when the project is completed.

9.3.4 JouBeh Technologies reported that the processing time of drifting buoy messages is a) less than 7 minutes at least 95% of the time; b) less than 15 minutes over 99.8% of the time; and c) less than 1 hour approximately 100% of the time. The Panel requested the Technical Coordinator to check with JouBeh, and confirm that the DBCP recommended real-time QC checks are being routinely applied by JouBeh (**action; TC; DBCP-29**).

9.3.5 The meeting made the following recommendations:

- (i) To continue to deploy Iridium drifting buoys in areas where delays are greater than 120 minutes (**action OP/a50; DBCP members; ongoing**);
- (ii) DBCP and CLS should perform regular (every 6 months) assessments of the global data buoy timeliness by comparing JCOMMOPS delay maps and Argos Data Mean Disposal Time Maps (**action OP/a66; CLS with TC; ongoing/semestrial**);
- (iii) To separate the moored buoy subsurface delays from the surface data delays and find a solution to best represent the timeliness of the moored array (**action; TC; DBCP-29**).

## 9.4 Vandalism

9.4.1. The Chair of the DBCP Working Group on Vandalism, Dr Venkatesan reported on the activities of the Working Group during the last intersessional period. The *DBCP Working Group on Vandalism* initiated work in line with resolutions of WMO and UNESCO IOC and the report on "Ocean Data Buoy Vandalism - Incidence, Impact and Responses", DBCP Technical Document No. 41, and followed in particular nine recommendations from the report. The working group continued its efforts during this intersessional period on such issues as:

1. to share lessons learned in counter vandalism efforts among buoy network operators,
2. to facilitate a conversation among buoy operators on counter vandalism approaches; including technical, educational, operational, and enforcement approaches,
3. to facilitate a conversation on the development of best practices to mature the various methodologies used to quantify the impacts of buoy vandalism,
4. to serve as a communication channel within the DBCP for further information requests on the subject of vandalism following the release of the WMO vandalism report.

9.4.2. The Panel noted with appreciation that the Working Group has prepared a standard format for reporting incidents of vandalism on data buoys and circulated it to member countries to ensure the continuity of attention within the DBCP, WMO and IOC on the subject of buoy vandalism and to discover, share and promote counter vandalism best practices throughout the international buoy operator community. A few programs responded to the form on vandalism and the results will be available on the DBCP website.

9.4.3 The Panel noted that the United Nations General Assembly (UNGA) in December 2011 adopted Resolution A/66/L.21, Oceans and the Law of the Sea, which noted the 2011 DBCP report on ocean data buoy vandalism – incidence, impact and responses (WMO-IOC/DBCP Technical

Document No. 41.) The UNGA urged States to take necessary action to cooperate with IOC, WMO and FAO to address damage to ocean data buoys.

9.4.4. The Panel further noted that India initiated new activities in cooperation with other organizations such as regional fisheries management organizations of FAO, and the Bay of Bengal Programme (BOBP) for distributing awareness posters, banners, conducting local workshops, and meeting with respective Ministry of fisheries in member countries and fishermen association and associated bodies. Indian buoys and RAMA buoys were pasted with multilingual waterproof stickers on the surface of the buoy in eight Asian languages stating the importance of buoy data for weather forecast and tsunami warning. India and JAMSTEC Japan have adapted to special fasteners for mounting sensors and antenna onto the mast of buoy system. Another aspect on technological solutions undertaken during the intersessional period were studied by the group (India, USA).

9.4.5 The Panel thanked the Indian Government for its continued efforts taken to protect moored buoy systems against Vandalism in line with the recommendations of the United Nations General Assembly, the WMO Congress, and the IOC of UNESCO Assembly. India's contribution to the Panel's activities in this regard has been realized through (i) technological advancements; (ii) coordination in the region with other countries; (iii) communication with stakeholders through meetings and workshops; (iv) posters; and (v) contributing globally as chair of DBCP Working group on vandalism.

9.4.6 The meeting agreed on the following actions:

- (i) Panel members are urged to report vandalism events using the proposed template (**action OP/a92; DBCP members; ongoing**).
- (ii) The Panel requested the Technical Coordinator to collect statistics and information on actual vandalism occurrences, and maintain relevant information on the DBCP website. (**action OP/a90; TC; ongoing**).
- (iii) Panel members are encouraged to undertake similar actions than India and USA to prevent vandalism on data buoys and report at the next Panel Session (**action; DBCP members; DBCP-29**)

## 9.5 Metadata

9.5.1 The Technical Coordinator (TC) reported on various activities dealing with metadata during the last intersessional period. In terms of the JCOMMOPS database, inputs are taken regularly from platform operators and telecommunication providers either on deployment or as a status report. The TC thanked the Moored Buoy operators that are providing regular updates to metadata and encouraged others to use similar methods. She outlined some examples of websites or email notifications that are useful for JCOMMOPS and discussed the importance of this information.

9.5.2 The Technical Coordinator emphasized the importance of receiving plans of deployments and defined a few metadata fields that would be necessary to have in the JCOMMOPS database. She thanked those operators that are regularly supplying JCOMMOPS with deployment plans and encouraged others to do so. Storing this information and displaying it for the community would be valuable for all operators.

9.5.3 Operators of Iridium platforms have continued to actively report metadata to each other and JCOMMOPS upon deployment even beyond the Iridium Pilot Project. The TC reported that JCOMMOPS is in communication with Iridium VAR providers to create a metadata feed similar to the situation with the Argos system.

9.5.4 The Panel noted that within the larger framework of Global Earth Observing System of Systems (GEOSS), the method for collecting and disseminating metadata has been defined. An important element of metadata dissemination is to follow a standard format. JCOMMOPS stores all metadata in a database and the delivery and format of this metadata can be customized through style sheets or web services to the end user. JCOMMOPS will work with the NOAA OSMC on defining ISO metadata for Argo and DBCP programs.

9.5.5 Significant progress was made by the Task Team on Moored Buoys (TT-MB) and the Task Team on Data Management (TT-DM) over the intersessional period on defining BUFR templates on drifting and moored buoys. It was reaffirmed that the current approach to have one single template for both drifters and moored buoys was not the best approach. A cleaner approach would be to have two separate templates each tailored for drifters and moored buoys. Drafts of these templates were circulated ahead of DBCP-28 and will be forwarded to the JCOMM TT-TDC for review once approved by the community.

9.5.6 The Panel recognized the work that the OceanSITES Data Management Team has done in the last intersessional period. The OceanSITES formats are continuing to be adopted by other programs and the DBCP will work with the OceanSITES team in collecting more detailed metadata in NetCDF format. The Panel agreed that alternate formats other than the NetCDF will probably have to be proposed to allow more flexibility for buoy operators to submit their metadata.

9.5.7 The Panel recalled that its Terms of Reference have been modified to include the monitoring of data and metadata from rigs and platforms reporting surface marine meteorological and oceanographic data (see also DBCP-doc 11.2). The new Terms of Reference for the Panel and the Technical Coordinator are reflected in the revised Operating Principles in Appendix I and Appendix II of **Annex IV** respectively.

9.5.8 **The meeting made the following recommendations:**

- (i) The Panel encouraged all buoy operators to provide a website of plans and deployment information for drifting and moored buoys similar to AOML, NDBC, and Canada as well as continuing e-mail notifications as necessary;
- (ii) The Panel recognized that operators of Iridium platforms have continued to actively report metadata to each other upon deployment. This is valuable and it was recommend to continue to do so beyond the life of the Iridium Pilot Project;
- (iii) Panel members should continue close cooperation with OceanSITES when considering metadata content and standards.

9.5.9 The Panel requested its members to:

- (i) provide JCOMMOPS with planned deployment metadata in the formats specified (**action; Panel members & TC; asap**)
- (ii) review the BUFR templates provided during the meeting and respond to the TT-MB chair for any changes or comments. (**action; Panel members; end of 2012**).

## **9.6 Technological developments in support of user requirements**

9.6.1 The Panel briefly discussed the need to conduct technology developments in support of user requirements, and concurred that the TT-IBP, and the Pilot Projects were fully occupied at this time on a number of related aspects (e.g. wave observations, high resolution SST, reliability of drogue and barometer sensors, new satellite data telecommunication techniques such as Iridium and Argos-3).

9.6.2 The Panel invited its members to explore the following aspects in the view to possibly make proposals at the next Panel session:

- Evaluating the performance of the sensors for long term monitoring applications (e.g. precipitation);
- Using adaptive sampling onboard the buoys to take into account specific weather situations. Sampling can be adapted when storms or tropical cyclones are coming, using either downlink or the measurements made by the buoy. The Panel noted that adaptive sampling is already in place on Tsunameters;
- Revisiting the business model for the moored buoy programmes, e.g. allowing to visit the buoys less often (e.g. every 2 years).

## **9.7 Drogue loss, and technical failures of operational drifters**

9.7.1 During the previous DBCP Session, the Panel noted with concern that recent studies had indicated that estimates of drogue loss events since the late 1990s had probably been underestimates. The Panel considered that the time was right for a detailed evaluation of the issues surrounding drogue loss and drogue loss detection, and this was carried out by the Global Drifter Program over the intersessional period. The GDP applied a methodology to drifter data to automatically reanalyze drogue presence and results of this study were presented during the Science and Technology session.

9.7.2 At the previous DBCP Session it was recommended to establish a detailed chronology of drogue design changes, going back as far as possible (DBCP-28 action No. 156) and to establish a detailed chronology of drogue loss events from the historical record (DBCP-28 action No. 152) and then to cross-correlate these two (DBCP-28 action No. 153). This analysis was conducted and it was determined that there is no connection between the switch in drogue design and the ability to detect drogue presence. However, there was a sharp decrease in the fraction of drifters with drogues concurrent with the phase-in of the mini drifter, a signal which had been hidden prior to the drogue reanalysis of Lumpkin et al. (2012). This result suggests that the mini drifter design has a far shorter drogue lifetime than the original, larger design: the half-life of the drogue decreased from 300-400 days in 1990—2000, to 75—100 days in 2005—2011, with the decrease most rapid in 2004.

9.7.3 The half-life is the expected lag after which 50% of drifters can be expected to lose their drogue, based on current performance. If all drifters lose drogues before dying, calculating half-life is easy: drogue ages are sorted, and the halfway/median value is the half-life. However, this is complicated in practice because many drifters die with drogues attached. To deal with this, an “at least” half life can be calculated as follows: For drifters that died with drogue attached: the “death age” is used in place of age at drogue loss. The drogue half-life is then calculated using all ages. In a second iteration, all “death age” values that are less than the drogue half life are removed, and the half life is recalculated. These steps are repeated until all “death ages” are greater than the half life. Half-lives (in days) by manufacturer are as follows for drifters deployed in these years:

<u>Manufacturer</u>	<u>2005</u>	<u>2006</u>	<u>2007</u>	<u>2008</u>	<u>2009</u>	<u>2010</u>	<u>2011</u>	<u>2012</u>
Clearwater	89	63	72	106	106	96	88	>61
Marlin-Yug	*	197	152	72	57	167	*	16
Metocean	305	308	>407	280	225	85	90	>77
Pacific Gyre	>161	>321	>242	199	>263	>244	>164	>70
Technocean	13	45	47	33	65	77	154	>27

9.7.4 These half lives were calculated for data through 20 March 2012. For nearly all manufacturers, it is too early to evaluate 2012 drogoue half-lives. "\*" indicates not enough data; >X indicates that most drifters died before losing their drogues, or that most are still alive with drogues attached.

9.7.5 The following table indicates the percent of drifters which lost their drogues in less than 90 days after deployment, as a function of deployment year:

<u>Manufacturer</u>	<u>2005</u>	<u>2006</u>	<u>2007</u>	<u>2008</u>	<u>2009</u>	<u>2010</u>	<u>2011</u>	<u>2012</u>
Clearwater	46%	57%	54%	34%	28%	36%	39%	22%
Marlin-Yug	*	0%	0%	44%	46%	44%	*	100%
Metocean	22%	14%	9%	15%	25%	36%	46%	32%
Pacific Gyre	27%	24%	16%	23%	12%	11%	14%	21%
Technocean	69%	57%	62%	78%	52%	46%	26%	50%

9.7.6 The following table indicates the percent of drifters which lost their drogues in less than 10 days after deployment, as a function of deployment year:

<u>Manufacturer</u>	<u>2005</u>	<u>2006</u>	<u>2007</u>	<u>2008</u>	<u>2009</u>	<u>2010</u>	<u>2011</u>	<u>2012</u>
Clearwater	3%	5%	7%	2%	4%	5%	5%	2%
Marlin-Yug	*	0%	0%	25%	33%	11%	*	50%
Metocean	5%	4%	4%	11%	5%	8%	6%	2%
Pacific Gyre	3%	4%	2%	8%	4%	2%	3%	2%
Technocean	42%	22%	9%	10%	9%	8%	3%	25%

9.7.7 As the detection of drogoue loss is vital to oceanographic users of drifter data, it was recommended to reactivate dormant actions to deploy intensively instrumented drifters that would allow detailed characterisation of drogoue performance and attendant stresses on its connection to the buoy hull (DBCP-28 action No. 154). The Scripps Institution of Oceanography (SIO) has worked with Pacific Gyre on a re-design of the tether attachment in order to make it more resistant to stress and torque. The drifter includes temperature and pressure sensors at the top and the bottom of the drogoue (SVP2PT). This drifter will be deployed in late 2012 early 2013.

9.7.8 The Panel also recommended to investigate other causes of drogoue loss i.e. (i) subsurface float phase out; and (ii) Nilspin tether material was phased out and "spacelay" wire rope became the standard – type of tether is not always recorded in spec sheet.

9.7.9 The Panel recognized that the problem of the drifter drogoue loss and drifter life-time is a critical issue for the DBCP. The Panel also noted that the GDP has the resources to investigate the problem and that it is committed to find and propose solutions to resolve it.

9.7.10 The Panel decided to establish a working group within the TT-IBP to address data buoy life-time improvement. It requested the Chair of the TT-IBP, Dr Crout to identify a leader for this working group, to establish it, and confirm membership and terms of reference to the Executive Board (**action; R. Crout; ASAP**). The Panel then requested the new working group to act as soon

as established, and to report on its findings and subsequent actions at the next Panel Session (**action; TT-IBP/WG-LT; DBCP-29**).

9.7.11 The Panel recommend using the larger spheres with additional buoyancy and capacity for the SVPBs (this allows to use bigger battery packs).

9.7.12 The Panel also recommended introducing warantee clauses with the manufacturers following the example of Argo.

## **9.8 Other issues to be discussed, as proposed by the Task Teams**

9.8.1 The was no further issue to discuss at this point.

## **10 INFORMATION REPORTS**

### **10.1 Argo**

10.1.1 The Argo Steering Team Co-Chair, Dr Susan Wijffels, presented a report on Argo, on behalf of the Argo Steering Team, the Argo Data Management Team and the Argo technical coordinator. The Panel noted that over 3500 floats were operating worldwide but that the core mission targets are just recently reached (3000 floats operating 60N/60S, no marginal seas), as some floats are operating a pilots in non-core regions. Argo is still short of requirements in the far Southern Ocean.

10.1.2 While over 20 nations deploy Argo floats, the program is still overly dependent on a small number of national programs and thus Argo must strive to increase contributions from a larger number of nations.

10.1.3 The Panel noted that 90% of Argo profiles reach the GTS within 24 hours of collection and that efforts to reduce delays in the GDACs data distribution are increasing their timeliness.

10.1.4 Most Argo data centres are meeting the requirements for throughput of delayed-mode quality control. Argo is regularly auditing the data stream for consistent formatting, pressure bias removal, consistency with altimetric data, and for outliers in the realtime data stream.

10.1.5 The Panel noted that the profiling float technology is evolving and new generations of instruments are emerging. Their long term performance will not be known for several years and diligence in monitoring the array performance is required. Currently 15% of active floats use high bandwidth two-ways telecommunication systems and this is projected to rapidly increase. Pilot deployments of bio-optical-geochemical sensors and ice-avoidance capabilities continue. Several groups are developing and field testing "deep floats". The evolution of Argo to pursue new and additional missions is being discussed at various workshops and by the Argo Steering Team.

10.1.6 The uptake and use of Argo data by both the operational and research community is now very high. Over 200 peer-reviewed publications per year are based on Argo data. The recent 4<sup>th</sup> Argo Science Workshop, held in conjunction with the "20 Years of Radar Altimetry" revealed many impressive operational and research applications of Argo, as well as some insight into possible future missions.



## **10.2 Buoy data management centres**

10.2.1 Mr Joe Linguanti (Canada) reported on the activities of the IOC International Oceanographic Data and Information Exchange (IODE) Responsible National Oceanographic Data Centre (RNODC) for drifting buoys (RNODC / DB), operated by the Integrated Science Data Management (ISDM, formerly MEDS) of Canada.

10.2.2 The Panel then reviewed the report of the JCOMM Specialized Oceanographic Centre (SOC) for drifting buoys, operated by Météo-France, presented by Mr Rolland.

10.2.3 The Panel thanked both centres for their reports. The full reports are provided in Appendices A and B of DBCP-28 preparatory document No. 10.2 and will be included in the CD-ROM that will be distributed with the Session final report.

10.2.4 The Panel noted the outcome of the JCOMM-4 Session with regard to marine climatology, and in particular its decision through Recommendation 2 (JCOMM-4) to engage in the development of a new Marine Climate Data System (MCDS). In this context, the Commission has invited France and Canada, and other parties currently performing the functions of DACs and/or GDACs or similar (e.g. GCCs, Argo, OceanSITEs, GTSP, GDP DAC) to participate in the discussions regarding the development of the MCDS strategy and implementation plan with a view to offering MCDS DAC or GDAC functions as appropriate. Meanwhile, the Commission approved the designation of the relevant French and Canadian centers as provisional GDAC for Drifting Buoys under JCOMM and IODE (GDAC-DB) to continue in their present roles of SOC/DB and RNODC/DB until the role of the MCDS GDACs is further clarified as a part of the

## **10.3 Argos operations and developments**

10.3.1 Mr. Bill Woodward (CLS America) and Mr. Michel Guigue (CLS Toulouse) presented reports on Argos operations and system improvements during 2011-2012. The DBCP recalled that Argos is a global satellite-based location and data collection system dedicated to studying and protecting our planet's environment. CLS, is the operator of the Argos system on behalf of NOAA, CNES and EUMETSAT, and continues to maintain and improve an operational service for all Argos users, especially for the meteorology and ocean community at a >99% level of availability. Operational highlights from the last 12 months include the opening of the Kalman Location Processing capability to all users and the installation/connection to 2 new regional antennas: i) METOP antenna at McMurdo; and ii) NPOESS antenna at Svalbard. It was reported also that NOAA has successfully implemented the operational capability to collect blind orbit data from the NOAA satellites with the NPOESS antenna at Svalbard. These actions combined with substantial progress in implementing the Real-time Antenna Upgrade Project all continue to improve the global timeliness for data collected using the Argos system. CLS also noted the continuing request from the DBCP to explore the possibility of including Easter Island in the southeast Pacific as a candidate upgrade site in the CLS Real-Time Antenna Upgrade Project and will report on the status of this at DBCP-29. CLS continues to provide the GTS processing for all DBCP Argos equipped drifters and moored buoys in compliance with WMO and DBCP TT-DM recommendations. The CLS GTS processing system as well as the quality of the data and the entire Argos system performance is monitored 24/7.

10.3.2 It was explained that the Argos instruments are now onboard five NOAA POES (15 – 19) and two EUMETSAT spacecrafts (METOP-A and METOP-B). Update of the existing Argos ground segment has been accomplished this year in order to take into account the new generation of Argos-4 instrument that are planned to begin flying in the 2015-2016 time frame aboard a “free-flyer” satellite scheduled to be launched by NASA. An “Argos chipset” project has been implemented to design, manufacture and test a prototype of a miniaturized and low-cost ARGOS-3/4 satellite transceiver that will enable two way communications and minimize power

consumption. The project is expected to be completed in approximately 30 months. Finally, CLS is in the process of defining and implementing: 1) OLA (Operations Level Agreements) between CLS Operations Division and CLS internal entities involved in Argos matters as well as SLA (Service Level Agreements) between CLS and their customers and, 2) an Operational Risk Management Process, both of which are aimed at improving, securing and optimizing the CLS Operational Monitoring and Control Processes

#### **10.4 Iridium operations and developments**

10.4.1 Under this agenda item, Mr Meldrum reviewed the current status and future plans for the Iridium 2-way satellite communications system, which was finding increasing favour within many parts of the data buoy and environmental observation community for reasons of continuous availability, data timeliness, ease of implementation, future availability and cost.

10.4.2 The current 66-satellite constellation remained complete, had not deteriorated in any way over the last 12 months, and the number of in-orbit spares remained at six. Overall, the constellation was in a much healthier state than had been predicted some years ago, and was expected (as a result of a number of independent studies) to remain fully operational beyond the commencement of the rollout of the replacement constellation in 2015. In financial terms, revenue continued to grow, and data services, such as Short Burst Data (SBD) service used by buoy operators, were enjoying a huge increase in traffic compared with some years ago.

10.4.3 The replenishment constellation, called Iridium NEXT, was fully funded and under detailed design by prime contractors Thales. The rollout schedule, involving launching nine satellites at a time on board the new Falcon vehicle, had not changed over the last 12 months, and appeared to be on track. The new constellation was promised to be fully backwards compatible with the current constellation, although some transitional difficulties could be expected. NEXT would additionally offer higher bandwidth services, and the possibility to embark third party payloads. A new company, AIREON, had earmarked some of this payload space to develop a truly global aviation monitoring and control service.

10.4.4 Iridium was also engaged with many partners in the development of new products and services, and had seen the recent successful rollout of its 128 kbps broadband product, OpenPort. This was increasingly being used by shipping companies to provide broadband services to their vessels in preference to INMARSAT and other VSAT services. Of particular interest to the environmental observation community were new and smaller modems and the proposed new modem chipset, which would offer the potential to build highly integrated and miniaturised sensor/communication packages. In due course, these would be exploited by many observational communities, including animal trackers.

10.4.5 Nonetheless, the Panel noted that the 2-way architecture of Iridium of necessity dictated that the platform engage in a dialogue, lasting several seconds, with the constellation as a preamble to data transfer. This could adversely affect communication success in situations of signal disruption, as might be encountered in rough seas and by marine mammals. In such situations, 1-way systems such as Argos-2 and Argos-3 in 'pseudo-ack' mode might be preferable.

10.4.6 The Panel also noted that for many users the costs of operating Iridium platforms was apparently much less than for Argos counterparts. However, Iridium did not offer an equivalent of the Argos service, which included a number of value-added functions, including conversion of raw data to physical units, both real-time and delayed mode QC, GTS formatting and insertion, archiving, and open access to all parts of this chain by the JCOMMOPS TCs. As a result, many operators had created their own 'back-office' services and took care of their own GTS insertion using their existing infrastructure. Nor was this user community currently in any position to exert

influence over future Iridium pricing policy: a situation that diverged from the current Argos JTA arrangements.

## **10.5 Additional reports, as required**

### ***Iridium services for the DBCP***

10.5.1 Following on from 10.4.6, some members of the Panel recalled that a similar situation had existed in the mid 1980s during the rollout of Argos drifter programmes. Whereas much of the GTS insertion at that time had been undertaken by the two main Argos processing centres, many regional HRPT stations also generated GTS bulletins, often of poor quality. As a result, drifter observations as a whole attracted a negative reputation. This had led directly to the creation of the DBCP and the appointment of its first TC in 1987. The solution had been to persuade regional HRPT antenna operators to feed their near-real-time data to the Argos processing centres, where they received a consistent level of processing in terms of data conversion, QC, formatting and GTS insertion. Additionally, and most importantly, the DBCP TC had access to all nodes of the processing chain and was able to initiate prompt action in the event of a problem being noted with a particular platform or processing module.

10.5.2 In order to circumvent possible similar issues with the uncoordinated GTS insertion of Iridium data from a wide range of platforms, including ships and floats, the Panel had its previous session considered a proposal from Mr Meldrum to establish an Iridium '1-Stop Shop' (1SS) that would be modelled closely on the current arrangements for Argos. Additionally it might generate income for JCOMMOPS through revenue-sharing with the eventual 1SS service provider.

10.5.3 This issue had in fact been further discussed at a preliminary workshop on the possible creation of a WMO-IOC-FAO Forum for Users of Satellite Data Telecommunication Systems (the SatCom Forum), in Toulouse in April 2012. There it had been agreed that the provision of a unified 1-stop GTS insertion service took precedence over an end-to-end 1-stop service that included the sale of airtime.

10.5.4 While the Panel recognised the considerable value that could accrue from such a service, it noted that a number of difficulties potentially impeded its acceptance. From an operator point of view, many agencies had already established their own Iridium infrastructure. The costs of this were generally 'invisible' to platform operator, whereas a 1SS would be visibly more expensive. Additionally, and critically, there had been no major crises so far with Iridium data circulating on the GTS, which meant that there was little incentive to change the present arrangements. Furthermore, the 1SS service provider would face a very difficult business case, in that there would be large up-front costs to build service, with no guarantee of market buy-in, and little margin from Iridium air-time sales.

10.5.5 The Panel questioned the longevity of the Iridium corporation and was informed that the company is confident of the strength and validity of its business plan. The Panel noted that buoys were not the only platform using data Iridium, and that many National Met services put data on the GTS routinely. Other sources of data (e.g. Argo, gliders, ships) therefore need also be considered. The Panel suggested that well described QA/QC procedures and a certification system for marine data could be more effective at maintaining quality on the GTS than control of data insertion on the GTS. The focus of the Service should be on the QA/QC rather than on buying airtime services.

10.5.6 The Panel felt that it would in consequence be necessary to attract significant community buy-in as a precondition to proceeding to an Invitation to Tender (ITT) for 1SS services, and it had urged Mr Meldrum and CLS to develop a short position paper to address this issue and seek community approval. This paper had finally been tabled (see ***Annex XVII***), but too late to allow the Panel to fully consider its implications. In discussion, the view was expressed that the

Panel's aims in this respect would be better addressed by the establishment of clear and unequivocal requirements for those agencies that inserted Iridium data on to the GTS. Nonetheless, the Panel considered that significant value remained in the concept for the provision of easy access by TCs to all elements of the data chain, and the possible of generation of revenue for JCOMMOPS through cost-sharing arrangements.

10.5.7 The Panel invited its members to review the 1SS paper, provide comments and feedback on the proposal to Mr Meldrum (**action; members; 1 Nov. 2012**), and requested Mr Meldrum to then refine the proposal (**action; D. Meldrum; 31 Dec. 2012**) for further discussion, analysis, and guidance by the Executive Board.

10.5.8 The Panel, in thanking Mr Meldrum and CLS for their efforts in this regard, also reminded CLS of their kind offer to develop a draft business case, based on various funding scenarios, using their knowledge of the likely costs (**action; CLS; asap**).

10.5.9 In conclusion, the Panel asked that the Executive Board report back to the next Panel session, at which point the Panel would decide whether or not to proceed to an open ITT for an Iridium 1SS (**action; D Meldrum & CLS; DBCP-29**).

10.5.10 The Panel also noted that a successful outcome might in due course lead to similar arrangements in support of environmental monitoring using other satellite communication systems, as envisaged by the joint WMO-IOC initiative to establish a satellite telecommunications forum to address this and other issues (the SatCom Forum). It noted with approval that this initiative was currently being led by WMO and Mr Meldrum, and asked Mr Meldrum to keep them fully informed and involved with this activity (**action OP/a26; D Meldrum; ongoing**).

10.5.11 The Panel noted with appreciation that the First Institute of Oceanography (FIO) of China had expressed interest in the one-stop-shop concept, and has offered to participate in its development.

#### ***Near-field tsunametry***

10.5.12 The Panel recalled the proposal made at DBCP-27 from the ITP to establish a pilot project, possibly on near-field tsunametry or sensor technology development (e.g. to be installed on multi-purpose ocean platforms). The Panel requested again the ITP to submit a proposal to the Executive Board (**action; R. Venkatesan; ASAP**), and instructed the Executive Board to act on behalf of the Panel in this regard, and seek guidance from Panel members if necessary (**action; EB; DBCP-29**).

#### ***Advertising the importance of buoy data to the public***

10.5.13 The Panel agreed that it would be useful to establish a catalogue of examples of anecdotal events where buoy data had been shown to have either a positive or negative impact on marine forecast. A catalogue of such examples will be useful to selling the importance of the buoy data to the greater public. It requested JCOMMOPS to assist in this regard by recording such events at JCOMMOPS and providing the information via the JCOMMOPS website (**action; JCOMMOPS; DBCP-29**). The Panel also invited its members to contribute to the catalogue once established (**action OP/a69; members; ongoing**).

## 11 ORGANIZATIONAL ISSUES

### 11.1 Technical Coordinator Coordinator's position

11.1.1 The Panel received a report by the IOC Secretariat on the status and arrangements for support of the fixed-term position for the DBCP Technical Coordinator, currently, Ms Stroker.

11.1.2 The Panel noted with regret Ms Stroker's decision to return to the USA by January 2013. The Panel was indeed satisfied with the services provided by Ms Stroker for the last 13 months according to the TC's Terms of Reference. The Panel noted with appreciation Ms Stroker's offer of service to smoothen the transition to the new Technical Coordinator, and thanked her for her work on behalf of the Panel so far.

11.1.3 Taking into account the generally lengthy process for recruitment, the Panel concurred with the Executive Board recommendations as detailed in **Annex VI**, section 4. In that context, the Panel noted Argo's strong preference to keep the JCOMMOPS Team together at the same location, in recognition of the principles that were agreed to by JCOMM and the Observations Coordination Group Panels during the recent effort to strengthen and expand JCOMMOPS; these principles included the vital role that JCOMMOPS plays in furthering integration of the ocean observing system as well as the importance of the synergies made possible through a team of technical coordinators working together at the same place. The Panel recognized that Ms Stroker working remotely in 2013 for JCOMMOPS would be considered on a trial basis to test the impacts of a more distributed JCOMMOPS. The Panel agreed to give authority to the Executive Board to act and decide on behalf of the Panel regarding options concerning the recruitment of the Technical Coordinator in consultation with the Secretariat.

11.1.4 As a regular process, the Panel reviewed the arrangements for overall supervision, guidance, training, evaluation and promotion of the Technical Coordinator in line with the existing Terms of Reference as decided by the Parent Organization through JCOMM (see DBCP Operating Principles for details), both now and in the future. The Panel's decisions in this regard were included in the revised DBCP Operating Principles (agenda item 12.2).

11.1.5 The Panel recognized that, while the new arrangements allowed alternation in the future if the situation of IOC would improve, they required careful and continuous examination of Panel on the institutional arrangement relating to the TC employment . It also recalled that securing sufficient funds at the DBCP/SOT Trust Funds is critical to secure this position, and urged all Panel Members to continue their budgetary contribution to the Trust Fund in Timely manner (**action OP/a42; Panel; continuous**).

### 11.2 JCOMM activities, including JCOMMOPS

11.2.1 The Secretariat reported briefly on activities under or associated with JCOMM that had taken place since DBCP-27, and were of direct interest to the Panel. Of primary interest, the Panel noted the outcome of the Fourth Session of the Joint WMO-IOC Technical Commission for Oceanography and Marine Meteorology (JCOMM), Yeosu, Republic of Korea, 23-31 May 2012.

#### ***DBCP contribution to JCOMM OPA priority activities for 2012-2016***

11.2.2 The Panel agreed with the following regarding the JCOMM Observations Programme Area (OPA) priority activities for this JCOMM intersessional period (2012-2016):

- a) Implementation of WIGOS: The Panel agreed again to respond to the Legacy Recommendations of the JCOMM Pilot Project for WIGOS as agreed at the previous DBCP Session (see paragraph 11.5.3 of DBCP-27 Final Report);

- b) Requirements setting, and priorities: The Panel recalled that it is committed to respond to the goals sated in the JCOMM Observations Programme Area (OPA) Implementation Goals (OPA-IG), as stated in the DBCP Implementation Strategy. The Panel is also contributing to the WMO Rolling Review of Requirements, and responding to the Implementation Plan for the Evolution of Global Observing Systems (EGOS-IP), as well as to observational requirements setting through its Pilot Project on the impact on Numerical Weather Prediction (NWP) of Sea Level Pressure (SLP) observations from drifters (see agenda item 8.2);
- c) Global observing effort with more contributors: The Panel is encouraging more partners to joint its activities, and contribute to the DBCP implementation effort; the DBCP Capacity Building activities are also meant to bring new partners from developing countries in the DBCP activities.
- d) New ocean observing platform types: At its last Session, the Panel proposed to change its Terms of Reference (ToR) as well as those of the Technical Coordinator in order for the DBCP to also take responsibility for the ocean rigs and platforms. The JCOMM Co-Presidents approved the ToR on behalf of the Commission on 24 July 2012 (per JCOMM-4 decision, and following subsequent consideration by the Management Committee). The new ToR for the Panel and the Technical Coordinator are provided in **Annex X**. The Panel is also looking at using new technologies such as surface wave gliders, and is collaborating with other groups using autonomous ocean observing platforms (e.g. Argo for profiling floats, and gliders). The cooperation with the World Ocean Council will also bring new opportunities for the deployment of data buoys and the servicing of moored buoys.
- e) Synergies: The Panel is a strong supporter of the JCOMMOPS, including through financial contributions. JCOMMOPS is a key resource for developing synergies between observing systems to exploit the potential of joint deployment opportunities, and to foster a common approach to sensor development and best practices. The DBCP Tasks Teams, and Pilot Projects also play a key role in this regard.
- f) Pilot Projects: The Panel is supporting a number of pilot projects (see item 8) which are meant to explore new ocean sensor, ocean observing platform, and data telecommunication technologies, promote the most cost-effective use of the existing resources, and optimal use of potential synergies between various observing systems (e.g. in situ // satellite integration with the HRSST Pilot Project).
- g) Capacity building: The Panel is committed to develop partnerships between developed countries and developing countries, and organize PANGEA type capacity building activities, including training workshops on implementation of data buoy programmes, and data use (see item 6.4).
- h) Standards and best practices: The Panel requested to Task Teams to review existing WMO and IOC Publications, as well as JCOMM Technical Reports, and DBCP Technical Documents, to check whether they reflect the current practices with regard to data buoys, and make proposals through the Technical Coordinator for their updating as needed (**action; TTs; DBCP-29**). The Panel also invited its members to make use of the RMIC facilities in their respective regions to ensure traceability of data buoy observations (**action OP/a80; DBCP members; ongoing**).
- i) Data & metadata exchange: The Panel requested the Technical Coordinator, in liaison with the Task Teams on Data Management, Moored Buoys, and Instrument Best Practices and Drifter Technology Development to propose a consolidated DBCP strategy and workplan for the collection, management, and distribution to end users and the archives of data buoy instrument/platform metadata (**action; TC; DBCP-29**).

**DBCP contribution to JCOMM DMPA priority activities for 2012-2016**

11.2.3 The Panel agreed with the following regarding the JCOMM Data Management Programme Area (DMPA) priority activities for this JCOMM intersessional period (2012-2016):

- a) Ocean Data Standards: The Panel (i) invited its members to review ocean data standards submitted through the JCOMM-IODE Ocean Data Standards Process (ODS<sup>34</sup>) (**action OP/a83; DBCP members; ongoing**), and (ii) requested the Task Team on Data Management to investigate whether DBCP data management practices should be submitted through that process (**action; TT-DM; DBCP-29**).
- b) IODE Ocean Data Portal: The Panel invited its members holding data buoy data sets to provide the corresponding discovery metadata in the appropriate search standard ISO 23950, and discovery metadata standard ISO 19115, and make them available through the WMO Information System (WIS) or the IODE Ocean Data Portal (ODP) (**action OP/a33; Panel members; ongoing**).
- c) Marine Climate Data System (MCDS): The Panel requested the Global Drifter Programme (GDP) Data Assembly Centre (DAC), the RNODC/DB, and the SOC/DB to collaborate as needed with the Expert Team on Marine Climatology (ETMC) for refining the Marine Climate Data System (MCDS) strategy, and ensuring the flow of quality buoy data to the appropriate archives (see also item 10.2, and items 11.2.8 to 11.2.9 below);
- d) Instrument/Platform metadata: See item (i) under paragraph 11.2.2 above.
- e) Marine Climatology workshops (CLIMAR<sup>35</sup>, MARCDAT<sup>36</sup>): The Panel invited its members to consider participating at the CLIMAR and MARCDAR workshop once planned.

11.2.4 The Panel agreed to include the above perspectives regarding the JCOMM Observations (OPA) and Data Management (DMPA) Programme Area priority activities for this JCOMM intersessional period (2012-2016) into the DBCP Implementation Strategy.

#### ***Rigs and Platform metadata***

11.2.5 The Panel recalled that at its previous Session it had proposed new Terms of Reference for itself in order for the DBCP to take over full responsibility for all types of Rigs and Platforms reporting meteorological and/or oceanographic measurements, and for all related aspects. The Panel also acknowledged that the fourth Session of JCOMM urged the Panel and the OPA in general to continue to investigate all possible means to recruit to additional ocean observing platforms (including Rigs and Platforms operated by the offshore industry). JCOMM-4 also adopted Resolutions 12.4/2 (JCOMM-4), in which it was decided that *the DBCP terms of reference will be kept under review by the Panel, with any changes proposed to be considered by the Management Committee, with a view to their approval by the Co-presidents on behalf of the Commission*. The Panel noted with appreciation that the Management Committee has then been consulted by email, and the new Terms of Reference as proposed by the Panel at DBCP-27 (see Annex IX of DBCP-27 Final Report) approved by the Co-Presidents.

#### ***Evaluation of wave measurements***

11.2.6 The Secretariat reported that JCOMM-4 was pleased to note the progress of the Joint DBCP-ETWCH Pilot Project on the evaluation of wave measurement systems, in support of a wide range of applications, including the monitoring of extreme wave events for disaster risk reduction, wave modelling, and the calibration and validation of satellite wave measurements [see

<sup>34</sup> <http://www.oceandatastandards.org/>

<sup>35</sup> CLIMAR: JCOMM Workshop on Advances in Marine Climatology; next workshop is tentatively planned in 2014

<sup>36</sup> MARCDAT: International workshop on Advances in the Use of Historical Marine Climate Data; next workshop is tentatively planned in 2016

<http://www.jcomm.info/wet>]. The Panel noted the following requests from JCOMM-4, and invited its members to consider reacting as appropriate:

- Additional Members/Member States to assist in the development of technology through deployment, testing of prototypes, and evaluation of wave measuring instruments;
- National Meteorological and Hydrological Services (NMHSs) to facilitate and enhance the provision of wave data through the Global Telecommunication System (GTS) as well as File Transfer Protocol (FTP).

### **Codes**

11.2.7 The Panel recalled that WMO Commission for Basic Systems (CBS) migration to table driven codes shall be in principle be completed by the end of 2012. The Panel is reviewing 2 separate templates, 1 for moored buoys and 1 for drifters, as it has been viewed that having 1 single template for all buoy and wave data was not the best approach. The Panel noted that these templates are undergoing evaluation (See Appendices B and C) and will be further reviewed at DBCP-29 before moving to the JCOMM-Task Team on Table Driven Codes for review. It requested the Chair of the Task Team on Moored Buoys (TT-MB), Mr Turton to lead these developments in consultation with the Task Team on Data Management (TT-DM), TT-MB, and the JCOMM Task Team on Table Driven Codes (TT-TDB), and with assistance from the Technical Coordinator as needed (*action; J. Turton; DBCP-29*).

### **Integration of data management centres**

11.2.8 The Panel noted that through Recommendation 7.2/1, JCOMM-4 strongly supported the development of the new Marine Climate Data System (MCDS) by 2020 to eventually replace the current Marine Climatological Summaries Scheme (MCSS). It viewed the MCDS as an opportunity to better integrate existing WMO and IOC data infrastructures serving the requirements for climate applications, including climate services, and provide for the required high quality marine meteorological and oceanographic climate data. JCOMM-4 requested ETMC in close cooperation with the International Oceanographic Data and Information Exchange (IODE) of the IOC and the Ocean Data Portal (ODP) Task Team of the IODE/JCOMM Expert Team on Data Management Practices (ETDMP), and other appropriate partners such as the ICSU World Data System (WDS) to review and update the MCDS strategy (as proposed by the Hamburg 2011 workshop), and to develop an implementation plan (including performance indicators for participating centres) for achieving the Vision for a new MCDS.

11.2.9 The Panel further noted that JCOMM-4 invited France and Canada, and other parties currently performing the functions of Data Acquisition Centres (DACs) and/or Global Data Assembly Centres (GDACs) or similar (e.g. GCCs, Argo, OceanSITES, GTSP, GDP DAC) to participate in the discussions regarding the development of the MCDS strategy and implementation plan with a view to offering MCDS DAC or GDAC functions as appropriate. Meanwhile, the Commission approved the designation of the relevant French and Canadian centers as provisional GDAC for Drifting Buoys under JCOMM and IODE (GDAC-DB) to continue in their present roles until the role of the MCDS GDACs is further clarified as a part of the MCDS strategy. The Panel expressed satisfaction of these developments, and encouraged Canada and France to strongly contribute to these developments. See also item 10.2, as well as item (c) under paragraph 11.2.3 above.

### **Regional Marine Instrument Centres**

11.2.10 The Panel recalled that two WMO-IOC Regional Marine Instrument Centres have now been established in Mississippi, USA, and Tianjin, China for the Regional Association IV, and the Asia Pacific region respectively. The Panel further noted that efforts are being made to establish an



RMIC for the Regional Association I in Casablanca, Morocco. In addition, JCOMM-4 urged Members/Member States to offer RMIC facilities in other regions, especially within Regional Association III (South America), Regional Association V (Southwest Pacific), and Regional Association VI (Europe), and to collaborate with the existing RMICs. See also item 11.5 for further details.

### ***DBCP Terms of Reference***

11.2.11 The new Terms of Reference for the Panel and the Technical Coordinator are reflected in the revised Operating Principles in Appendix I and Appendix II of ***Annex IV*** respectively.

### ***JCOMM in situ Observations Programme Support Centre (JCOMMOPS)***

11.2.12 The Technical Coordinator, Ms Stroker presented an update on the JCOMM *in situ* Observations Programme Support Centre (JCOMMOPS) activities, priorities and challenges on behalf of the Centre. The Panel took note of the progress in the development of the Centre and continuing transitions after hiring a new DBCP Technical Coordinator last fall.

### ***JCOMMOPS development strategy***

11.2.13 The Panel noted that following a request from the JCOMM Observations Coordination Group (OCG), JCOMMOPS has prepared a “strategy paper” to clarify a number of items including budget, deliverables, performance and scenarios for its expansion with detailed and budgeted proposals. JCOMMOPS circulated the paper to various groups, including the DBCP Chair and Secretariats. The paper is now in review.

11.2.14 Ms Stroker reported that the first JCOMMOPS Strategy Meeting was held in Toulouse, France on 16 December 2011. The meeting was well attended by the host organizations, CLS and the French Research Institute for Exploitation of the Sea (IFREMER), the WMO and IOC Secretariats, and Panel members. Special attention was brought to the funding issues with UNESCO and the transfer of JCOMMOPS employees to WMO.

11.2.15 The Strategy meeting attendees, embryo of executive board for JCOMMOPS, agreed on a number of proposals and actions, including in particular:

- Firm establishment of a dedicated software engineer position;
- Establishment of a Ship Coordinator position (for the JCOMM Ship Observations Team (SOT) and possibly GO-SHIP coordination);
- Investigate further development of JCOMMOPS in Brest.

Based on the success of this meeting, JCOMMOPS will continue to hold the one-day meetings annually or at least every two years.

11.2.16 Ms Stroker reported that JCOMMOPS is currently creating a catalog of products and services (web based, bulletins, statistics, maps, and tools). The Panel acknowledged that this catalog will be the base for the JCOMMOPS production phase in 2012-2013, and that it will document the proposals for the Centre performance evaluation and expansion.

11.2.17 Ms Stroker announced that the internship Damien Bourarach, trained within JCOMMOPS in 2011-2012, has started on September 17<sup>th</sup> to work for JCOMMOPS as CLS employee and junior software engineer. This was made possible thanks to increased contributions to JCOMMOPS via CLS, in particular from OceanSITES (Australia, USA WHOI and SIO, POGO). The JCOMMOPS Information Technology (IT) staff is now made of ½ Full Time Equivalent (FTE)

senior software engineer (Laurent Cros), and one FTE junior and occasionally students. The Technical Coordinators and the IT team will finalize the full specifications by September 2012, and start the production phase of the next generation of products and web based tools. The Panel thanked CLS for making this decisive improvement possible.

### ***Ship logistics coordinator's position***

11.2.18 Ms Stroker was proud to announce that based on the approval of the supporting Panels and Steering Teams, host country, and the Secretariats, JCOMMOPS is now in the process of hiring a new "Ship Logistics Coordinator". The announcement for this position was published from May- August 2012. Twenty-two applications were received, many of them outstanding. A committee with all stakeholders representatives, including a reduced executive committee (JCOMMOPS, CLS, JCOMM OPA Coordinator, Secretariat) was set up to review and select the incumbent. The executive committee has made a short list and interviewed four candidates, and is in the process of making a final selection and recommendations to the whole committee. The position is currently regarded as a pilot activity based on an 18 months fixed term contract with CLS, which is also hosting JCOMMOPS. It is foreseen that if the pilot activity is proved successful, and provided long term funding can then be identified.

11.2.19 The Panel also noted with appreciation that during the recruitment process, the GO-SHIP Steering team agreed to support this position financially and provided inputs to the ToR. Accordingly, this third Coordinator within JCOMMOPS will then essentially support the following activities as outlined below:

- i) SOT technical Coordination (30%)
- ii) GO-SHIP technical coordination (30%)
- iii) Cross-programme ship issues  
(planned cruises inventory, ship time service, training, etc) (40%)

11.2.20 The Panel concurred with the process that was outlined by the Technical Coordinator for the recruitment of the Ship logistics Coordinator, and thanked the recruitment committee for its work. The Panel also reiterated its commitment made at the previous DBCP Session to support the position during the pilot phase at the previously agreed level. The Panel also noted with appreciation that the rest of the position funding will come from JCOMMOPS budget positive balance, SOT and GO-SHIP contributions.

### ***JCOMMOPS budget***

11.2.21 Ms Stroker presented the operational budget for 2011 and 2012 and a synthesis on the overall JCOMMOPS budget. She highlighted the exceptional contributions for the OceanSITES Programs in 2012 and while many of these were "one-off" contributions, JCOMMOPS encourages this level of support will continue. The Panel encouraged the SOT to help sustain its coordinator position (i.e. 30% of the ship logistics coordinator's position) and thereby increase its financial support to JCOMMOPS.

11.2.22 The Panel agreed to support the cost of the JCOMMOPS logistics contract with CLS, at the usual level of 50% (13,750 Euro), through its trust fund at WMO and letter of agreement between CLS and the WMO Secretariat. The Panel recalled that the remaining 50% part, coming essentially from Argo, will be covered via contributions that arrive directly at CLS. The Panel agreed that for future years, and in order to make some savings on the WMO overhead fees, it would be appropriate to have some or part of existing contributions to the DBCP directed to CLS for the purpose of paying the 50% contribution of the DBCP to this contract. The Panel requested its members to consider whether they could pay their contribution (or part of it) that way, consult

with the WMO Secretariat and CLS as needed, and possibly decide to do so in the future (**action; Panel members; DBCP-29**).

11.2.23 Ms Stroker discussed the year at JCOMMOPS and thanked Mr Belbeoch and the community for providing assistance, guidance, and training through the year. She sees that there is a bright future for the Centre and knows that a lot of progress will be made in 2012-2013.

11.2.24 The Panel thanked the Argo program that contributed greatly to the development of the JCOMMOPS centre through its Technical Coordinator.

11.2.25 The Panel finally noted the optimism of JCOMMOPS in serving the JCOMM/GOOS component, with a team close to be complete, successful experiments, and foundations of the infrastructure strengthened, a decade of enhanced integrated services is in sight.

11.2.26 The Panel recognized the outstanding role of Mr Mathieu Belbéoch (JCOMMOPS) in developing the JCOMMOPS and its information system, in assuring limited impact of the TC gap in the past, and in promoting the ship coordination activities of JCOMMOPS. The Panel also recognized that he had accumulated considerable institutional memory, and that this had substantial value in times where there are relatively frequent changes regarding the TC position, and other JCOMMOPS staff. The Panel recalled that its Technical Coordinator was under direct management of the DBCP Chair, assisted by the Executive Board and the Secretariat. The Panel requested the OCG in consultation with the Management Committee and with the Chairs of the contributing Panels and Programmes to discuss and clarify the concept of JCOMMOPS leadership (**action; OCG; DBCP-29**). Some preliminary discussions could also take place at the next JCOMMOPS strategy meeting for elaborating possible options.

### **11.3 Report on decisions of WMO and IOC governing bodies**

#### **11.3.1 Forty-fifth Session of the IOC Executive Council**

11.3.1.1 The IOC Secretariat representative reported on results on decisions made at the Forty-Fifth Session of the IOC Executive Council (EC-XLV<sup>37</sup>), 26-28 June 2012, Paris, France, which were related to the work of GOOS, JCOMM and of the DBCP. The decisions and recommendations from the fourth Session of JCOMM (JCOMM-4, Yeosu, Republic of Korea, 23-31 May 2012) and the first meeting of the interim GOOS Steering Committee (iGSC-1, Paris, France, 20 - 22 June 2012) were endorsed by the IOC-EC (IOC Decision EC-XLV/Dec.3.2 II).

11.3.1.2 The Panel noted that the IOC Executive Council noted a continuing commitment to GOOS and the further development of operational oceanography and sustained observations. The IOC Executive Council made note of the key role of JCOMM in supporting operational oceanography programmes. The IOC Executive Council emphasized the need for IOC contributions to the success of these programmes.

11.3.1.3 Noting the staffing changes in JCOMMOPS and the IOCCP, the IOC Executive Council highlighted concerns about the potential permanence of staffing changes to other institutions such as WMO, and Member States were encouraged to contribute resources in order to maintain the Commission's capacity and strength in ocean science, services and observations.

11.3.1.4 The Executive Secretary reaffirmed GOOS as a priority for IOC, and noted the outcome of the meeting of the recently created iGSC, held in Paris, from 20 to 22 June. Concerns were expressed about the geographic balance of the new GOOS Steering Committee. The Executive Secretary pointed out that the group was close to geographic balance, exceeded gender balance

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37: [http://www.ioc-unesco.org/index.php?option=com\\_oe&task=viewEventRecord&eventID=697](http://www.ioc-unesco.org/index.php?option=com_oe&task=viewEventRecord&eventID=697)

goals, had an appropriate scientific and technical discipline balance, and most importantly was committed to working with all GOOS Regional Alliances.

### **11.3.2 Sixty-fourth Session of the WMO Executive Council**

11.3.2.1 The WMO Secretariat representative reported on the outcome of the sixty-fourth Session of the WMO Executive Council (WMO EC-64, Geneva, Switzerland, 25 June - 3 July 2012)<sup>38</sup>. In particular, the Panel noted the following decisions of EC-64 and urged its members to take them into account when developing their activities in support of the Panel (**action OP/a53; Panel members; ongoing**):

- The Council noted that the updated JCOMM Observations Programme Area Implementation Goals as presented to the fourth JCOMM session are fully responding to the requirements of WMO Application Areas (in particular climate monitoring, NWP, and ocean applications), and requested Members to consider contributing to the achievement of these goals, as well as to support the JCOMM in situ Observing Programme Support Centre (JCOMMOPS).
- The Council noted the initiative to develop a Marine Climate Data System (MCDS) that will fully address the requirements of the Global Framework for Climate Services (GFCS). It requested Members to contribute to the MCDS developments by providing appropriate infrastructure to ensure the flow of operational and research marine meteorological and oceanographic data through the MCDS centres, as well as to contribute data to the MCDS according to the agreed standards, and assist in data rescue activities.

## **11.4 User requirements**

### **11.4.1 GCOS / GOOS / WCRP Ocean Observing Panel for Climate (OOPC)**

11.4.1.1 The Panel noted that the IOC through Resolution XXVI-8 'Strengthening and Streamlining GOOS' decided to recommit the IOC to a Global Ocean Observing System (GOOS) that is a holistic system of global, regional and coastal observations and products. The GOOS governance will be aligned with the OceanObs'09 working group's Framework for Ocean Observing oriented to an Essential Ocean Variable approach.

11.4.1.2 At the first interim GOOS Steering Committee meeting, held in June 2012 (iGSC-I), the committee reaffirmed the importance of Ocean Observations Panel for Climate (OOPC) to the past and future GOOS and approved the OOPC as a component of GOOS, sharing co-sponsorship with GCOS and WCRP.

11.4.1.3 The Panel noted that per JCOMM-4 decision, JCOMM will continue to rely on OOPC for observing requirements for climate, as expressed through implementation plan of GCOS and GOOS. JCOMM-4 called upon OOPC to revisit the requirements for upper ocean thermal observations. Meanwhile, the Panel reaffirmed its decisions at the last Panel Session regarding its response to the GCOS 2010 Implementation Plan, and reproduced in **Annex XV**.

### **11.4.2 WMO Rolling Review of Requirements update**

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38: <https://sites.google.com/a/wmo.int/ec-64-main-page/>

11.4.2.1 The Panel discussed latest developments with regard to the WMO Rolling Review of Requirements (RRR), stressing on non-climate requirements. It noted the most recent version of the Statement of Guidance for Ocean Applications.

11.4.2.2 The Panel noted that the new Implementation Plan for the Evolution of Global Observing Systems (EGOS-IP<sup>39</sup>) has now been approved by the Commission for Basic Systems at its fifteenth Session (CBS-15, Jakarta, Indonesia, 10-15 September 2012). The Panel further noted JCOMM-4 decisions related to the WMO RRR.

11.4.2.3 The Panel recalled the discussion under agenda item 8.2 and the outcome of the DBCP workshop on the Evaluation of the Impact of Sea Level Atmospheric Pressure (SLP) Data Over the Ocean from Drifting Buoys on Numerical Weather Prediction (NWP) (Sedona, USA, 21 May 2012). The Panel noted that the workshop demonstrated the substantial impact of SLP data from drifters on NWP.

11.4.2.4 The Panel invited its members to take the following into account when planning their national buoy programme activities:

- i. To make sure that the gaps identified in the Statement of Guidance for Ocean Applications are taken into account;
- ii. To address all ocean observations related actions of the EGOS-IP;
- iii. To actively participate in DBCP-ETWCH Pilot Project on Wave Measurement Evaluation and Test (PP-WET) for the evaluation of the quality of wave observations, and the development of cost-effective wave observations from drifters
- iv. To make precipitation measurements from moored buoys, including coastal moorings, tropical moorings, and OceanSITES;
- v. To install barometers on all newly deployed drifters;
- vi. To assist with the completion of the RAMA array of tropical moored buoys in the Indian Ocean.

## 11.5 WMO Integrated Global Observing Systems (WIGOS)

### ***WIGOS Implementation***

11.5.1 The Secretariat reported on the recent development with regard to the WMO Integrated Global Observing System (WIGOS), in particular with regard to the implementation of WIGOS per decisions of the WMO Sixteenth Congress (Geneva, Switzerland, 16 May – 3 June 2011). The Panel noted that the WIGOS framework Implementation Plan (WIP) drafted by the Inter-Commission Coordination Group on WIGOS (ICG-WIGOS) has been approved by the Sixty-Fourth Session of the WMO Executive Council (Geneva, Switzerland, 25 June – 3 July 2012). It identified a number of implementation activities where the Panel could contribute, and urged its members to collaborate as needed (***action; Panel members; 2016***). The Panel agreed that the decisions by the previous DBCP Session regarding its response to the legacy recommendations of the JCOMM Pilot Project for WIGOS were still valid, and provided an excellent contribution of the Panel to WIGOS implementation (see DBCP-28 final report<sup>40</sup>, paragraph 11.5.3).

### ***WMO-IOC Regional Marine Instrument Centres (RMICs)***

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39 <http://www.wmo.int/pages/prog/www/OSY/gos-vision.html#egos-ip>

40 [http://www.jcomm.info/components/com\\_oe/oe.php?task=download&id=14982&version=1.0&lang=1&format=1](http://www.jcomm.info/components/com_oe/oe.php?task=download&id=14982&version=1.0&lang=1&format=1)

11.5.2 The Panel recalled that two Regional Marine Instrumentation Centres (RMICs) have been established in USA (for Regional Association IV) and in China (for the Asia Pacific region). It further noted with appreciation that efforts to establish another RMIC for the Regional Association I (Africa) in Casablanca, Morocco, are well underway, and a JCOMM Marine Instrumentation Workshop planned in Casablanca in early 2013. The Panel invited its members to use the existing RMIC facilities to ensure traceability of data buoy observations.

11.5.3 The Panel recalled that the RMIC can play a role in the Pilot Project on Wave measurement Evaluation and Test (PP-WET) by (i) calibrating instruments, (ii) providing technical advice, (iii) do data analysis on behalf of the Pilot Project participants. It therefore urged the PP-WET and the two RMICs in USA and China to cooperate in this regard and report at the next Panel Session (**action; PP-WET & RMICs; DBCP-29**).

#### ***International forum of Users of Satellite Data Telecommunication***

11.5.4 The Panel noted recent developments with regard to the establishment of an international Forum of users of satellite data telecommunication systems (Satcom Forum). A preparatory workshop was held in Toulouse, France, from 23 to 27 April 2012. The workshop agreed that the current Argos Joint Tariff Agreement (JTA) should eventually operate as an independent operating sub-group of the future Forum. The workshop reviewed the draft Terms of Reference of the Satcom Forum and drafted operating principles of the Satcom Forum, including governance, roles and responsibilities of the Satcom Forum Chair, and Executive Committee, frequency of meetings, reporting procedures. The Panel also noted that a first *ad hoc* Forum workshop is planned in 2013. It invited its members to participate at this workshop once announced.

#### ***Review of WMO and IOC Publications***

11.5.5 The Panel noted the efforts of the Ship Observations Team (SOT) to shift instrument related practices from WMO No. 306, Manual on Codes, into the WMO No. 8, Guide to Meteorological Instrument and Methods of Observation. The Panel recommended that similar effort should be undertaken by the DBCP for buoy related instrument practices that appear with the description of the FM-13 SHIP, and FM-18 BUOY codes, and requested the TT-IBP to address this issue (**action; TT-IBP; ASAP**). As a general principle, the Panel also recommended that the TT-IBP keep under review all relevant WMO and IOC Publications to make sure that the instrument practices they describe are consistent with the current practices.

### **11.6 Financial reports**

11.6.1 The Meeting noted with satisfaction the positive and secure cash balance of funds totalling USD 690,372 as of 31 December 2011, as shown in the DBCP Annual Report for 2011.

11.6.2 As discussed and decided at the 27<sup>th</sup> Session (DBCP Operating Principles), new budget items such as Capacity Building, Collaborative Arrangements, Technical Developments and Evaluations and SOT were introduced. In 2011, USD 19,394 (Table 1, **Annex IX**) was charged to the Capacity Building line item for the Second in-region CB Workshop for countries of the Western Indian Ocean region (Balaclava, Mauritius, May 2011). USD 7,549 was charged to the SOT line item for travel by the SOT TC to the 4th Session of the JCOMM Observations Coordination Group (Hobart, Australia, April 2011).

11.6.3 The IOC Interim Statement for the period 1 January – 31 July 2012 is provided in **Annex VII**. It shows a positive balance of USD 16,332 as of 31 July 2011. During this period, no contribution had yet been received from the US.

11.6.4 The WMO Interim Statement for the period 1 January–31 July 2012 is shown in **Annex VII**. It shows a positive balance of USD 567,570. USD 23,000 corresponding to expenditures for the Third in-region CB Workshop for Countries of the Western Ocean Region (Mombasa, Kenya, April 2012) was charged to the Capacity Building line item.

11.6.5 The IOC Interim Statement and the WMO Interim Statement are included in the Interim Statement of Accounts for the DBCP/SOT Trust Fund, as given in Table 1 of **Annex IX**. It should be noted that, in order to compare the current expenditure level with the budget, this Interim Statement shows the actual expenditure with the budgeted amounts as decided at DBCP-27.

11.6.6 The review of the DBCP Accounts as at 31 July 2012 and estimates for the years 2013 and 2014 is given in Table 1 of **Annex IX**. The Panel noted the JTA budget managed within the DBCP/SOT Trust Fund (Table 2, **Annex IX**), including the CLS contribution made on behalf of the JTA, and the expenditures for the JTA chairman, the JTA Executive Committee, and the Secretariat, and acknowledged that it did not impact the DBCP budget.

11.6.7 The Panel noted with appreciation the provisional table of contributions for 2013 as detailed in **Annex VIII**. The Panel thanked contributing Panel members for their commitments.

11.6.8 The Panel recalled that expenditures from the DBCP/SOT Trust Fund are largely in Euros. Recognizing that the exchange rate between the US dollar and the Euro is affecting more and more the DBCP budget in a negative way, the Panel urged the Members once more to consider contributing to the DBCP/SOT Trust Fund in Euros (**recommendation OP/r7**). The Panel noted with appreciation that several Panel Members have already been paying their contribution in Euros in the last three years.

11.6.9 As being done at DBCP-27, the Panel again urged its members to pay their contributions in a timely fashion (**recommendation OP/r8**). In the view of the increasing DBCP activities, especially in Capacity Building, and pilot activities, and considering the need to secure the position of the Technical Coordinator, the Panel invited its members not contributing to the Trust Fund to discuss nationally whether a contribution could be made in the future (**recommendation OP/r9**). The Panel also invited members already contributing to the Trust Fund to investigate nationally whether their contribution could be increased (**recommendation OP/r10**).

11.6.10 The Panel approved its budget for 2013 (maximal expenditures) as detailed in Table 1 of **Annex IX**. The Executive Board, authorized by the Panel, and taking in account the decisions and recommendations made at the twenty-eighth session of the DBCP, will set a plan for the 2013 actual expenditures. The Executive Board will liaise with Mr Frank Grooters for updating the interim financial report with the most accurate and actual information (**action OP/a40; DBCP-EB; 31 Jan. 2013**).

11.6.11 The Panel requested the joint Secretariats and Mr Grooters to work together to distribute the final statement for the year 2012 to the Panel members as soon as the IOC and WMO Final Statement of Accounts for the year 2012 are finalized (**action OP/a41; Secretariat & F. Grooters; 1 Mar. 2013**).

11.6.12 The Panel noted for example the substantial in kind contributions of Korea and India to the DBCP Capacity Building activities through the NPOMS workshop, and the DBCP Capacity Building workshop for Asian countries respectively. It agreed that in kind national contributions should now be reflected in the financial reports, at least qualitatively (**action OP/a45; Financial Advisor; ongoing**).

11.6.13 The Panel reaffirmed Frank Grooters (the Netherlands) to act as its financial advisor according to the DBCP operating principles, and thanked Mr Grooters warmly for his

comprehensive financial report, and the Secretariat for providing timely and valuable financial information to Mr Grooters.

## **12 REPORT AND RECOMMENDATIONS FROM THE EXECUTIVE BOARD SESSION**

### **12.0 Report from the Executive Board Session**

12.0.1 The Chair reported on the outcome of the Executive Board Session (EB) that was convened during the evening of 4 October 2012 to discuss a number of issues that had arisen during the plenary session and to make recommendations to the Panel for its consideration.

12.0.2 The Panel concurred with the Executive Board recommendations as detailed in **Annex VI**, including on the proposed expenditures and budget for the next intersessional period.

### **12.1 DBCP implementation strategy**

12.1.1 As had become the custom at previous sessions, the Panel did not enter into discussion of its Implementation Strategy, but noted that the document was continuously updated by Chair and Secretariats, essentially to take into account the outcome and recommendations from the fourth Session of the Joint WMO-IOC Technical Commission for Oceanography and Marine Meteorology (JCOMM, Yeosu, Republic of Korea, 23-31 May 2012), the WMO Executive Council sixty-fourth Session (Geneva, Switzerland, 25 June to 3 July 2012), and the IOC Executive Council forty fifth Session (Paris, France, 26 - 28 June 2012). The Chair asked the Panel to review the document (available from the web<sup>41</sup>) and to forward any comments to the Chairperson by the end of November 2012 (**action; Members; 30 Nov. 2012**).

### **12.2 DBCP Operating Principles**

12.2.1 The Panel reviewed its operating principles and approved them. The new operating principles are attached as **Annex IV**.

12.2.2 The Panel recalled the dynamic nature of the document and invited its members to provide the Chairperson with comments by the end of the year (**action; members; 31 December 2012**).

### **12.3 Review of action items from the previous DBCP Session**

12.3.1 The Technical Coordinator presented the action plan from the twenty-seventh DBCP Session, Geneva, September 2011. The tables presented focused on actions and recommendations that were still underway. The plan also included some outstanding actions from previous Panel sessions. The key items were discussed during the session. The Panel should be aware that all actions are collated in the MS Excel file at the end of each DBCP session.

12.3.2 The Panel agreed to move the ongoing actions, and the set of recommendations from its workplan to the Operating Principles as a new Annex.

### **12.4 Workplans and priorities for the Panel and the Technical Coordinator**

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41 [http://www.jcommops.org/doc/DBCP/DBCP\\_Impl\\_Strategy.pdf](http://www.jcommops.org/doc/DBCP/DBCP_Impl_Strategy.pdf)



12.4.1 As in previous years, the Panel reviewed and updated the overall work plan for itself and the Technical Coordinator for the coming intersessional period. These work plans are given in **Annex III**. Noting that the Technical Coordinator's position had been partly vacant during most of the last intersessional period, the Panel invited the Chair, in liaison with the Executive Board and the Secretariat, to revise the list of prioritized tasks for the Technical Coordinator as agreed at the previous Session, and discuss execution details with Ms Stroker (**action; Chair; asap**). The Panel requested the Technical Coordinator to then undertake the tasks as proposed by the Chair and to report at the next Panel Session (**action; K. Stroker; asap**). In particular, the Panel agreed that the addressing the drogue loss and buoy life-time issues should be regarded as a priority activity for the Technical Coordinator.

12.4.2 During the overall session, the Panel discussed and agreed on its priorities for the next intersessional period. These are reflected in the DBCP budget (**Annex IX**) as well as in its workplan (**Annex III**).

### 13 NATIONAL REPORTS

13.1 The National Reports Session was chaired by Mr Chris Marshall (Canada). The Panel received written reports on current and planned buoy programmes from Australia, Brazil, Canada, China, Chile, France, Germany, India, Iran, Japan, New Zealand, Republic of Korea, South Africa, Sweden, the United Kingdom, and the United States of America. As usual, these written reports, as well as others submitted to the Secretariat before 31 December 2012, would be published in the Panel's Annual Report (**action; Secretariat; Early-2013**). Oral presentations were made during the Session on national activities by the following countries: Australia, Canada, China, Germany, India, United Kingdom, and the USA.

13.2 The Panel invited its members who had not submitted National Reports to submit their input to the Secretariat before the end of the year (**action; members; 31 Dec. 2012**).

### 14 ELECTION OF THE CHAIRPERSON AND VICE-CHAIRPERSON

14.1 The Panel recalled that according to its Operating Principles, the term for the members of the Executive Board is for one year during the intersessional period. They shall be eligible for re-election in their respective capacities, but would serve in principle for no more than 4 terms.

14.2 The Panel further recalled that the current core members of the Executive Board included:

- Mr Al Wallace (Canada), first elected at DBCP-25, October 2009;
- Mr Jean Rolland (France), first elected at DBCP-25, October 2009;
- Mr Johan Stander (South Africa), first elected at DBCP-26, Sept. 2010;
- Dr R. Venkatesan (India), first elected at DBCP-26, Sept. 2010;
- Dr Sid Thurston (USA), appointed by Mr Wallace to serve in the Executive Board in 2010.

14.3 The Panel re-elected Mr Wallace as its Chairperson, to serve for a fourth term until the end of the next Panel session.

14.4 The Panel noted that Mr Rolland was proposing to step down from the position of vice-chair for Europe. The Panel elected Mr Jon Turton (UK) for that position.

14.5 The Panel re-elected Mr Stander, and Dr Venkatesan to serve for their third terms as Vice-chairpersons for the Southern Hemisphere, and Asia respectively until the end of the next Panel Session.

## **15 ADOPTION OF THE SESSION REPORT**

15.1 The Panel reviewed and adopted the draft session report prepared by the Secretariat. The list of action items arising from this Session is provided in ***Annex III***.

## **16 DATES AND PLACE FOR THE NEXT SESSION**

16.1 The Panel recalled its agreement – reflected in the DBCP Operating Principles – at DBCP-23 to hold DBCP sessions either in Paris or Geneva every other year as of its twenty-fifth session. The Panel agreed to organize next year's Session in Paris, France at the IOC headquarters. Tentative dates for the session were agreed to be scheduled provisionally from 23 to 27 September 2013, ensuring minimum duplication with schedules for events of other JCOMM and related programmes.

## **17 CLOSURE OF THE SESSION**

17.1 In closing the session, the Chairperson Mr Wallace once again thanked the Bureau of Meteorology (BoM), and especially Dr Peter Dexter (Australia) for the excellent facilities, support and hospitality that had been provided for the meeting, all of which had contributed substantially to its success. He also thanked Ms Louise Wicks (Australia) for the assistance she has provided during the Session, as well as the Secretariat, the Executive Board, the Technical Coordinator, the Chairs of the Action Groups, Task Teams, and Pilot Project Steering Groups, national representatives, and all participants for their active and positive contributions to the meeting and to the work of the Panel, which allows to build the data buoy community. He also thanked the manufacturers for their contribution to the work of the Panel.

17.2 The twenty-eighth session of the Data Buoy Cooperation Panel closed at 1700 on Saturday, 6 October 2012.

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**ANNEX I**

**AGENDA**

- 1 Opening and Welcome of the DBCP Session**
- 2 Scientific and Technical Workshop**
- 3 Opening of the DBCP business Session**
  - 3.1 Adoption of the agenda
  - 3.2 Working arrangements
- 4 Reports by the Chairperson, Vice-Chairpersons, and the Executive Board**
- 5 Report by the Technical Coordinator**
- 6 Report by the Task Teams**
  - 6.1 Task Team on Data Management (TT-DM)
  - 6.2 Task Team on Instrument Best Practices and Drifter Technology Development (TT-IBPD)
  - 6.3 Task Team on Moored Buoys (TT-MB)
  - 6.4 Task Team on Capacity-Building (TT-CB)
- 7 Reports by the Action Groups**
  - 7.1 Surface Marine programme of the Network of European Meteorological Services, EUMETNET (E-SURFMAR)
  - 7.2 Global Drifter Programme (GDP)
  - 7.3 International Arctic Buoy Programme (IABP)
  - 7.4 International Buoy Programme for the Indian Ocean (IBPIO)
  - 7.5 WCRP-SCAR International Programme for Antarctic Buoys (IPAB)
  - 7.6 International South Atlantic Buoy Programme (ISABP)
  - 7.7 DBCP-PICES North Pacific Data Buoy Advisory Panel (NPDBAP)
  - 7.8 OCEAN Sustained Interdisciplinary Timeseries Environment observation System (OceanSITES)
  - 7.9 Tropical Moored Buoys Implementation Panel (TIP)
  - 7.10 International Tsunameter Partnership (ITP)
- 8 Pilot Projects**
  - 8.1 Drifter Iridium Pilot Project
  - 8.2 Pilot Project on the impact of SLP from drifters on NWP
  - 8.3 Pilot Project on Wave Measurement from Drifters (PP-WMD)
  - 8.4 DBCP/ETWCH Pilot Project on Wave measurement Evaluation and Test from moored buoys (PP-WET)
  - 8.5 DBCP/GHRSST Pilot Project for High Resolution SST (PP-HRSST)

**9 Issues for the Panel**

- 9.1 Information Exchange
- 9.2 Deployment opportunities and strategies
- 9.3 Data timeliness
- 9.4 Vandalism
- 9.5 Metadata
- 9.6 Technological developments in support of user requirements
- 9.7 Drogue loss, and technical failures of operational drifters
- 9.8 Other issues to be discussed, as proposed by the Task Teams

**10 Information Reports**

- 10.1 Argo
- 10.2 Buoy data management centres
- 10.3 Argos operations and developments
- 10.4 Iridium operations and developments
- 10.5 Additional reports, as required

**11 Organizational Issues**

- 11.1 Technical Coordinator's position
- 11.2 JCOMM activities, including JCOMMOPS
- 11.3 Report on decisions of WMO and IOC governing bodies
- 11.4 User requirements
- 11.5 WMO Integrated Global Observing Systems (WIGOS)
- 11.6 Financial reports

**12 Report and Recommendations from the Executive Session**

- 12.1 DBCP implementation strategy
- 12.2 DBCP Operating Principles
- 12.3 Review of action items from the previous DBCP Session
- 12.4 Workplans and priority for the Panel and the Technical Coordinator

**13 National Reports**

**14 Election of the Chairperson and Vice-Chairperson**

**15 Adoption of the Session Report**

**16 Dates and Place for the Next Session**

**17 Closure of the Session**

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**ANNEX II**

**LIST OF PARTICIPANTS**

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## ANNEX III

## ACTION LIST / WORKPLAN

## DBCP WORKPLAN FOR THE NEXT INTERSESSIONAL PERIOD (2013)

*(Ongoing actions as well as Recommendations from this and past Panel Sessions are now included in the Operating Principles)*

No.	Ref item	Action item	Who	Supported by	Reporting to	Deadline
1	2.3(2)	to refer the issue of investigating the possible future inclusion of netCDF as an acceptable format for GTS transmission, from these observing platforms as well as guidelines for operations to the JCOMM Task Team on Table Driven Codes and then the JCOMM Management Committee (MAN) for possible further consideration by CBS	TT-DM	TC	Panel	DBCP-29
2	2.3(3)	to follow up the issue of updating DBCP TD No. 8 (SVPB Design Reference) to take into account the latest design changes, and coordinate this action as needed	TC	Secretariat	Panel	DBCP-29
3	2.3(5)	to consider at least one OSE study to address the effect of thinning the drifter barometer array	PP-SLP	Panel members	Panel	DBCP-29
4	2.4	to submit their papers via e-mail or CD-ROM to the Workshop Chairperson, via electronic format (MS Office compatible format only), by 30 November 2012	S&T workshop authors	Secretariat	Workshop Chair	30 November 2012
5	2.5	to organize the DBCP Scientific and Technical workshop in 2013	J. Stander & J. Rolland	Secretariat, Local host	Panel	DBCP-29
6	5.6, 5.12(v)	to modify the GTS bulletin header to follow WMO specifications as the entire TAO array has plans to be refreshed by 2014.	NDBC	TC	Panel	asap
7	5.12(i)	to adopt an international sticker, similar to that developed for the Argo Program; and requested the Technical Coordinator to make a proposal through the Executive Board	TC	Secretariat	EB	DBCP-29
8	5.12(iv)	to work with Iridium VARs to obtain drifting and moored buoy data	TC	VAR	Panel	DBCP-29

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<b>No.</b>	<b>Ref item</b>	<b>Action item</b>	<b>Who</b>	<b>Supported by</b>	<b>Reporting to</b>	<b>Deadline</b>
9	5.12(vi)	to make a distinction between Rigs & Platforms and Moored Buoys on JCOMMOPS status maps	TC		Panel	DBCP-29
10	6.1.3(ii)	to add a new column to the GDP/DAC: List and Details of all Buoys in Database on the web <sup>42</sup> to show latitude and longitude of where drifters lost their drogues	GDP		TT-DM	ASAP
11	6.1.3(iii)	to identify experts for each unfinished section of the "Oceanographer's and Marine Meteorologists Cookbook for submitting data in real time and in delayed mode" so the existing draft can be completed, and submitted for publication	TC	Secretariat	Panel	TTDM
12	6.2.6	to verify the requirement of no conflict of interest for the TT-IBP vice-chair, and to report to the Executive Board for confirming the decision	TT-IBP Chair	Secretariat, Manufacturers	Panel	ASAP
13	6.4.2(i)	to convene the Fourth "DBCP In-Region Western Indian Ocean Capacity Building Workshop" (WIO-4), May 2013, Zanzibar, Tanzania	TT-CB	Secretariat	Panel	Spring 2013
14	6.4.2(ii)	to coordinate WIO-4 preparations with the DBCP, Tanzania Meteorological Agency, the NOAA Office of Climate Observation (OCO), the Agulhas-Somali Current Large Marine Ecosystem (ASCLME), and Western Indian Ocean Marine Science Association (WIOMSA)	S. Thurston	Secretariat	Panel	until WIO-4
15	6.4.2(iii)	to continue to build Observation Development Team (ODT) and Modelling Development Team (MDT) with Met/Ocean Institutes in the Western Indian Ocean Region	TT-CB	Secretariat	Panel	WIO-4
16	6.4.2(iv)	to Assemble a Team to explore recent advances in Information and Communication Technology (ICT) to help facilitate more effective DBCP TT-CB Outreach and Capacity Building Activities on a larger scale	TT-CB	TC, Secretariat	Panel	until DBCP-29
17	6.4.2 (v)	to Enhance Coordination and Cooperation between TT-CB, WMO Regional Associations, GOOS Regional Alliances, and other IOC regional bodies	TT-CB	Secretariat	Panel	DBCP-29

<sup>42</sup> <http://www.aoml.noaa.gov/phod/dac/dirall.html>

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No.	Ref item	Action item	Who	Supported by	Reporting to	Deadline
18	6.4.2(vi)	to endorse and provide coordination support, through TT-CB, for the organization of the Second "North Pacific Ocean and Marginal Seas" (NPOMS-2) Workshop likely in Qingdao China or Okinawa Japan, and the Second "Regional Workshop on Best Practices for Instruments and Methods of Ocean Observation" in Chennai India. The Panel emphasized that the regional activities should create synergies and avoid duplication, at all cost, therefore requested to develop specialize activities that meet the interest of the respective regions, preferably with the identified resources within the regions. To ensure this and for smooth coordination among regional activities, the Panel decided to invite the leaders of the regional workshop organization would become members of the TT-CB.	TT-CB	Secretariat	Panel	continuous
19	7.5.2	to review the new ToR of IPAB, and make further recommendations to the IPAB during the next intersessional period if necessary	EB	Secretariat	Panel	DBCP-29
20	7.7.2	to investigate the impact of pressure observations from the Barent Sea area on NWP, and provide guidance regarding the density of drifters to be maintained there	PP-SLP	Panel members	Panel	DBCP-29
21	8.1.10(i)	to complete the analysis, the publication of a final report, and the compilation of a best-practices guide for the use of Iridium in drifters.	D Meldrum & TC	TT-IBP	TT-IBP, Panel	asap
22	8.1.10(ii)	to continue seeking improvements in Iridium buoy energy efficiency through the implementation of improved power management schemes and the latest low-power GPS receivers.	Buoy Manufacturers	Panel members	Panel	asap
23	8.2.4	to lead identified PP-SLP actions and report on the outcome at the next Panel Session	L. Centurioni	PP-SLP	Panel	DBCP-29
24	8.4.9(i)	to review the membership of the PP-WET Steering Committee in late 2012, and discuss plans for a possible follow up technical workshop on results to date	PP-WET co-chairs, Secretariat	EB, Secretariat	Panel	ASAP
25	8.4.9(ii)	to develop guidelines on the best practices for measurement of reliable, high-quality spectral wave measurements, including directional spectra, possibly as an outcome of the PP-WET technical workshop	PP-WET co-Chairs	TT-IBP, Secretariat	Panel	DBCP-29

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No.	Ref item	Action item	Who	Supported by	Reporting to	Deadline
26	8.4.9(iii)	to plan follow up PP-WET technical workshop on results to date	PP-WET co-Chairs	Secretariat	Panel	DBCP-29
27	8.5.2	to pursue and promote the PP-HRSST proposal to deploy significant numbers of HRSST drifters in support of the upcoming Sentinel-3 mission as a matter of urgency.	PP-HRSST Chair	PP-HRSST	Panel	asap
28	8.5.4	to take all reasonable steps to diagnose the source of the identified warm bias of HRSST drifter data.	PP-HRSST SG	Panel members	Panel	asap
29	8.5.5	to ensure that HRSST from their drifters was distributed on the GTS in support of PP-HRSST objectives.	SPURS participants	TC	PP-HRSST, Panel	asap
30	8.5.6	to proceed with the recruitment of additional members in PP-HRSST representing all interests as soon as possible.	PP-HRSST Chair	PP-HRSST	PP-HRSST	asap
31	9.1.1.4	to review the content of the DBCP web page on best practices <sup>43</sup> and to provide feedback to the Technical Coordinator as appropriate.	Panel members		TC	DBCP-29
32	9.1.3.2	to review JCOMM Document "An Oceanographer's and Marine Meteorologist's Cookbook for Submitting Data in Real Time and Delayed Mode" and publish the document during the next intersessional period	TC	Secretariat	Panel	DBCP-29
33	9.2.7(ii)	to establish a link with the JCOMMOPS site for Panel members who wish to request drifters for deployment opportunities.	GDP	TC	Panel	June 2013
34	9.3.4	to check with JouBeh, and confirm that the DBCP recommended real-time QC checks are being routinely applied by JouBeh	TC	Joubeh	TT-DM	DBCP-29
35	9.3.5(iii)	to separate the moored buoy subsurface delays from the surface data delays and find a solution to best represent the timeliness of the moored array	TC	TT-MB	Panel	DBCP-29
36	9.4	to undertake similar actions than India and USA to prevent vandalism on data buoys and report at the next Panel Session	DBCP members	USA, India, TC	Panel	DBCP-29
37	9.5.9(i)	to provide JCOMMOPS with planned deployment metadata in the format specified	Panel members & TC	TC	JCOMMOPS	asap
38	9.5.9(ii)	to review the BUFR templates provided during the meeting and respond to the TT-MB chair for any changes or comments.	Panel members	TC	TT-MB	end of 2012

43: <http://www.jcommops.org/dbcp/bestpractice.html>



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<b>No.</b>	<b>Ref item</b>	<b>Action item</b>	<b>Who</b>	<b>Supported by</b>	<b>Reporting to</b>	<b>Deadline</b>
39	9.7.10	to identify a leader for the TT-IBP working group on data buoy life-time improvement, to establish it, and confirm membership and terms of reference to the Executive Board	R. Crout	Secretariat	EB	ASAP
40	9.7.10	to act as soon as the working group on data buoy life-time improvement (WG-LT) is established, and to report on its findings and subsequent actions at the next Panel Session	WG-LT	TT-IBP	Panel	DBCP-29
41	10.5.7	to review the 1SS paper, provide comments and feedback on the proposal to Mr Meldrum	Panel members	TC	D. Meldrum	1 Nov. 2012
42	10.5.7	to refine the 1SS proposal for further discussion, analysis, and guidance by the Executive Board	D. Meldrum		EB	31 Dec. 2012
43	10.5.8	to develop a draft business case for the 1SS, based on various funding scenarios, using their knowledge of the likely costs	CLS	D. Meldrum	Panel	asap
44	10.5.9	to report back to the next Panel session, at which point the Panel would decide whether or not to proceed to an open ITT for an Iridium 1SS	D. Meldrum & CLS		Panel	DBCP-29
45	10.5.12	to submit a proposal to the Executive Board regarding establishment of a pilot project, possibly on near-field tsunametry or sensor technology development	R. Venkatesan	ITP	EB	ASAP
46	10.5.12	to act on behalf of the Panel regarding establishment of a pilot project, possibly on near-field tsunametry or sensor technology development, and seek guidance from Panel members if necessary	EB	R. Venkatesan	Panel	DBCP-29
47	10.5.13	to assist in establishing a catalogue of examples of anecdotal events where buoy data have been shown to have either a positive or negative impact on marine forecast by recording such events at JCOMMOPS and providing the information via the JCOMMOPS website	JCOMMOPS	Panel members	Panel	DBCP-29
48	11.2.2 (h)	to check whether existing WMO and IOC Publications, as well as JCOMM Technical Reports, and DBCP Technical Documents reflect the current practices with regard to data buoys, and make proposals through the Technical Coordinator for their updating as needed	DBCP Task Teams	Secretariat	TC	DBCP-29
49	11.2.2(i)	to propose a consolidated DBCP strategy and workplan for the collection, management, and distribution to end users and the archives of data buoy instrument/platform metadata	TC in liason with TT-IBP, TT-MB, TT-DM	TT-IBP, TT-MB, TT-DM	Panel	DBCP-29

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<b>No.</b>	<b>Ref item</b>	<b>Action item</b>	<b>Who</b>	<b>Supported by</b>	<b>Reporting to</b>	<b>Deadline</b>
50	11.2.3(a)	to investigate whether DBCP data management practices should be submitted through ODS process	TT-DM	Secretariat	Panel	DBCP-29
51	11.2.7	to lead these migration of buoy data to BUFR in consultation with the Task Team on Data Management (TT-DM), TT-MB, and the JCOMM Task Team on Table Driven Codes (TT-TDC), and with assistance from the Technical Coordinator as needed	J. Turton	TT-DM, TT-TDC, TC	Panel	DBCP-29
52	11.2.22	to consider whether they could pay their contribution (or part of it) directly to CLS to provide for the DBCP contribution to the JCOMMOPS logistics contract with CLS, consult with the WMO Secretariat and CLS as needed, and possibly decide to do so in the future	Panel members	Secretariat, JCOMMOPS, CLS	Panel	DBCP-29
53	11.2.26	to discuss and clarify the concept of JCOMMOPS leadership	OCG	EB, OceanSITES co-Chairs, SOT Chair, Argo ST Chair	Panel	DBCP-29
54	11.5.1	to collaborate as needed with regard to WIGOS implementation	Panel members	Secretariat	Panel	2016
55	11.5.3	to cooperate with regard to PP-WET and report at the next Panel Session	PP-WET & RMICs	RMICs	Panel	DBCP-29
56	11.5.5	to undertake similar effort than the SOT for buoy related instrument practices that appear with the description of the FM-13 SHIP, and FM-18 BUOY codes to be shifted to WMO No. 8	TT-IBP	SOT TC, TC	Panel	ASAP
57	12.1.1	to review the DBCP implementation strategy (available from the web <sup>44</sup> ) and to forward any comments to the Chairperson by the end of November 2012	Panel members	Secretariat	DBCP Chair	30 Nov. 2012
58	12.2.2	to provide the Chairperson with comments regarding the DBCP Operating Principles by the end of the year	Panel members	Secretariat	DBCP Chair	31 December 2012
59	12.4.1	to revise the list of prioritized tasks for the Technical Coordinator as agreed at the previous Session, and discuss execution details with Ms Kelly Stroker	DBCP Chair	TC, Secretariat	Panel	asap

44 [http://www.jcommops.org/doc/DBCP/DBCP\\_Impl\\_Strategy.pdf](http://www.jcommops.org/doc/DBCP/DBCP_Impl_Strategy.pdf)

JCOMM Meeting Report No. 93, ANNEX III

<b>No.</b>	<b>Ref item</b>	<b>Action item</b>	<b>Who</b>	<b>Supported by</b>	<b>Reporting to</b>	<b>Deadline</b>
60	12.4.1	to undertake the tasks as proposed by the Chair and to report at the next Panel Session , noting that addressing the drogue loss and buoy life-time issues should be regarded as a priority activity for the Technical Coordinator	K. Stroker	EB, Secretariat	Panel	asap
61	13.1	to publish national reports in the Panel's Annual Report	Secretariat	Panel members	Panel	Early-2013
62	13.2	to submit their input to the Secretariat before the end of the year	Panel members	secretariat	Panel	End of each year

## ANNEX IV

### OPERATING PRINCIPLES OF THE DATA BUOY CO-OPERATION PANEL (DBCP) (as adopted by DBCP-28)

#### 1. INTRODUCTION

1.1 The Data Buoy Co-operation Panel (DBCP) is a subsidiary body of the Joint WMO-IOC Technical Commission for Oceanography and Marine Meteorology (JCOMM). The World Meteorological Organization (WMO) and Intergovernmental Oceanographic Commission of UNESCO (IOC) jointly sponsor the JCOMM, in order to undertake international / intergovernmental coordination of marine observational networks for which both organizations are mandated.

1.2 The DBCP was established in 1985 by WMO Resolution 10 (EC-XXXVII) and IOC Resolution EC-XIX.7. In 1993, the governing bodies of IOC and WMO agreed to change the name of the Panel to the Data Buoy Co-operation Panel (DBCP) with extended terms of reference, so that the Panel may provide international coordination required for both drifters and moored buoy programmes, which support major WMO and IOC programmes (IOC Resolution XVII-6 and WMO Resolution 9 (EC-XLV)). As the JCOMM was established in 1999, the Panel became a part of the JCOMM Observations Programme Area (Resolution 4 (EC-LII)). The Terms of Reference of the DBCP are reproduced in [Appendix I](#).

1.3 The DBCP addresses the requirements and needs for real-time or archival data from buoys, both drifting and moored, coordinates buoy deployments worldwide, maintenance and collection of data from instrumented oceanographic and meteorological drifting buoys and moored buoys on the high seas. The Panel provides a forum for the exchange of technical and related information on buoy technology, communications systems and the applications of buoy data, to both operations and research.

1.4 The Panel coordinates its activities with related regional and global programmes of WMO and IOC, such as the World Weather Watch (WWW), the Global Ocean Observing Systems (GOOS) and the ICSU / WMO / IOC / UNEP Global Climate Observing System (GCOS) and the ICSU / WMO / IOC World Climate Research Programme (WCRP), and serve their needs for the data buoy technology and the implementation of data buoy networks.

1.5 The Panel adheres to a data policy approved by itself at DBCP Sessions. The DBCP Data Policy is reproduced in [Appendix IX](#).

#### 2. PANEL MEMBERS AND PARTICIPANTS

2.1 The Terms of Reference for the DBCP are decided by the WMO and IOC Executive Bodies through proposition by JCOMM; the Panel is reporting to JCOMM and serves the needs of WMO and IOC Programmes. In this context, WMO and IOC Members / Member States designate National Focal Points for buoy programmes who become full Panel members. This is done by means of a letter from the Permanent Representative of a country with WMO to the WMO Secretary-General or by the IOC Action Addressee to the Executive Secretary of IOC. The lists of National Focal Points for buoy programmes are maintained by the WMO and IOC Secretariats, and published on the JCOMM website.

2.2 Participants in the DBCP activities can be operational agencies, meteorological and oceanographic institutes, research agencies, data centres, governmental and non-governmental organizations, and commercial services interested in the global oceans who actively contribute to the aims of the Panel. Individuals with an interest in data buoy activities are also welcome to attend as observers.

2.3 Following the outcome of last DBCP Session, a number of ongoing tasks and activities have been identified by the Panel for its members to undertake. They are to:

1. submit their national reports to the Secretariat before the end of the year (input submitted before 30 November to be published in the Panel's Annual Report);
2. take the recommendations from the IOC XXVI Assembly and the WMO 16th Congress into account when developing their activities in support of the Panel;
3. address user requirements and particular observing systems deficiencies as expressed in the JCOMM Statement of Guidance for Ocean Applications;
4. review the DBCP Implementation Strategy document at [http://www.jcommops.org/doc/DBCP/DBCP\\_Impl\\_Strategy.pdf](http://www.jcommops.org/doc/DBCP/DBCP_Impl_Strategy.pdf) and to forward any comments to the Chairperson by the end of November each year;
5. continue their budgetary contribution to the Trust Fund in Timely manner;
6. comply with the WMO Quality Management Framework (QMF) and quality management principles;
7. make use of the barometer drifter upgrade scheme (see <http://www.jcommops.org/dbcp/platforms/barometer.html>) by purchasing barometers for GDP-funded SVP drifters and negotiating their deployment positions with AOML;
8. provide GDP/AOML with manufacture dates for all buoys built within the last 5 years, as well as with barometer/SLP data;
9. provide instrument/platform metadata regarding the buoys they deploy to JCOMMOPS, using the recommended mechanisms (paying particular attention to SST and SSS data); to comply with buoy metadata collection scheme;
10. notify of all deployments of Iridium Drifters via the dedicated mailing list ([iridium-pp@jcommops.org](mailto:iridium-pp@jcommops.org)) and eventually via a notification web page on the JCOMMOPS web;
11. provide information on deployment opportunities to JCOMMOPS (preferably through a national website similar to AOML, NDBC and Canada) for all buoys, as well as to continue e-mail notifications as necessary – annual reports, action group annual planning, ship schedules, national plans, national contact points etc. Panel members also subscribe on the list and systematically post their deployment opportunities on the [ships@jcommops.org](mailto:ships@jcommops.org) mailing list as well;
12. provide info/materials for DBCP/JCOMMOPS websites (news, brochure);
13. actively communicate with national coordination for GEO to fully inform on the Panel's activities and capabilities in this;
14. start systems for record keeping for instrument calibration, replacement and validation that conform to ISO recommended specifications;
15. review best practices prior to drifter purchase for safety, and GTS data processing purposes;
16. follow the best practices and standards eventually proposed under WIGOS, and in particular, to provide the buoy platform / instrument metadata to JCOMMOPS, and the ODAS metadata service as appropriate;

17. use the WMO-IOC Regional Marine Instrument Centres (RMIC) facilities as appropriate, and participate at future workshops;
18. encourage other centres to act as Principal Meteorological and Oceanographic Centre Responsible for Quality Control of Buoy Data (PMOC) and existing centres to invest more resources in the implementation of DBCP Quality Control (QC) guidelines;
19. contribute to feeding the JCOMM database extreme wave events when such events are observed by data buoys and are recorded by Panel Members.

2.4 Similarly, the buoy and equipment manufacturers have been invited to participate on an ongoing basis to DBCP activities as following. They:

1. collaborate with buoy operators and JCOMMOPS and submit through JCOMMOPS the instrument/platform metadata, including description of buoy models, using the recommended mechanisms (paying particular attention to SST and SSS data); to comply with buoy metadata collection scheme. JCOMMOPS to negotiate metadata formats on ad hoc basis;
2. provide Service Argos with list of most used buoy models and formats they operate;
3. investigate participating in the Association of Hydro-Meteorological Equipment Industry (HMEI - <http://www.hydrometeoindustry.org/>) as a way to be represented at JCOMM meetings;
4. enhance buoy safety through improved design (refer recommendations) and keep the Panel informed about related changes.

2.5 The ongoing actions for Panel members and DBCP activity participants are reflected in [Appendix XI](#).

### **3. KEY DBCP PERSONNEL, THE EXECUTIVE BOARD AND TECHNICAL CO-ORDINATOR**

3.1 The Panel elects a Chairperson and Vice-chairpersons at the end of its regular sessions with geographical representation from: (i) Asia; (ii) Europe; (iii) North America; and (iv) the Southern Hemisphere. Elections will be decided by a simple majority if a quorum of Panel members is present. A quorum will consist of six Panel members. If a quorum is not present at the regular meeting, elections will be by unanimous vote.

3.2 The elected Chairperson leads the DBCP during the next intersessional period within principles and financial limits defined by the Panel, and Chairpersons the next Panel Session. The Chairperson is supported by the WMO-IOC Joint Secretariat and the DBCP Executive Board, which is responsible for the day-to-day management of the Programme within the guidelines set at the regular meeting of Panel members. The Terms of Reference of the Executive Board are provided in [Appendix IV](#) to this document.

3.3 The Panel recruits a full-time Technical Co-ordinator whose position is fully financed by voluntary contributions from Panel members or other contributors. The Technical Co-ordinator acts as the focal point for the Programme and carries out the directives of the Panel, as appropriate, during the intersessional period. Upon the Panel's decision, the Technical Co-ordinator works for other related programmes to assist their implementation. Tasks and duties of the Technical Co-ordinator are detailed under section 11 of this document, and the Terms of Reference of the Technical Co-ordinator are given in [Appendix II](#).

3.4 By the decision at the 24th session, the Technical Co-ordinator works a third of his/her time on the OceanSITES Project Office support.

3.5 The Technical Co-ordinator would be requested to inform the Chairperson and the Secretariat of his / her wish, or otherwise, to continue to work as Technical Co-ordinator of the Panel for the period 1 June "Y+1" to 31 May "Y+2". Should that information be a wish to continue, the Panel in turn would agree to retain him/her as Technical Co-ordinator, subject to the availability of funds, and subject to his / her specific contract limitations with his / her relay employer.

3.6 In case the Technical Co-ordinator wished to quit the position, he/she would be required to inform the Panel as soon as possible, and in any case preferably six months in advance, to assist in the recruitment and training of his / her successor, in order to ensure as full continuity as possible in the work of the Panel's Technical Co-ordinator.

3.7 The Chair within one month after each session is reviewing programme, prioritising tasks, establishing working priorities and discussing execution details of the technical coordinator as agreed at the previous Session.

3.8 The Technical Coordinator shall then undertake the tasks as proposed by the Chair and, report at the next Panel Session.

3.9 The Chair will also finalise updates to the DBCP implementation strategy including reference to the Capacity Building efforts being undertaken by the Panel and seeking feedback from Panel members.

3.10 The Chair will maintain close links with members of the Ship Observations Team (SOT) so that support on deployment opportunities can be obtained from the Ship of Opportunity Programme (SOOP) Implementation Panel (SOOPIP) and the Voluntary Observing Ship (VOS) Panel (VOSP) of the SOT.

3.11 The secretariat is maintaining a list of national contact points for the DBCP and within other relevant bodies with potential for involvement in DBCP activities.

3.12 The current contact details for key DBCP personnel are listed in [Appendix X](#).

#### **4. TASK TEAMS**

4.1 Task Teams can be established to work proactively on key issues identified by the Panel, in order to ensure that the Workplan is duly implemented during the intersessional period. The Chairperson(s) of Task Team(s) is / are appointed by the Panel. The Team(s) will report to the Panel on their activities at its regular sessions. The Chairs and Co-Chairs of the Task Teams should not be in a situation of conflict of interest. The Terms of Reference and Membership of the current Task Teams are provided in [Appendix V](#).

4.2 From time to time, the Panel may decide to establish and fund Pilot Projects of limited duration to evaluate new technologies or procedures that might enhance its capabilities.

#### **5. ACTION GROUPS**

5.1 The implementation of buoy deployments is coordinated at the regional level through global, regional, or specialized Action Groups. The definition of an Action Group is given in [Appendix III](#).



## **6. IMPLEMENTATION STRATEGY**

6.1 The Panel defines its Implementation Strategy and review it at its regular meetings. The Implementation Strategy is defined in such a way that it is consistent with the WMO and IOC Strategic plans.

## **7. WORKPLAN**

7.1 The Panel established and reviews the overall Workplan for itself and the Technical Co-ordinator at its regular sessions, for the coming intersessional period.

7.2 The DBCP Chairperson and the Executive Board may update the Technical Co-ordinator's Workplan during the intersessional period, as appropriate, and report on such changes at the next Panel Session.

7.3 Ongoing actions and recommendations from the Panel, as agreed upon at previous DBCP Session are listed in [Appendix XI](#).

## **8. FUNDING**

8.1 The DBCP is self-sustaining, by contributions of equipment, services (such as communications, deployment, archiving, and scientific or technical advice), and coordination. The contributions include monetary contribution to secure employment and activities of the Technical Co-ordinator, through IOC and WMO.

8.2 Monetary contributions - on a voluntary basis - are made by Panel members to the DBCP/SOT Trust Fund at WMO and/or IOC, as appropriate. The Terms of Reference of the DBCP/SOT Trust Fund at WMO are given in [Appendix VII](#). The Trust Fund at IOC follows the Financial Regulations of the IOC Special Account that are reproduced in [Appendix VIII](#) (Decisions in 157<sup>th</sup> Executive Board of UNESCO). The IOC Regulations follow the General rules and regulations of UNESCO on Trust Funds, which correspond to those of WMO, in principle.

8.3 The Panel can establish budget lines to implement the DBCP activities, based on its agreed Workplan. The current DBCP budget line items are provided in [Appendix VI](#).

8.4 Through the present arrangement, the Technical Co-ordinator is recruited by IOC, and the employment and activities of the Technical Co-ordinator depend on the DBCP Trust Fund in IOC and in WMO - the salary and logistical support are paid within the DBCP Trust Fund in IOC, whereas the expenses incurred for the TC's activities are executed within the DBCP/SOT Trust Fund in WMO.

8.5 Timely contribution from Panel members is critical to secure the TC employment contract, considering the yearly cycle of the administration within WMO and IOC. Panel members are encouraged to ensure that their contributions are made in good time.

8.6 The logistics for the DBCP Technical Co-ordinator are currently provided by the CLS (France), of which the terms and cost are defined by a MOU between the IOC and CLS on the logistic support for JCOMMOPS – where the Technical Co-ordinator reports organizationally . The annual cost is paid to the CLS from the DBCP Trust Fund in IOC. All actual expenses incurred by the host for the logistic support of JCOMMOPS, in excess of the amount of the contract signed with IOC to that effect, is considered as a contribution by the host to the work of the Panel.

8.7 The WMO and IOC Secretariats provide finalized financial statements of account on an annual basis to the Panel in early Year+1 as soon as the organizations' fiscal year accounting is



finalized. The Panel also reviews its financial situation at regular Panel sessions, with interim statements of the budget provided by the WMO and IOC Secretariats.

8.8 The WMO Secretariat shall facilitate the transfer of sufficient funds from the DBCP/SOT Trust Fund at the WMO to the DBCP Trust Fund at the IOC if needed to pay all related expenses from the IOC.

8.9 The Panel may appoint a Panel Member as finance advisor to act on its behalf of and to work with the WMO-IOC Joint Secretariat to produce a consistent, comprehensive and comprehensible set of annualized accounting reports to be presented to the Panel and its Executive Board at their regular meetings (see [Appendix X](#) for currently appointed person).

8.10 The joint Secretariats and the DBCP financial advisor will work together to prepare and distribute the final statement of the DBCP/SOT Trust Fund for the previous year to the Panel members as soon as the IOC and WMO Final Statement of Accounts for that year are finalized. On the basis of the IOC and WMO Final Statements and the advice of the DBCP Executive Board, the financial advisor will also prepare a revised budget estimate for the following 2 years. The IOC and WMO Final Statements and the final statement for the DBCP/SOT Trust Fund are then included in the DBCP Annual report.

8.11 The DBCP financial advisor will request IOC and WMO to provide an Interim Statement of Accounts over the period 1 January-31 July for the preparation by the Secretariat and the Financial Advisor of an interim statement of the DBCP/SOT Trust Fund, to be presented to the DBCP members at the following DBCP Session.

## **9. ORGANIZATION AND CONDUCT OF THE DBCP SESSIONS**

9.1 In odd years, the regular session of the DBCP will be held at either the WMO or IOC Headquarters, based on the agreement and decision by the Panel and the WMO-IOC Joint Secretariat, in order to lessen travel duties of the Secretariats and to provide opportunities for extended participation of other WMO or IOC officers in the session for wide range of information exchange and cooperation.

9.2 In even years, the regular session of the DBCP will be held at an external location, upon a suitable offer for hosting sessions. This is to advocate and support the Panel's activities in regional and national levels, and to encourage regional / national staff at all levels to actively participate in the work of the Panel, in particular through presentations to the Scientific and Technical Workshop and other networking opportunities.

9.3 The agenda and timetable of the regular session will be drawn up by the Panel Chairperson, in consultation with the Executive Board, other Panel members and the Joint WMO-IOC Secretariat. In principle, the Panel discussion at the regular session is to be completed within 3 days. In order to ensure efficiency of the session as well as the comprehensive review and exchange of information, some parallel or side sessions and focused discussion may be introduced, as required. The Panel will strive to reach decisions by consensus only; no voting should in principle take place. All decisions and relevant discussion will be recorded in the session report, which will be approved by the Panel before it disperses.

## **10. INFORMATION EXCHANGE AND REPORTING**

10.1 The Technical Co-ordinator maintains a website on behalf of the Panel. The URL for the website is: <http://dbcp.jcommops.org/> .

10.2 The Technical Co-ordinator also maintains mailing lists for the Panel. The names of the mailing lists, their objectives, and membership are detailed on the DBCP website.

10.3 The Panel may produce and update the DBCP brochure. The contents, means of publication and distribution, and funding mechanisms for related activities are to be agreed by the Panel at its regular sessions.

10.4 The Panel members who represent DBCP at various events are to use a standard Powerpoint presentation template. The template is developed and maintained by the Technical Co-ordinator, and available from the DBCP website.

10.5 The Technical Co-ordinator also maintains a document describing the Panel's achievements since its establishment.

10.6 The Panel maintains series of DBCP Technical Publications that are issued by the WMO Secretariat. These publications can be with the form of paper copy, CD-ROM, DVD-ROM, or be web-based only. The list of current DBCP Publications is available at the DBCP website. The actual costs of editing, publishing, and distributing the DBCP Publications are being recuperated from the DBCP/SOT Trust Fund.

10.7 At its regular sessions, the Panel receives reports on activities during the intersessional period, from:

- the Executive Board;
- the Technical Co-ordinator;
- the Action Groups (annual basis), and
- the Member Countries (annual).

10.8 The annual reports by Action Groups and the Member Countries are also to be included in the DBCP Annual Report. Members who had not submitted written National Reports for the year YYYY at the regular Panel Sessions shall submit their input to the Secretariat before the end of the year YYYY. The Annual Report shall be provided by the Secretariat during the year following the year of the report.

10.9 The Panel's regular session report shall be provided by the secretariat within 3 months after the last day of the session and will be consolidated into a single mailing, structured as follows:

- a. A 2-page covering letter containing important information for decision makers, including:
  - Executive summary of the Panel's achievements, activities and aspirations for the current year;
  
- b. A slimmed-down paper hard copy report containing information that needs to be referenced (and possibly annotated) rather frequently and quickly. This would essentially replace the existing session final report. The material in this report would include the following:
  - Executive summary of the Panel's achievements, activities and aspirations for the current year;
  - The final report of the regular session (i.e., the usual final report without the annexes);
  - Agenda;
  - List of participants;
  - Operating Principles of the Panel (this document, as updated and agreed at the annual session);

- Summaries of the Action Group reports;
- Executive Board report;
- Finalised annual financial accounts, including the table of national contributions and budget for the following year;
- If necessary, selected buoy and GTS statistics (showing trends in numbers, quality, delays, plus a few maps);
- List of Actions and Workplan, and;
- List of Acronyms.

c. A CD-ROM containing the entire above, plus a complete set of meetings, and all other annexes generally attached to the two reports includes:

- A full report by the Technical Co-ordinator;
- National reports;
- Full reports by the Action Groups;
- Data Management Centre reports;
- The current status and development of satellite communications (CLS/Argos, Iridium, etc);
- GTS report;
- National Focal Point list;
- Contracts;
- Other financial and administrative papers; and
- Technical Document list, including available electronic versions.

d. All of the above information will be available on-line via the JCOMMOPS website.

10.10 During the intersessional period, the Technical Co-ordinator provides for synthetic quarterly reports on his/her activities and the status of his/her Workplan's implementation to the DBCP Executive Board.

10.11 The Technical Co-ordinator produces monthly maps and statistical graphics on a monthly basis regarding the status of buoy programmes. This information is posted on the DBCP website and issued through the appropriate mailing lists.

10.12 Written reports to the Panel session will adhere to a format that will make clear to the Panel, by means of an Executive Summary, those issues that require discussion and decision. Similarly, presentations to the session will presume that written reports have been read by the Panel, and will concentrate solely on those issues, which require an action or decision by the Panel. Report presenters will submit a summary of their report and the ensuing discussion and actions to the secretariat for inclusion in the draft final report of the session.

10.13 The National Focal Point shall annually check the DBCP list of National Focal Points for logistical facilities and report discrepancies, changes, or additions to the WMO Secretariat.

## **11. ROUTINE TASKS OF THE TECHNICAL CO-ORDINATOR**

The following routine tasks of the Technical Co-ordinator (TC) comply with his/her Terms of Reference ([Appendix II](#)).

11.1 The Technical Co-ordinator acts as a clearing house for information on all aspects of buoy data use; he/she maintains DBCP and JCOMMOPS websites as appropriate.

11.2 The Technical Co-ordinator monitors the status of the global drifting and moored buoy networks in terms of: (i) spatial density; (ii) accuracy of the measurements; (iii) real-time data distribution and data timeliness; and (iv) buoy lifetime. The TC identifies gaps in the system, and makes recommendations to the Panel as appropriate. He/she also regularly provides information on instrument performances to the WMO Database as part of the CBS Rolling Review of Requirements (RRR).

11.3 Through direct contacts with programme managers, Principal Investigators, and buoy operators, the Technical Co-ordinator advertises the DBCP Programme, encourage use of buoy data, and active participation of new participants. The TC identifies sources of buoy data not currently reported on the GTS and determines thereason for non-availability, (particularly for the Arctic Buoys IABP).The TC regularly contacts buoy programme managers of existing and new programmes in order to: (i) promote data exchange and GTS distribution of the data in real-time; (ii) invite them, and possibly convince them, if useful, to authorise GTS distribution of their buoy data; (iii) offer technical assistance for that purpose if needed; (iv) collect information on buoy programmes, and the deployed buoys, including metadata; and (v) collect information in buoy deployment opportunities for use by other buoy operators. Programme Managers may also directly contact the Technical Co-ordinator for receiving assistance with regard to the GTS distribution of their buoy data.

11.4 The Technical Co-ordinator provides information and assists as appropriate buoy data users for accessing data and platform/instrument metadata.

11.5 The Technical Co-ordinator also participates actively in buoy quality monitoring as defined in the DBCP Quality Control Guidelines (details on the DBCP website<sup>1</sup>). In particular, The TC monitors the dedicated mailing list, and information posted on the dedicated web page, reviews the buoy monitoring statistics, and provides feedback to buoy operators regarding the quality of their buoy data as appropriate and recommends action for those buoys reporting erroneous data. He/she assists in the resolution of specific technical problems regarding the GTS distribution of the data as appropriate (obtaining WMO numbers, looking at technical files, calibration curves, looking at data losses, etc.).

11.6 The Technical Co-ordinator works closely with centres responsible for the collection, location, data processing, and real-time GTS distribution of the buoy data for: (i) monitoring the system and identifying possible problems; (ii) making sure these problems are corrected; and (iii) providing technical assistance as appropriate.

11.7 Upon request, the Technical Co-ordinators also provides the WMO and IOC Secretariats with status maps, statistical information and graphs, and documentation.

11.8 The Technical Co-ordinator maintains the DBCP list of buoy manufacturers and provides it on the DBCP website.

11.9 The Technical Co-ordinator liaises with the DBCP Action Group coordinators and prepares reports on DBCP activities for the regular meetings of the Action Groups. The TC represents the Panel or the Action Groups at relevant technical meetings, both inside and outside WMO and IOC, as required.

11.10 The Technical Co-ordinator assists the Chairperson and the Secretariats in the preparation of the DBCP Session, including the preparation of specific technical preparatory documents and presentations.

11.11 The Technical Co-ordinator undertakes the tasks as proposed by the Chair during the intersessional period as a matter of priority as prioritised and reports at the next Panel Session.

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1 : <http://www.jcommops.org/dbcp/2qgd.html>

11.12 The Technical Co-ordinator supports, as required, existing DBCP action groups, and provides assistance on request to other internationally coordinated buoy programme developments.

11.13 The Technical Co-ordinator coordinates with the Indian Ocean Panel (IOP) implementing strategy for the Indian Ocean Observing System as far as data buoys are concerned.

11.14 The Technical Co-ordinator produces on a yearly basis prior to Panel Session, a table of national commitments in the Southern Ocean, and seeks additional commitments for barometer upgrades, and deployment opportunities in the Southern Ocean to achieve a level of 300 buoys south of 40S.

11.15 The Technical Co-ordinator maintains a catalogue of existing ongoing ocean data buoy programmes, and provides information to Panel members or on its website, about where inventories of buoys are held, to aid in deployment planning.

11.16 The Technical Co-ordinator implements the JCOMMOPS work-plan – particularly with respect to Deployment opportunities.

11.17 The Technical Co-ordinator maintains a summary of requirements for buoy data to meet expressed needs of the international meteorological and oceanographic communities.

11.18 The Technical Co-ordinator coordinates the operations of DBCP Quality Control guidelines.

11.19 The Technical Co-ordinator to collect statistics and information on actual vandalism occurrences, and maintain relevant information on the DBCP website.

## **12. REVIEW OF THE MANAGEMENT STRUCTURE AND OPERATING PRINCIPLES**

12.1 The Panel reviews and updates its management structure, and operating principles at its regular sessions. This includes, in particular, the appropriate appendices of the DBCP operating principles, i.e., definition of an Action Group, Terms of Reference of the Executive Board, budget lines, and Terms of Reference of the DBCP/SOT Trust Fund at WMO and IOC.

**ANNEX IV, APPENDIX I**

**Terms of Reference of the Data Buoy Co-operation Panel**

*(as approved by the JCOMM Co-Presidents on behalf of the Commission,  
24 July 2012, per Resolution 3 (JCOMM-4))*

The Data Buoy Co-operation Panel shall:

Consider the expressed needs of the international meteorological and oceanographic communities for real-time or archival data from ocean-data buoys on the high seas, as well as rigs and platforms reporting surface marine meteorological and oceanographic data and request action from its members, the Technical Co-ordinator or Action Groups to meet these needs;

1. Co-ordinate activity on existing programmes so as to optimize the provision and timely receipt of good quality data and metadata from them;
2. Propose, organize and implement, through the co-ordination of national contributions, the expansion of existing programmes or the creation of new ones to supply such data;
3. Support and organize as appropriate such Action Groups as may be necessary to implement the deployment of data gathering buoys to meet the expressed needs of oceanographic and meteorological programmes such as WWW, WCRP, GOOS, GCOS, GFCS, WIS, and WIGOS;
4. Encourage the initiation of national contributions to data buoy programmes from countries which do not make them;
5. Promote data exchange, including the insertion of all available and relevant platform data and metadata into the Global Telecommunication System, and the submission of data and metadata to the appropriate archives;
6. Promote the exchange of information on data buoy activities and encourage the development and transfer of appropriate technology;
7. Ensure that other bodies actively involved in buoy use are informed of the workings of the Panel and encourage, as appropriate, their participation in the Panel deliberations;
8. Make and regularly review arrangements to secure the services of a Technical Co-ordinator with the terms of reference given in Part B;
9. Report formally to the Joint WMO / IOC Technical Commission for Oceanography and Marine Meteorology (JCOMM), and participate in and contribute to an integrated global operational ocean observing system, implemented and co-ordinated through JCOMM; and
10. Submit annually to the Executive Councils of the WMO and the IOC, to JCOMM and to other appropriate bodies of WMO and IOC, a report that shall include summaries of the existing and planned buoy deployments and data flow.

**ANNEX IV, APPENDIX II**

**Terms of Reference for the Technical Co-ordinator of the DBCP**  
*(as approved by the JCOMM Co-Presidents on behalf of the Commission,  
24 July 2012, per Resolution 3 (JCOMM-4))*

The Technical Co-ordinator of the Data Buoy Co-operation Panel shall:

1. Under the direction of the Data Buoy Co-operation Panel take all possible steps within the competence of the Panel to assist in the successful achievement of its aims;
2. Assist in the development, implementation, and management of quality control procedures for relevant observing platforms;
3. Assist in setting up suitable arrangements for notifying the appropriate user communities of changes in the functional status of relevant operational observing platforms;
4. Assist in the standardization of relevant observing platform formats, sensor accuracy, etc.;
5. Assist when requested with the development of cooperative arrangements for buoy deployment;
6. Assist in the clarification and resolution of issues between Service Argos and ~~buoy~~ relevant observing platforms operators;
7. Assist in promoting the insertion of all available and relevant observing platform data into the Global Telecommunications System;
8. Supply information about buoy developments and applications to the WMO and IOC Secretariats and assist the Data Buoy Co-operation Panel to promote an international dialogue between oceanographers and meteorologists;
9. Coordinate and monitor the flow of relevant observing platform data into appropriate permanent archives.

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**ANNEX IV, APPENDIX III**

**Definition of a DBCP Action Group**  
*(as approved at DBCP-X)*

1. A DBCP Action Group is an independent self-funded body that maintains, as a significant element of its responsibilities, an observational buoy programme providing meteorological and oceanographic data for real-time and / or research purposes in support of the World Weather Watch (WWW), the World Climate Research Programme (WCRP), the Global Climate Observing System (GCOS), and the Global Ocean Observing System (GOOS), and other relevant WMO and IOC programmes.
  2. Action Groups of the DBCP shall support the aims and objectives of the DBCP - as set out in the Terms of Reference of the DBCP - particularly with respect to:
    - Provision of good quality and timely data to users;
    - Insertion of real-time (or near real-time) data into the GTS;
    - Exchange of information on data buoy activities and development and transfer of appropriate technology.
  3. An Action Group may be regional or national in nature provided that its programme benefits a regional or international community.
  4. To be adopted as an Action Group of the DBCP, the Terms of Reference or operating principles of the body or programme shall be submitted to a session of the DBCP for formal approval. Once approved these shall be lodged with the Secretariats of WMO and IOC.
  5. The DBCP shall support the activities of its adopted action groups especially through the assistance of its key personnel (technical co-ordinator and the Secretariats of WMO and IOC) as far as resources allow.
  6. Action Groups of the DBCP shall submit annual reports of their activities to the Chairperson of the DBCP.
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**ANNEX IV, APPENDIX IV**

**Terms of Reference of the DBCP Executive Board**  
*(as approved at DBCP-28)*

***The DBCP Executive Board shall:***

1. Seek guidance from the Panel at its regular sessions regarding specific issues to be addressed by the Executive Board and the Tasks Teams during the intersessional period;
2. Act promptly to deal with any administrative, financial and planning issues and opportunities that might arise, within the guidelines established and reviewed regularly by the Panel;
3. Authorise the Chairperson to commit any expenditure necessary for the resolution of these issues and the promotion of the Panel's aims and objectives, up to the maximum amounts that might be agreed in advance by the Panel at its regular session;
4. Review the DBCP Implementation Strategy to ensure that it is kept up-to-date and complies with ongoing activities and users' requirements;
5. Considering the dynamic nature of the DBCP Operating Principles, in consultation with Panel members, assist the Chairperson in proposing updates to these principles on a annual basis;
6. Assist the Chairperson with regard to continuing the arrangements (including finance) to secure the services of a technical coordinator;
7. Set working priorities for the Technical Co-ordinator according to the DBCP recommendations at its regular sessions, and provide further guidance during the DBCP intersessional period;
8. Assist the Chairperson, and liaise with the Financial Advisor for updating the interim financial report with the most accurate and current information by end of each year;
9. Confer primarily regularly by e-mail, and exploit opportunities afforded by attendance at other meetings (e.g., the JCOMM OCG meeting) for face-to-face meetings;
10. Conduct meetings annually, following an agenda drawn up by the DBCP Chairperson;
11. Consult with Panel members and the Chairpersons of the DBCP Task Teams during the intersessional period if required;
12. Report its activities to the DBCP at its regular Session, and throughout the intersessional period as appropriate.

**Membership:**

The following individuals are members of the DBCP Executive Board:

- DBCP Chairperson, or his / her appointed deputy (Executive Board Chairperson)
- DBCP Vice-chairpersons
- DBCP member (appointed by the Chairperson)<sup>2</sup>
- DBCP Technical Co-ordinator (*ex officio*)
- Representative of the IOC Secretariat (*ex officio*)<sup>3</sup>
- Representative of the WMO Secretariat (*ex officio*)<sup>4</sup>
- Representative of the Manufacturers (*ex officio*)<sup>5</sup>

Note 1: A quorum of the Board should consist of at least three members, and must include the Chairperson or his / her appointed deputy.

Note 2: Any Panel Member may attend DBCP annual Executive Board meetings as an observer, subject to the availability of adequate meeting room space. If required, the Chairperson of the DBCP Executive Board will make a final decision as to which observers may attend, and may also invite other persons to attend at his / her discretion.

Note 3: The term for the members of the Executive Board is for one year during the inter-sessional period. They shall be eligible for re-election in their respective capacities, but would serve in principle for no more than 4 terms.

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2 : Mr Sidney Thurston (USA) has been appointed by the current DBCP Chairperson, Mr Al Wallace to serve in the Executive Board  
3 : Currently Mr David Meldrum  
4 : Currently Mr Etienne Charpentier  
5 : Nominated on rotating basis by the Panel. Currently Mr Andy Sybrandy (Pacific Gyre, USA)

**ANNEX IV, APPENDIX V**

**TERMS OF REFERENCE OF THE DBCP TASK TEAMS**

**TERM OF REFERENCE OF THE TASK TEAM ON DATA MANAGEMENT**

*(as adopted at DBCP-28)*

***The DBCP Task Team on Data Management shall:***

1. Receive and review reports from the Data Management Centres specializing in buoy data, i.e., (i) the Météo-France SOC / DB; and (ii) the ISDM, Canada RNODC / DB; reconcile any overlaps with emphasis on differences;
2. Liaise with the DBCP Task Team on Quality Management for compiling table driven coding requirements for data buoy observations, for all relevant applications, and submit them in a consolidated way to the DMPA Task Team on Table Driven Codes;
3. Address issues to do with real-time distribution of data, including GTS issues, timeliness and methods to improve data / flows. In particular,
  - 3.1. with assistance from the Technical Coordinator, monitor GTS bulletin headers used for GTS distribution of buoy data, reconcile the differences found, and publish the list on the JCOMMOBS website and Meteo-France QC tools
  - 3.2. share experiences regarding usage of various satellite communications systems for buoy data and participate in related DBCP pilot projects,
  - 3.3. assist for the review of satellite data telecommunications systems,
  - 3.4. provide special attention to buoy data reception,
  - 3.5. promote standardization of data transmission formats, and encourage the manufacturers to use standard DBCP-M2 formats and to add additional data if necessary as requested by the buoy owners at the end of that format,
  - 3.6. follow up and possibly assist in implementing requirements expressed by the buoy users within the Argos system, and assist the Panel and the DBCP Chairperson as needed to make recommendations to the JTA,
  - 3.7. continue seeking improvements in Iridium buoy energy efficiency through the implementation of improved power management schemes and the latest low-power GPS receivers,
  - 3.8. remind the operators of Iridium drifters to continue to actively report metadata to each other upon deployment beyond the life of the Iridium Pilot Project
4. Address issues relating to delayed-mode distribution and archiving of the data;
5. Seek input from data users on which instrumental metadata is most important and how it is best managed and coordinate these activities with JCOMM; to regularly forward collected metadata to the ODAS metadata service (China)
6. Review all relevant JCOMM Publications, to make sure they are kept up-to-date and comply with Quality Management terminology;
7. Follow-up with regard to the development of the WIGOS Pilot Project for JCOMM and make sure that the developments proposed by the Task Team are consistent with the WIGOS and WIS requirements;

8. Provide guidance to make sure that discovery metadata about buoy observational datasets are properly compiled and made available through the Ocean Data Portal (ODP) and the WMO Information System (WIS) using the required ISO-19115 profiles;
9. Make recommendations to the DBCP Executive Board or the DBCP for addressing the issues above; and
10. Report to the DBCP Executive Board and the DBCP at its biennial Sessions

**Membership:**

The membership is open to all Panel members. The Chairperson<sup>6</sup>, appointed by the Panel, has selected the following team members:

Ms Mayra Pazos (TT Chairperson and GDP representative)	(TT Co-Chairperson – to be appointed)
Mr Yann Bernard (CLS data manager)	Mr Pierre Blouch (France)
Mr Bruce Bradshaw (RNODC representative)	
Ms Emily Daniel (MetOcean)	Mr Jean Rolland (SOC representative)
Mr Johan Stander (SAWS)	DBCP Technical Co-ordinator ( <i>ex officio</i> )
Ms Santjie du Toit (SAWS)	

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<sup>6</sup> The Chair and Co-Chair of the Task Team should not be in a situation of conflict of interest.

**ANNEX IV, APPENDIX V (Continued)**

**TERMS OF REFERENCE OF THE TASK TEAM ON  
INSTRUMENT BEST PRACTICES & DRIFTER TECHNOLOGY DEVELOPMENTS**  
*(as adopted at DBCP-28)*

Note: The DBCP Evaluation Group is being merged into this Task Team.

***The DBCP Task Team on Instrument Best Practices & Drifter Technology Developments shall:***

*On instrument best practices and quality management*

1. When required by the DBCP, evaluate quality of buoy data produced by specific types of buoys, as well as functioning, efficiency;
2. Review existing practices for automatic real-time buoy data quality control, and delayed-mode buoy data quality control, and possibly suggest design changes for improvement (sensors, hardware, software, data formats) in liaison with the Task Team on technological developments;
3. Address instrument evaluation issues; suggest specific tests and / or evaluation deployments in different sea conditions to DBCP members in order to evaluate buoy quality as described in (1) above;
4. Share experience and results of evaluation with the DBCP and other interested parties;
5. Review and recommend Best Practices; work on specific technical issues in order to facilitate standardization and liaise with the other DBCP Task Teams as appropriate (e.g., DBCP recommended Argos message formats); and
6. Define specific criteria for evaluation purposes (e.g. ocean areas, definition of acceptable quality data, e.g., early failures, lifetimes, delays, accuracies, resolutions, etc.);
7. Comply with the requirements of the WMO Quality Management Framework (QMF) and quality management principles;

*On drifter technology developments*

8. Investigate developments in the fields of sensor technology, on-board processing, buoy hardware, hull design, energy generation and storage in order to better meet user requirements in terms of the range, reliability and quality of observed parameters and their cost-effectiveness;
9. Regularly review and document operational and upcoming satellite telemetry systems in terms of their ability to address user requirements such as bandwidth, timeliness, availability, geographical coverage, reliability, service quality, technical support, energy consumption and cost, and make specific recommendations to the communications service providers on required / desired enhancements;
10. Review operational platform location systems, and whether they meet the user requirements;

11. Propose to the DBCP and its Executive Board any evaluation activities and pilot projects that it deems beneficial to data buoy operators;
12. Propose recommendations, both upon request and unsolicited, to the Argos Joint Tariff Agreement. Such recommendations shall be passed via the DBCP Executive Board or the DBCP as appropriate; and
13. Evaluate, test, and promote buoy designs that are resistant to vandalism;

*General*

14. Review all relevant JCOMM Publications to make sure they are kept up to date, comply with Quality Management terminology, and adhere to the WMO Quality Management Framework (QMF);
15. Provide the DBCP Executive Board and the DBCP, both upon request and unsolicited, with technical advice needed for addressing the issues above; and
16. Submit reports to the DBCP Executive Board and to the DBCP at its annual session that describe intersessional activities and propose a Workplan for the next intersessional period.

**Membership:**

The membership is open to all Panel members. The Chairperson<sup>7</sup>, appointed by the Panel, has selected the following team members:

Mr Richard Crout (TT Chairperson);	Mr Andy Sybrandy, Pacific Gyre (TT Vice-Chairperson)
Mr Pierre Blouch, Météo-France	Ms Emily Daniel, MetOcean
Mr Shaun Dolk, NOAA / AOML	Ms Julie Fletcher, MSNZ
Mr Paul Freitag, NOAA / PMEL	Mr Frank Grooters, KNMI
Mr Michel Guigue, CLS	Mr Robert Jensen, USACE
Mr Chris Marshall, Environment Canada	Mr David Meldrum, SAMS
Mr Sergey Motyzhev, Marlin Yug	Dr Luca Centurioni, SIO
Ms Mayra Pazos, NOAA / AOML	Mr Steve Piotrowicz, NOAA
Dr M Ravichandran, INCOIS	Dr. Tim Richardson, Liquid Robotics
Mr Jean Rolland, Météo-France	Mr Jon Turton, UK Met Office
Mr R. Venkatesan, NIOT, India	Mr Bill Woodward, CLS America
Mr David Murphy, Sea-Bird Electronics, USA	Technical Co-ordinator, DBCP

The Co-chairperson is representing the manufacturers and is selected on a rotating basis.

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<sup>7</sup> The Chair and Co-Chair of the Task Team should not be in a situation of conflict of interest. Manufacturer representative may be accepted as Vice-Chair of the Task Team provided that the major drifter manufacturers agree.

**ANNEX IV, APPENDIX V (Continued)**

**TERM OF REFERENCE OF THE TASK TEAM ON MOORED BUOYS**  
(as adopted at DBCP-24)

**The DBCP Task Team on Moored Buoys shall:**

1. Review and document operational moored buoy systems and their underlying requirements;
2. Liaise with the different communities deploying moorings, including TIP, OceanSITES, seabed observatories, as well as national moored buoy programmes (coastal and global), and promote the development of multi-disciplinary mooring systems;
3. Liaise with the GOOS Scientific Steering Committee (GSSC) and its technical sub-Panel for Integrated Coastal Observations (PICO) to facilitate synergy between advances in GOOS implementation and the development of operational capabilities, in particular, for sustained coastal observations, analysis and related services by using mooring systems;
4. Liaise with the JCOMM Expert Team on Waves and Coastal Hazard Forecast Systems (ETWCH) regarding the need for in situ wave observations;
5. Compile information on opportunities for the deployment and / or servicing of moored buoys;
6. Monitor technological developments for moored data buoys and liaise with the Task Team on Technological Developments on satellite data telecommunication aspects;
7. Review all relevant WMO and IOC Publications on Instrument Best Practices (e.g., JCOMM, CIMO) to make sure they are kept up to date, address WIGOS issues, and comply with Quality Management terminology;
8. Provide the DBCP Executive Board or the DBCP with technical advice needed for developing moored buoy programmes, including the issues above; and
9. Report to the DBCP Executive Board and the DBCP at its biennial Sessions, with periodically updated Workplans supporting implementation.

**Membership:**

The membership is open to all Panel members. The Chairperson<sup>8</sup>, appointed by the Panel, has selected the following team members:

Mr Jon Turton, UK Met Office (TT Chairperson);	(TT Vice-Chairperson – to be appointed)
Mr Richard L. Crout, NOAA / NDBC	Mr Paul Freitag, NOAA / PMEL
Dr Robert Jensen, USACE	Mr Chris Marshall, Environment Canada
Mr Chris Meinig, NOAA / PMEL	Mr Ariel Troisi, SHN
Mr R. Venkatesan, NIOT, India	Mr Al Wallace, MSC
Dr Uwe Send, SIO	

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<sup>8</sup> The Chair and Co-Chair of the Task Team should not be in a situation of conflict of interest.

**ANNEX IV, APPENDIX V (Continued)**

**TERMS OF REFERENCE FOR THE DBCP TASK TEAM ON CAPACITY-BUILDING**  
*(as adopted at DBCP-28)*

***The DBCP Task Team on Capacity-Building shall:***

1. Initiate, plan and coordinate the implementation of the Training and Capacity-Building work programme including, in particular, Training Courses on Buoy Programme Implementation and/or Data Management; coordinate production of relevant training materials, and identify lecturers;
2. In parallel with the organization of training programmes, keep under review existing training material (paper and electronic) and advise on updating and developing new DBCP standard material in this regard; and investigate ways to add training material from all capacity building activities to IOC/IODE OceanTeacher;
3. Review and assess national, regional, and global requirements for capacity-building and develop / improve programmes as appropriate;
4. Liaise with other capacity-building programmes in relevant areas to develop and implement integrated activities, to explore potential synergies and opportunities for efficiently using resources available; liaise in particular with the JCOMM cross-cutting Team on Capacity-Building;
5. Endeavour to mobilize the resources required for DBCP capacity-building, including those needed for the implementation of the Training Courses;
6. Make recommendations to the DBCP Executive Board and / or the DBCP for addressing the issues above;
7. Report to the DBCP Executive Board and the DBCP at its biennial Sessions;
8. Consider inviting mariners and shipping companies to the DBCP Capacity Building workshops as a way to advertise the ocean observation activities and seek their support;
9. Make sure the data buoy vandalism aspects are being addressed as part of its activities;
10. Investigate on possible cooperation with relevant Capacity Building programmes in WMO and IOC.



**Membership:**

The membership is open to all Panel members. The Chairperson<sup>9</sup>, appointed by the Panel, has selected the following team members:

Dr Sidney THURSTON, NOAA/OCO (TT Chairperson)	(TT Vice-Chairperson – to be appointed)
DBCP Executive Board members, including DBCP Chairperson, Vice-chairpersons (or their respective deputies)	DBCP Technical Co-ordinator
Hamad Mohammed AL GHEILANI (Oman)	Mathieu BELBEOCH (JCOMMOPS)
	Walter FLORES SERVAT (Peru)
Djoko HARTOYO (Indonesia)	Dr G. LATHA (India)
Byung-Gul LEE (Republic of Korea)	Kwan-Chang LIM (Republic of Korea)
Rick LUMPKIN (USA)	Mr Ali MAFIMBO (Kenya)
David Meldrum (UK)	Lucy SCOTT (South Africa)
R. VENKATESAN (India)	Ms Louise Wicks (IOC Perth Office)
Representative of the IOC Secretariat	Representative of the WMO Secretariat
Ms Santjie du Toit (SAWS)	Mr Johan Stander (SAWS)
Dr Juliet Hermes (SA)	

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<sup>9</sup> The Chair and Co-Chair of the Task Team should not be in a situation of conflict of interest.

**ANNEX IV, APPENDIX VI**

**CURRENT DBCP BUDGET LINE ITEMS**

*(as approved at DBCP-28)*

The DBCP budget includes the following line items:

1. Contract for the DBCP Technical Co-ordinator<sup>10</sup>;
2. Ship Coordinator's position<sup>11</sup>;
3. JCOMMOPS logistical support<sup>12</sup>;
4. Travel of DBCP Chairperson<sup>13</sup>;
5. Travel for the DBCP Technical Co-ordinator<sup>13</sup>;
6. Travel of DBCP Representatives<sup>13</sup>;
7. Travel for the ship coordinator's position<sup>14</sup>;
8. Bank charge and support cost<sup>15</sup>;
9. Outreach and publication activities<sup>16</sup>;
10. JCOMMOPS Data/Development<sup>17</sup>;
11. JCOMMOPS information system migration<sup>18</sup>;
12. SOT<sup>19</sup>;
13. OceanSITES<sup>20</sup>;
14. Provision for termination / transition of the Technical Co-ordinator;
15. Technical developments and evaluations<sup>21</sup>;
16. Implementation support to address regional system deficiencies;<sup>22</sup>
17. Consultancy;
18. Capacity-Building<sup>23</sup>;
19. Collaborative Arrangements<sup>24</sup>;
20. JTA<sup>25</sup>, including Chairperson's contract, Executive Board, and Secretariat support;
21. Contingency.

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10: Includes the salary and benefits;

11: Includes the salary and benefits;

12: Expenses shared with the Argo Information Centre (AIC). This includes office space and use of furniture, personal computer, licenses for basic office software, secretarial support, telephone, Internet and e-mail access, and miscellaneous office supplies;

13: Missions on behalf of the Panel;

14: Expenses to be decided by the OPE Chair in consultation with the chairs of programmes contributing to JCOMMOPS;

15: Bank charges and service charges from the WMO and IOC for supporting the DBCP Trust Fund;

16: DBCP and JCOMMOPS brochures and DBCP Publications;

17: Hardware and software, and host IT support for developing, running, and maintaining the JCOMMOPS Information System;

18: Provision for the migration of the JCOMMOPS Information System;

19: Expenditure in support of the JCOMM Ship Observations Team (SOT) activities to be decided by the SOT Chairperson;

20: Expenditure in support of OceanSITES activities to be decided by the OceanSITES co-Chairperson;

21: For example, the DBCP Iridium Pilot Project;

22 : For example, improving data timeliness in areas where system weaknesses are identified;

23: Support for DBCP-related training courses: travel of trainers and / or trainees; training materials;

24: Support for collaborative arrangements with other international programmes, between Panel Members, or with private companies for the provision of coordination functions, or the deployment and / or operations of instruments; and

25: This expenditure is balanced by an equivalent contribution of the JTA to the DBCP Trust Fund.

**ANNEX IV, APPENDIX VII**

**DRAFT TERMS OF REFERENCE FOR THE DBCP TRUST FUND AT WMO**  
*(as adopted at DBCP-28 and further agreed by way of exchange of letters between the WMO Secretary General<sup>26</sup> and the DBCP Chairperson<sup>27</sup>)*

1. The purpose of the DBCP Fund is to support the activities of the Data Buoy Co-operation Panel (DBCP) and the Ship Observations Team (SOT);
2. The DBCP Fund is a Trust Fund within the provisions of Articles 9.7<sup>28</sup>, 9.8<sup>29</sup> and 9.9<sup>30</sup> of the WMO Financial Regulations (Resolution 37, Cg-XV);
3. The Fund shall be managed by WMO under its applicable rules and procedures, according to an annual budget adopted by the DBCP at its regular Sessions and any other directions provided by the DBCP;
4. The budget will be constructed according to a format agreed by the Panel, in which all income and expenditures will be identified in general articles and specific chapters. The format of the budget may be revised by the Panel as necessary. The budget may take note of other monies and resources made available for support of the DBCP activities, but which are not included as part of the Fund. Only those monies placed in the Fund, however, shall be subject to these terms of reference. The DBCP will provide WMO with details of the share to be borne by participating Members and contributors for invoicing purposes;
5. The Chairperson may authorize in writing the WMO Secretariat to commit any expenditure necessary for the resolution of these issues and the promotion of the Panel's aims and objectives, up to the maximum amounts that might be agreed in advance by the Panel at its regular session, as long as these are consistent with the DBCP Operating Principles. The Chairperson may also authorize to commit any expenditure exceeding these maximum amounts, or unplanned DBCP expenditures with the approval from the DBCP Executive Board, under its Terms of Reference;
6. The unit of account shall be the United States dollar. When commitments are made, the appropriate funds will be converted, as necessary, to the currency of commitment in at least the amount of the commitment;
7. The income of the Fund will include:
  - (i) Annual contributions from participating Members / Member States;
  - (ii) Funds deposited for specific purposes, hereafter referred to as deposits;
  - (iii) Other contributions from third parties;
  - (iv) Interest on investments as may be made by the Secretary-General in accordance with the provisions of Financial Regulation 12.231 (Resolution 37, Cg-XV); and
  - (v) Miscellaneous income.

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26: (Reference to Letter from WMO SG to DBCP Chair to be included here in due course)

27: (Reference to response from DBCP Chair to WMO SG to be included here in due course)

28: 9.7: Trust funds, reserve and special accounts may be established by the Secretary-General and shall be reported to the Executive Council.

29: 9.8: The purpose and limits of each trust fund, reserve and special account shall be clearly defined by the Executive Council. Unless otherwise provided by the Congress, such funds and accounts shall be administered in accordance with the present Financial Regulations.

30: 9.9: Income derived from investments of trust funds, reserve and special accounts shall be credited as provided in the provisions applicable to such funds or accounts or at the request of the donors at any time. In other circumstances, Regulation 10.1 shall apply.

31: 12.2: The Secretary-General may make long-term investments of moneys standing to the credit of trust funds, reserve and special accounts, except as may be otherwise provided by the appropriate authority in respect of each such fund or account and having regard to the particular requirements as to the liquidity of funds in each case.

8. The Fund will be used as agreed by the DBCP to:
- (i) Finance technical and operational support services for the DBCP, including in particular for supporting its Technical Co-ordinator salary, benefits, logistical support, and missions; DBCP capacity-building activities; data buoy Technical Evaluation and DBCP Pilot Projects; consultancy and missions of experts acting on behalf of the Panel; practical arrangements for the deployment or servicing of buoys; promotion and exchange of information about the Panel activities;
  - (ii) Finance the share of the DBCP in supporting the activities of JCOMMOPS and the Observing Programme Support Centre (OPSC) as agreed by the Panel at its regular sessions;
  - (iii) Provide support to the Argos Joint Tariff Agreement within the resources set aside by the DBCP under these activities;
  - (iv) Assist in the establishment and operation of data buoy programmes;
  - (v) Meet appropriate administrative costs incurred by WMO in providing support to DBCP activities;
  - (vi) Meet other administrative costs including such items as meetings and consultants;
  - (vii) Purchase specified goods or services; and
  - (viii) Support other activities required to meet the basic goal of the DBCP Panel;
9. Authority for the disbursement of funds, in respect of contracts and agreements properly concluded, is delegated to the Chairman of the DBCP. The Chairperson of the DBCP will request in writing the Secretary-General of WMO, or his representative, to disburse the funds;
10. Where required by their internal regulations, individual contributors to the DBCP Fund may wish to negotiate additional conditions governing the application, conditions of deposit and disbursement of funds. Such additional conditions shall not inhibit the efficient and proper use of the Fund nor modify the intent of the Fund. They shall require the acceptance in writing by the Chairperson of the DBCP and the Secretary-General of WMO or his representative;
11. The Fund shall be maintained on a continuous basis and amounts standing to the credit of the Fund at the end of any WMO biennial period shall remain in the Fund for use in the subsequent period;
12. Upon liquidation of the Fund for any reason, the DBCP shall make provision for the payment of unliquidated obligations and estimated expenses of winding-up business. It shall then arrange for repayment - to the extent that funds are available and according to the depositors instructions - of deposits for which no equipment or services have been received;
13. At the closure of the Fund:
- (i) Any remaining surplus after (12) above, shall be distributed among the then DBCP Members in proportion to their total contributions and deposits paid by them to the DBCP Fund; and
  - (ii) Any remaining deficit, including provision for the payment of unliquidated obligations and estimated expenses of winding-up business, shall be met by the DBCP Members in an equitable way, to be decided upon by the DBCP.

14. The Fund will be terminated not later than one year after the formal termination of the DBCP;
  15. All funds credited to the DBCP Fund shall be subject to these terms of reference and to the Terms of Reference of the DBCP; and
  16. Any revision or amendment to the present Terms of Reference is subject to a decision of the DBCP and the agreement of WMO.
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**ANNEX IV, APPENDIX VIII**

**FINANCIAL REGULATIONS APPLICABLE TO  
THE INTERGOVERNMENTAL OCEANOGRAPHIC COMMISSION (IOC)**

*(Excerpt from the Decisions by 157<sup>th</sup> Executive Board of the UNESCO)*

**Article 1 - Creation of a Special Account of UNESCO**

- 1.1 In accordance with Article 6, paragraph 6, of the Financial Regulations of UNESCO, there is hereby created a Special Account for the Intergovernmental Oceanographic Commission, hereinafter referred to as IOC.
- 1.2 The following Regulations shall govern the operation of this Special Account.

**Article 2 - Financial period**

The financial period shall correspond to that of UNESCO.

**Article 3 - Income**

- 3.1 As provided in its Statutes, the income of IOC shall consist of:
- (a) funds appropriated for this purpose by the General Conference of UNESCO;
  - (b) voluntary contributions from States, international agencies and organizations, as well as other entities allocated to it for purposes consistent with the policies, programmes and activities of UNESCO and IOC;
  - (c) such subventions, endowments, gifts and bequests as are allocated to it for purposes consistent with the policies, programmes and activities of UNESCO and IOC;
  - (d) fees collected in respect of the execution of projects entrusted to IOC, from the sale of publications, or from other particular activities; and
  - (e) miscellaneous income.
- 3.2 The Executive Secretary of IOC, hereinafter referred to as the Secretary, may accept income as set forth in Article 3.1 on behalf of IOC, provided that, in any case which would involve IOC in an additional financial liability, the Secretary shall obtain the prior approval of the IOC Executive Council and the consent of the Executive Board of UNESCO.
- 3.3 The Secretary shall report to the IOC Assembly and the IOC Executive Council on any subventions, contributions, grants, gifts or bequests accepted.

**Article 4 - Budget**

- 4.1 The Secretary shall prepare, in a form to be determined by the IOC Assembly, a biennial programme and budget and shall submit it to the IOC Assembly for approval.
- 4.2 The appropriations voted in the budget shall constitute an authorization to the Secretary to incur obligations and to make expenditures for the purposes for which the appropriations are voted and up to the amounts so voted.

- 4.3 The Secretary is authorized to transfer funds between activities under the same appropriation line. The Secretary may be authorized by the IOC Assembly to transfer funds, when necessary, between appropriation lines within the limits established by the Appropriation Resolution voted by the IOC Assembly and shall report to the IOC Executive Council on all such transfers.
- 4.4 The Secretary is required to maintain obligations and expenditures within the level of the actual resources that become available to the General Account mentioned in Article 5.1 below.
- 4.5 Appropriations shall remain available for obligation during the financial period to which they relate.
- 4.6 The Secretary shall make allotments and any modifications thereon, within the limits of the Appropriation Resolution, which shall be communicated, in writing, to the officials authorized to incur obligations and make payments.
- 4.7 Appropriations shall remain available for 12 months following the end of the financial period to which they relate to the extent that they are required to discharge obligations for goods supplied and services rendered in the financial period and to liquidate any other outstanding legal obligations of the financial period.
- 4.8 At the end of the 12-month period provided for in Article 4.7 above, the then remaining unspent balance of obligations retained shall revert to the General Account mentioned in Article 5.1 below.

#### **Article 5 - The General Account**

- 5.1 There shall be established a General Account, to which shall be credited the income of IOC as described in Article 3 above and which shall be used to finance the approved budget of IOC.
- 5.2 The balance remaining in this General Account shall be carried forward from one financial period to the next.
- 5.3 The uses to which this balance may be put shall be determined by the IOC Assembly.

#### **Article 6 - Trust Funds, Reserve and Subsidiary Special Accounts**

- 6.1 In addition to a Working Capital Fund, the Secretary shall establish a Reserve Fund to cover end-of-service indemnities and other related liabilities; the Fund shall be reported to the IOC Assembly at the time of the budget approval.
- 6.2 Trust Funds, Subsidiary Special Accounts and any other Reserve Accounts may be established by the Secretary, who shall report to the IOC Assembly and the IOC Executive Council.
- 6.3 The Secretary may, when necessary, in connection with the purpose of a Trust Fund, Reserve or Subsidiary Special Account, prepare special financial regulations to govern the operations of these funds or accounts and shall report thereon to the IOC Assembly and the IOC Executive Council. Unless otherwise provided these funds and accounts shall be administered in accordance with these Financial Regulations.

**Article 7 - Accounts**

- 7.1 The UNESCO Comptroller shall maintain such accounting records as are necessary and shall prepare, for submission to the IOC Assembly and the IOC Executive Council, the biennial accounts showing, for the financial period to which they relate:
- (a) the income and expenditure of all funds;
  - (b) the budgetary situation including:
    - (i) original appropriations;
    - (ii) the appropriations as modified by any transfers;
    - (iii) the amounts charged against these appropriations;
  - (c) the assets and liabilities of IOC.
- 7.2 The Secretary shall also give such other information as may be appropriate to indicate the current financial position of IOC.
- 7.3 The biennial accounts of IOC shall be presented in dollars of the United States of America. Accounting records, may, however, be kept in such currency or currencies as the Secretary may deem necessary.
- 7.4 Appropriate separate accounts shall be maintained for all Trust Funds, Reserve and Subsidiary Special Accounts.

**Article 8 - External audit**

The audited accounts of IOC, which constitute an integral part of the statement of the financial position of UNESCO, and the report of the External Auditor of UNESCO on IOC, shall be submitted to the IOC Assembly for approval.

**Article 9 - General provision**

Unless otherwise provided in these Regulations this Special Account shall be administered in accordance with the Financial Regulations of UNESCO.

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## **ANNEX IV, APPENDIX IX**

### **DBCP DATA POLICY** *(as adopted at DBCP-25)*

#### ***Data access policy***

1. The DBCP encourages timely, free and unrestricted access to data. Real time data sharing is achieved via the Global Telecommunications System<sup>32</sup> of WMO. DBCP also cooperate with data contributors to ensure that data can be accepted into and be used through the NODC and WDC network of the IOC/IODE as long-term repositories for oceanographic data and associated metadata.

2. At present, all of the archiving agencies and many of the operational and research bodies make provision for the release of drifter data to scientific and other customers. In particular, many data are available via the web, either in the form of track plots or as datasets. In many cases, the policies relating to the release and use of these data are not immediately clear. The Panel is seeking clarification from these agencies, and from its action groups, with a view to developing a coordinated data access policy for drifter data within the letter and the spirit of the WMO data exchange policy defined in WMO Congress Resolution 40 (Cg-XII) and the IOC oceanographic data exchange policy defined in IOC Assembly Resolution XXII-6.

#### ***Data archiving***

3. Drifter data inserted on the GTS are routinely archived by ISDM, the IODE Responsible National Oceanographic Data Centres (RNODC) for Drifting Buoys. The AOML DAC archives all data from the GDP, and any other drifter data that are made available to it. The Panel and its action groups will actively encourage all buoy operators to forward their data to one or other of these responsible global archives.

#### ***Instrumental Metadata***

4. There has been an increasing demand for instrumental metadata in recent years to serve a number of applications - and climate studies in particular. The DBCP has established its own metadata collection system at JCOMMOPS and is contribution to the Marine Climate Data System (MCDS).

#### ***Quality control***

5. Quality control procedures are in place to ensure the usefulness of real time data and also of data archives. A well-defined feedback mechanism is required to control real time data (see the DBCP QC Guidelines<sup>33</sup>).

#### ***More information :***

- WMO data policy Resolution 40<sup>34</sup>
- IOC Oceanographic Data Exchange Policy<sup>35</sup>
- CLIVAR data policy<sup>36</sup>

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32 : <http://www.jcommops.org/DBCP/1gtsinfo.html>

33 : <http://www.jcommops.org/dbcp/2qgd.html>

34 : [http://www.wmo.int/pages/prog/www/ois/Operational\\_Information/AdditionalDataProducts/02\\_Resolution%2040.pdf](http://www.wmo.int/pages/prog/www/ois/Operational_Information/AdditionalDataProducts/02_Resolution%2040.pdf)

35 : [http://www.ioc-unesco.org/index.php?option=com\\_oe&task=viewDocumentRecord&docID=338](http://www.ioc-unesco.org/index.php?option=com_oe&task=viewDocumentRecord&docID=338)

36 : [http://www.clivar.org/data/data\\_policy.php](http://www.clivar.org/data/data_policy.php)

**ANNEX IV, APPENDIX X**

**CURRENT KEY DBCP PERSONNEL**

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37 Elected at DBCP-28, Fremantle, Australia, 2-6 October 2012

38 Appointed on 29 August 2011

39 Elected at DBCP-26, Oban, United Kingdom, 27-30 Sept. 2010

40 Appointed at DBCP-24, Cape Town, south Africa, 13-16 Oct. 2008

**ANNEX IV, APPENDIX XI****ONGOING ACTIONS AND RECOMMENDATIONS FROM THE PANEL****1- DBCP ONGOING ACTIONS**

*(ongoing actions from past Panel Sessions; actions arising from this DBCP-28 Panel Session are highlighted in red)*

<b>No</b>	<b>Ref item<sup>85</sup></b>	<b>Action Item</b>	<b>Who</b>	<b>Supported by</b>	<b>Reporting to</b>	<b>When</b>
		<b>ADMINISTRATIVE</b>				
1	OP/10.13 D22/8.6.1.1, D22/9.3.2	To check the DBCP list of National Focal Points for logistical facilities and report discrepancies, changes, or additions to the WMO Secretariat.	Panel members	WMO Secretariat	WMO Secretariat	Continuous
2	OP/3.5, 3.6 D22/10.3.1	To inform chairman of his/her wish or otherwise to continue to work as TC/DBCP.	TC		Chair	End of each contract
3	OP/Apx4(6) D22/10.3	Continue the arrangements (including finance) to secure the services of a technical coordinator.	Chair	Secretariat	Secretariat	Continuous
4	OP/10.9 D23/6.7.; D22/7.2.12	To consolidate and publish the Panel's session report (web only) and Annual Report (CD-ROM and web).	Chair, Secretariat	TC	Executive councils of WMO & IOC	End of each year
5	OP/10.8 D27/13.1	to publish the written national report reports, as well as others submitted to the Secretariat before 30 November of year YYYY, in the Panel's Annual Report for YYYY	Secretariat		Panel	Early YYYY+1
6	OP/10.8 D27/13.2	Members who had not submitted National Reports for the year YYYY to submit their input to the Secretariat before the end of the year YYYY	Panel members		Panel	31 Dec. YYYY
7	OP/Apx4(5) D25/11.6.2, D26/12.2.2, D27/12.2.2	The Panel recalled the dynamic nature of the DBCP Operating Principles document and invited its members to provide the Chairperson with comments by the end of the year.	Panel members	Chair	Chair, Panel	End of each year
8	D25/11.6.2	Collate Updates to the DBCP Operating Principles document.	Chair	Secretariat	Chair	End of each year
9	OP/10.13 D26/9.3.11	to check the JCOMM list of NFP for logistic facilities and submit changes to the Secretariat .	NFP	Secretariat	Secretariat	ongoing

<sup>85</sup> Ref item: reference to paragraph number of DBCP Operating Principles (OP/Apx4/CB(6) = Operating Principles, Appendix IV, Capacity Building part, item 6), and/or DBCP Session final reports as appropriate (e.g. D22/8.6.1.1 = Para 8.6.1.1 of DBCP-22 Final Report).

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No	Ref item <sup>85</sup>	Action Item	Who	Supported by	Reporting to	When
10	OP/3.7 D22/10.4, D27/12.4.1	To review programme and establish working priorities of the technical coordinator.  (DBCP-27: to revise the list of prioritized tasks for the Technical Coordinator as agreed at the previous Session, and discuss execution details with the Technical Coordinator)	Chair	EB, Panel members	Panel	asap after Panel Session
11	OP/3.8 OP/10.11 D26/5.12 (iv), D27/5.6, D27/12.4.2	to undertake the tasks as proposed by the Chair and to report at the next Panel Session  (DBCP-27: to address during the next intersessional period as a matter of priority the high priority activities identified at DBCP-26)	TC	Panel members, EB, Secretariat	Panel	asap/ongoing
12	D28/4.2.3.11	to report to the Panel at its next session and follow the recommended template	Chair & vice-Chairs	Secretariat	Panel	ongoing
<b>CAPACITY BUILDING</b>						
13	OP/Apx5/CB(22) D23/4.3.6, D27/6.4.2 (viii)	To develop and keep up to date standardized training materials in parallel with the organization of training programmes. To investigate ways to add training material from all capacity building activities to IOC/IODE OceanTeacher.	TT-CB	Secretariat	Panel	Next Panel Session
14	OP/Apx5/CB(8) D27/9.2.8	to consider inviting mariners and shipping companies to the DBCP Capacity Building workshops as a way to advertise the ocean observation activities and seek their support	TT-CB	Secretariat	Panel	DBCP-28
15	OP/Apx5/CB(1) D22/2.2.1.2 (xii); D22/4.3.3; D22/4.3.5	To organize Capacity Building activities (training workshops, training materials, identifying lecturers).	TT-CB	Secretariat	Panel	Next Panel session
16	OP/Apx5/CB(10) D22/4.3.6	To investigate on possible cooperation with relevant Capacity Building programmes in WMO and IOC.	Secretariat	Chair	Panel	Next Panel session
<b>DATA COLLECTION</b>						
17	OP/Apx5/DM(3.6) ToR	To follow up and possibly assist in implementing requirements expressed by the buoy users within the Argos system.	CLS	TC	Panel, JTA meeting	Continuous
18	OP/Apx5/DM(3.3) D23/8.4.2.4	To continue review of satellite data telecommunications systems – including the Iridium system.	D. Meldrum, TC	Panel members	Panel	Continuous
19	OP/Apx5/DM(3.2) D23/8.4.2.2	To share experiences regarding usage of various satellite communications systems for buoy data, including Iridium.	Panel members	Chair & TC	Chair	Continuous

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No	Ref item <sup>85</sup>	Action Item	Who	Supported by	Reporting to	When
20	OP/2.3(10) D23/8.4.1.10	To notify of all deployments of Iridium Drifters via a dedicated mailing list (iridium-pp@jcommops.org) and eventually via a notification web page on the JCOMMOPS web.	Participants in IPP	TC	JCOMMOPS	Continuous
21	OP/Apx5/DM(3.5) D26/6.1.5 (1)	to promote standardization of data transmission formats using DBCP-M2 concept . DBCP-27: TTDM has continued to encourage manufacturers to use standard DBCP-M2 formats and to add additional data if necessary asrequested by buoy owners at the end of the existing data format.	TT-DM	TC	Panel	ongoing
22	OP/Apx5/DM(3.4) D27/4.2.2.3	to provide special attention to buoy data reception	INMARSAT		Panel members	ongoing
23	OP/Apx5/DM(3.7) D27/8.1.7 (ii)	to continue seeking improvements in Iridium buoy energy efficiency through the implementation of improved power management schemes and the latest low-power GPS receivers.	Buoy Manufacturers		Panel members	ongoing
24	OP/Apx5/DM(3.8) D27/9.5.9 (ii)	the operators of Iridium drifters to continue to actively report metadata to each other upon deployment beyond the life of the Iridium Pilot Project	Panel members	TC	Panel	ongoing
25	OP/Apx5/DM(3.6) D22/11.1	To make recommendations to the following JTA Session.	Chair		JTA, Panel	JTA Session
26	D28/10.5.10	to keep the Panel fully informed and involved with regard to the development of the Satcom forum	D. Meldrum	Secretariat	Panel	ongoing
		<b>DATA EXCHANGE</b>				
27	OP/11.3 D23/3.3.8	To identify sources of buoy data not currently reported on the GTS and determine reason for non-availability, (particularly for the Arctic Buoys IABP).	TC & CLS	Panel members & Secretariat	Chair & Panel for information	Continuous
28	OP/2.3(19) D25/10.2.5; D24/12.1.14 .	to contribute to feeding the JCOMM database extreme wave events when such events are observed by data buoys and are recorded by Panel Members.	Panel members	NODC	Panel	Continuous
29	OP/Apx5/DM(3.1) D27/6.1.2 (iv)	to monitor GTS bulletin headers used for GTS distribution of buoy data, reconcile the differences found, and publish the list on the JCOMMOPS website and Meteo-France QC tools	Météo France & ISDM, JCOMMOPS		Panel	ongoing
30	OP/11.3 D27/7.3.5	to contact the programme operators to promote data exchange and GTS distribution of the data in real-time	I. Rigor	TC	Panel	ongoing
31	D28/7.3.3	to communicate the value of urging scientists to distribute data from research programme buoys that are deployed in the Arctic	IABP	TC	Panel	ongoing
32	D28/7.10.3, 7.10.6	to commit more widely to real time data sharing by all national operators, and to make Tsunameter data freely available on the GTS in accordance with the IOC Oceanographic Data Exchange Policy	ITP	TC	Panel	ongoing

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No	Ref item <sup>85</sup>	Action Item	Who	Supported by	Reporting to	When
33	D28/11.2.3(b)	Members holding data buoy data sets to provide the corresponding discovery metadata in the appropriate search standard ISO 23950, and discovery metadata standard ISO 19115, and make them available through the WMO Information System (WIS) or the IODE Ocean Data Portal (ODP)	Panel members	TC IODE Project Office	Panel	ongoing
		<b>METADATA</b>				
34	OP/2.3 (9) OP/2.4(1) D27/11.5.3 (ii), D26/6.3.3, D24/10.5.6; D23/6.14; D21/8.6.4.5.	Buoy operators to provide metadata to JCOMMOPS; Manufacturers to collaborate with buoy operators and JCOMMOPS and submit the instrument/platform metadata using the recommended mechanisms (paying particular attention to SST and SSS data); both to comply with buoy metadata collection scheme. DBCP-27: JCOMMOPS to negotiate metadata formats on ad hoc basis	Buoy operators & manufacturers	TC	Panel	Continuous
35	OP/2.3(16) D26/6.3.3	to regularly forward collected metadata to the ODAS metadata service (China) .	JCOMMOPS	Secretariat & China	Panel	Ongoing
36	OP/2.3(8) D27/6.2.4	to provide GDP/AOML with manufacture dates for all buoys built within the last 5 years.	Manufacturers	AOML	Panel	ongoing
37	OP/2.3(8) D27/6.2.4	to provide barometer/SLP data to the GDP/AOML	Met. Services	TC	Panel	ongoing
38	D27/6.2.4	to incorporate manufacture date and barometer death date into the GDP (AOML) metadata and make it available online (including creating additional columns in the GDP metadata)	AOML		Panel	ongoing
39	OP/Apx5/DM(3.88) D27/11.5.3 (vi)	to make sure that discovery metadata about buoy observational data-sets are properly compiled and made available through the Ocean Data Portal (ODP) and the WMO Information System (WIS) using the required ISO-19115 profiles	Panel members	TC, Secretariat	Panel	ongoing
		<b>FINANCES</b>				
40	OP/Apx4(8) D27/11.6.10, D26/11.6.12 (1), D25/10.6.7	Liase with the Financial Advisor for updating the interim financial report with the most accurate and current information.	EB	Financial Advisor		End of each year
41	OP/8.10 D27/11.6.11, D26/11.6.12 (2), D25/10.6.7	The joint Secretariats and the DBCP financial advisor to work together to distribute the final statement for the previous year to the Panel members as soon as the IOC and WMO Final Statement of accounts for that year are finalized. Statements to be included in the DBCP Annual report.	Secretariat	Financial Advisor	Panel members	Jan. each year

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No	Ref item <sup>85</sup>	Action Item	Who	Supported by	Reporting to	When
42	OP/2.3(5) D27/11.1.3 D28/11.1.5	to continue their budgetary contribution to the Trust Fund in Timely manner	Panel members			continuous
43	OP/8.8 D27/11.6.14, D26/11.1.7	to facilitate the transfer of sufficient funds from the DBCP/SOT Trust Fund at the WMO to the DBCP Trust Fund at the IOC if needed to permit covering all related expenses from the IOC	WMO Secretariat			When needed
44	OP/8.11 D22/10.1.8; D22/10.1.10	to request IOC and WMO to provide an Interim Statement of Accounts over the period 1 January-31 July	Finance Advisor	Secretariat & Chair	Panel	March each year
45	D28/11.6.12	to reflect in kind contribution in the financial reports, at least qualitatively	Finance Advisor	Secretariat	Panel	July each year
46	OP/8.11 D22/10.1.10	To prepare an interim statement of the DBCP/SOT Trust Fund, to be presented to the DBCP members at the following DBCP Session	Secretariat and Finance Advisor		Panel	July each year
<b>IMPLEMENTATION</b>						
47	OP/2.3(7) D27/5.10	to make use of the barometer drifter upgrade scheme (see <a href="http://www.jcommops.org/dbcp/platforms/barometer.html">http://www.jcommops.org/dbcp/platforms/barometer.html</a> ) by purchasing barometers for GDP-funded SVP drifters and negotiating their deployment positions with AOML	Panel members	AOML	Panel	ongoing
48	OP/2.3(2) D27/11.3.1; D27/11.3.2.1	to take the recommendations from the IOC XXVI Assembly and the WMO 16th Congress into account when developing their activities in support of the Panel	Panel members	Secretariat, TC	Panel	ongoing
49	D28/9.2.7(i)	to provide planned deployment metadata as requested by JCOMMOPS	Panel members	JCOMMOPS	JCOMMOPS	ongoing
50	D28/9.3.5(i)	to continue to deploy Iridium drifting buoys in areas where delays are greater than 120 minutes	Panel members	TC	Panel	ongoing
<b>IMPLEMENTATION STRATEGY</b>						
51	OP/3.9 D25/11.1.1. 4.2.5; D23/4.3.10. 4.4.1; D22/4.2.3.	To finalise updates to the DBCP implementation strategy ( DBCP TD 15) including reference to the Capacity Building efforts being undertaken by the Panel – feedback sought by members .	Chair	Panel members	Panel	End of each year
52	OP/2.3(4) D27/12.1.1, D26/12.1.1	to review the DBCP Implementation Strategy document at <a href="http://www.jcommops.org/doc/DBCP/DBCP_Impl_Strategy.pdf">http://www.jcommops.org/doc/DBCP/DBCP_Impl_Strategy.pdf</a> and to forward any comments to the Chairperson by the end of November each year	Panel members	Secretariat	Chair & Panel	Nov. each year

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No	Ref item <sup>85</sup>	Action Item	Who	Supported by	Reporting to	When
53	D28/11.3.2.1	to take decisions of WMO and IOC executive bodies into account when developing their activities in support of the Panel	Panel members	Secretariat	Panel	ongoing
<b>IMPLEMENTATION / ACTION GROUPS</b>						
54	OP/11.12 ToR	To support, as required, existing DBCP action groups, and provide assistance on request to other internationally coordinated buoy programme developments.	TC & Secretariat	Chair	Panel	Continuous
55	OP/11.13 D20	To coordinate with IOP implementing strategy for the Indian Ocean Observing System as far as data buoys are concerned.	IBPIO	Chair, TC, Secretariat	Panel	Continuous
56	OP/11.14 D23/; 4.2.4; D16	To produce a table of national commitments in the Southern Ocean. To seek additional commitments for barometer upgrades, and deployment opportunities in the Southern Ocean to achieve a level of 300 buoys south of 40S.	TC	Panel members	Panel	Continuous
<b>IMPLEMENTATION / LOGISTICS</b>						
57	OP/2.3(11) D27/9.2.3, D27/9.5.9, (i)D23/7.2.4; D23/8.6.1.1; D22/8.6.1.13  D28/9.2.7(iii)  D28/9.2.8	To provide information on deployment opportunities to JCOMMOPS (preferably through a national website similar to AOML, NDBC and Canada) for all buoys, as well as to continue e-mail notifications as necessary – annual reports, action group annual planning, ship schedules, national plans, national contact points etc. To subscribe on the list and systematically post their deployment opportunities on the ships@jcommops.org mailing list as well  to communicate routinely with the new Ship Coordinator once in place, in the view to exchange information on deployment opportunities, seek his/her assistance for identifying opportunities, and develop further synergies between the different ocean observing systems in this regard	Panel members & TT-CB	TC	JCOMMOPS & Panel	Continuous
58	OP/3.10 D19	To maintain close links with SOT members so that support on deployment opportunities can be obtained from the SOOP and VOS Panels of SOT.	Chair	TC	Panel	Continuous
59	D23/8.6.1.10	To provide information to Panel members or on its website, about where inventories of buoys are held, to aid in deployment planning.	GDP		Next Panel session	Continuous
60	OP/11.16 D26/11.2.11, D23/8.5.1.8; D22/8.5.1.9.; D22/8.5.3.	To implement JCOMMOPS work-plan – particularly with respect to Deployment opportunities.	TC & TC/Argo	JCOMM	Next Panel session	Continuous
61	D26/9.3.7	to provide a table of inventories at its various warehouses to the Technical Coordinator before June each year, so that it can be presented to the Panel at each DBCP Session, and therefore assist Panel members of identifying how they can assist with the deployments.	R. Lumpkin	Panel members	TC	June each year



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No	Ref item <sup>85</sup>	Action Item	Who	Supported by	Reporting to	When
<b>MONITORING</b>						
62	OP/3.11 ToR	To maintain a list of national contact points for the DBCP and within other relevant bodies with potential for involvement in DBCP activities.	Secretariat	Panel members	Chair & Panel for information	Continuous
63	OP/11.15 D23/8.4.2.4	To maintain a catalogue of existing ongoing ocean data buoy programmes.	TC	Panel members & Secretariat	Chair & Panel for information	Continuous
64	OP/2.4(1) D21	To provide input on buoy models for JCOMMOPS database.	Manufacturers	TC	Panel	Continuous
65	OP/2.4(2) D21	To provide Service Argos with list of most used buoy models and formats they operate.	Manufacturers	TC	Service Argos	Before deployment
66	D28/9.3.5(ii)	to perform regular (every 6 months) assessments of the global data buoy timeliness by comparing JCOMMOPS delay maps and Argos Data Mean Disposal Time Maps	CLS	TC	Panel	Every 6 month
<b>REQUIREMENTS</b>						
67	OP/11.17 ToR	To maintain summary of requirements for buoy data to meet expressed needs of the international meteorological and oceanographic communities.	TC	Panel members & Secretariat	Chair for presentation to the Panel	Continuous
68	OP/2.3(3) D24/12.1.13	to address user requirements and particular observing systems deficiencies as expressed in the JCOMM Statement of Guidance for Ocean Applications.	Panel members		Panel	Continuous
69	D28/10.5.13	to contribute to the catalogue of examples of anecdotal events where buoy data have been shown to have a positive impact on marine forecast once established	Panel members	TC & Secretariat	Panel	ongoing
<b>INFORMATION EXCHANGE</b>						
70	OP/2.3(12) D22/7.2.3	To provide info/materials for DBCP/JCOMMOPS websites (news, brochure).	Panel members	TC	Panel	Continuous
71	OP/2.3(13) D21	To actively communicate with national coordination for GEO to fully inform on the Panel's activities and capabilities in this regard.	Panel members		Panel	Continuous
72	OP/9.2 D23/6.7	Compile a CD-ROM of scientific and technical workshop at the last Panel Session.	Chair & Secretariat	TC	Executive councils of WMO & IOC	End of each year
73	OP/2.3(113) D26/13.2, D25/12.1	To submit their national reports to the Secretariat before the end of the year (input submitted before 30 November to be published in the Panel's Annual Report).	Panel members	Secretariat	Secretariat	30 Nov. each year

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No	Ref item <sup>85</sup>	Action Item	Who	Supported by	Reporting to	When
74	OP/9.2 D27/2.2, D26/2.7	to submit their papers via e-mail or CD-ROM to the Workshop Chairperson, via electronic format (MS Office compatible format only) .	S&T workshop authors	Secretariat	Chairperson	30-Nov each year
75	D26/6.2.6 (1)	to identify authors who are willing to provide the updates to DBCP related standards document as listed on the DBCP website.	TT-IBP	TC & Secretariat	Panel	Continuous
<b>INSTRUMENT PRACTICES</b>						
76	OP/2.3(14) D27/6.2.3	to start systems for record keeping for instrument calibration, replacement and validation that conform to ISO recommended specifications	Panel members	TT-IBP	Panel	ongoing
77	OP/2.3(15) D21	To review best practices prior to drifter purchase for safety, and GTS data processing purposes.	Panel members	TT-IBP & TC	Panel	Continuous
78	OP/2.3(16) D24/12.6.8.4	to follow the best practices and standards eventually proposed under WIGOS, and in particular, to provide the buoy platform / instrument metadata to JCOMMOPS, and the ODASmetadata service (China) as appropriate.	Panel members	TC & Secretariat	Panel	Continuous
79	D26/11.5.10	to address the recommendations from the WMO-BIPM workshop .	PP-HRSST	Secretariat	Panel	ongoing
80	OP/2.3(17) D27/11.5.3 (iv), D26/11.5.5 D28/11.2.2(h)	to use the RMIC facilities in their respective regions as appropriate, and participate at future workshops to ensure traceability of data buoy observations	Panel members	RMICs, Secretariat	Panel	ongoing
81	OP/2.4(3) D27/11.5.3 (v), D24/10.7.3	Investigate participating in the Association of Hydro-Meteorological Equipment Industry (HMEI - <a href="http://www.hydrometeoindustry.org/">http://www.hydrometeoindustry.org/</a> ) as a way to be represented at JCOMM meetings.	Manufacturers		Panel	Continuous
<b>QUALITY MANAGEMENT</b>						
82	OP/2.3(6) D27/11.5.3 (vii)	to comply with the WMO Quality Management Framework (QMF) and quality management principles	Panel members	Secretariat	Panel	ongoing
83	D28/11.2.3(a)	to review ocean data standards submitted through the JCOMM-IODE Ocean Data Standards Process (ODS <sup>86</sup> )	Panel members	Secretariat	ODS	ongoing
<b>QUALITY MANAGEMENT / INSTRUMENT EVALUATION</b>						
84	OP/Apx5/IBP(1)(7) D26/6.2.5	to address a number of issues (HRSST, life time of drogues, quality of pressure data, environmental impact of drifters, Using solar cells on drifters) .	TT-IBP	TC & Panel members	Panel	Ongoing

86 <http://www.oceandatastandards.org/>

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No	Ref item <sup>85</sup>	Action Item	Who	Supported by	Reporting to	When
		<b>QUALITY MANAGEMENT / INTERCOMPARISONS</b>				
85	D27/8.4.10	to assist the PP-WET Pilot Project and play a role in PP-WET activities (by existing RMICs with wave capability, and particularly the RMIC for RA-IV)	Existing RMICs		Panel	ongoing
86	D28/2.3(1)	to consider more comprehensive analysis and inter-comparisons to fully understand performance of various sensors of different platforms	TT-IBP	TC, Panel members	Panel	ongoing
		<b>QUALITY MANAGEMENT / QUALITY CONTROL</b>				
87	OP/11.18 ToR	To coordinate operations of DBCP QC guidelines.	TC	Panel members & Data Quality centres	Panel	Continuous
88	OP/2.3(18) D23/8.1.2	To encourage other centres to act as PMOC and existing centres to invest more resources in the implementation of QC guidelines.	Panel members	TC	Panel	Continuous
		<b>SAFETY / VANDALISM / SECURITY</b>				
89	OP/2.4(4) D17	To enhance buoy safety through improved design (refer recommendations) and keep the Panel informed about related changes.	Manufacturers & Panel members	Panel members, TC	Panel	Continuous
90	OP/11.19 D27/9.4.11 D28/9.4	to collect statistics and information on actual vandalism occurrences, and maintain relevant information on the DBCP website	TC		Panel	ongoing
91	OP/Apx5/CB(9) D27/9.4.12	to make sure the data buoy vandalism aspects are being addressed as part of its activities	TT-CB		Panel	ongoing
92	D28/9.4	to report vandalism events using the proposed template	Panel members	TC	Panel	ongoing
		<b>TECHNOLOGY DEVELOPMENT</b>				

**ANNEX IV, APPENDIX XI****ONGOING ACTIONS AND RECOMMENDATIONS FROM THE PANEL****2- RECOMMENDATIONS**

*(ongoing recommendations from this DBCP-28 and past Panel sessions;  
recommendations arising from this Panel Session are highlighted in red)*

<b>No.</b>	<b>Ref.</b>	<b>Recommendation</b>	<b>By</b>
<b>CAPACITY BUILDING</b>			
1	DBCP-26 / 11.3.13 (i)	The Panel agreed that it should continue to be involved in Capacity Building activities, including through the provision of funding from its Trust Fund;	Panel
2	DBCP-26 11.3.10	to discuss the issue nationally in the view promote the commitments of WMO Members to PANGEA activities through the VCP	Panel members
<b>DATA EXCHANGE</b>			
3	DBCP-26 / 9.6.6 (iii)	DBCP has only just begun to develop a new BUFR template for drifting and moored buoy data. To make progress on this, a clear strategy for collaborating with the JCOMM TT-TDC in future, is necessary.	TT-DM
4	DBCP-27 / 6.1.4, DBCP-26 / 9.8.1	To keep the same WMO number for a mooring's position as long as moorings are maintained at that position. In case a mooring ceases to be maintained at a given position, the WMO number should not be re-used for another location. 7-digit WMO numbers for drifters or for moorings should not be reallocated, until available numbers are exhausted, which is not expected to happen in the foreseeable future.	Panel members
5	DBCP-26 / 11.2.15 (iii)	The Panel invited its members to contribute to the JCOMM Extreme Wave database by submitting information on extreme wave events to the US National Oceanographic Data Center (NODC).	Panel members
6	DBCP-26 / 6.3	to consider reporting as much OceanSITES buoy data as possible in real-time through the GTS.	OceanSITES

<b>No.</b>	<b>Ref.</b>	<b>Recommendation</b>	<b>By</b>
<b>FINANCES</b>			
7	DBCP-27 / 11.6.8 DBCP-26 / 11.6.11 (1)	to consider contributing to the DBCP/SOT Trust Fund in Euros.	Panel members
8	DBCP-27 / 11.6.9 DBCP-26 / 11.6.11 (2) & 11.1.7	Panel members should pay their contributions in a timely fashion.	Panel members
9	DBCP-27 / 11.6.9 DBCP-26 / 11.6.11 (3) DBCP-25 / 10.6.7	Panel members not contributing to the Trust Fund are invited to discuss nationally whether a contribution could be made in the future.	Non contributing Panel members
10	DBCP-27 / 11.6.9 DBCP-26 / 11.6.11 (4) DBCP-25 / 10.6.7	Panel members contributing to the Trust Fund are invited to investigate nationally whether their contribution could be increased.	Contributing Panel members
11	DBCP-26 7.8.3 & 11.2.12	to increase its contribution to the DBCP/SOT Trust Fund.	OceanSITES, SOT-
<b>IMPLEMENTATION</b>			
12	DBCP-27 / 9.2.9	to consider offering awards to ships which are actively contributing deployment opportunities as a way to further encourage their participation as well as the participation of others.	Panel members
13	DBCP-27 / 9.4.2	To address the recommendations on data buoy vandalism from the DBCP Technical Document No. 41 <sup>87</sup> – “ <i>Ocean Data Buoy Vandalism - Incidence, Impact and Responses</i> ” (these recommendations are also reproduced in DBCP-27/ <a href="#">Annex XIV</a> ).	Panel members

87: [http://www.jcomm.info/index.php?option=com\\_oe&task=viewDocumentRecord&docID=7150](http://www.jcomm.info/index.php?option=com_oe&task=viewDocumentRecord&docID=7150)

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<b>No.</b>	<b>Ref.</b>	<b>Recommendation</b>	<b>By</b>
14	DBCP-26 / 11.2.15 (iv) DBCP-25 / 6.3	The Panel urged its members to make use of the DBCP barometer upgrade scheme implemented through the Global Drifter Programme (GDP) and supported by the United States for all newly deployed drifters, including those deployed in tropical regions.	Panel members
15	DBCP-26 / 11.2.15 (vi)	The Panel agreed to develop further the JCOMMOPS proposal for the establishment of a Cruise Technical Coordinator position at JCOMMOPS to act as an international focal point on ship cruises opportunities in support of global ocean observations.	Panel
16	DBCP-25 / 6.3	Research programmes (e.g. DAMOCLES) to put real-time and/or near-real-time data on GTS to address spatial gap in Russian sector of the Arctic region.	Arctic Research Programs
17	DBCP-23 / 2.2.1.3 (xxiii) & 2.2.2.7	Encourage cooperation with OceanSITES and the Tsunameter network at a national level.	Panel members
18	DBCP-28 / 5.12(ii)	to provide any information on planned deployments to JCOMMOPS as soon as it is available, and to work with the soon to be hired Ship Coordinator to increase drifter deployments	Panel members
19	DBCP-28 / 5.12(iii)	to provide information to JCOMMOPS on models, formats, and shipments	Panel members
20	DBCP-28 / 9.2.6	to consider using unique sailing vessel opportunities on a cost-sharing basis with the Argo programme to enhance deployment opportunities in the southern Indian and Atlantic Oceans, or other areas	Panel members
<b>INSTRUMENT PRACTICES/CALIBRATION</b>			
21	DBCP-27 / 6.2.3 DBCP-26 / 6.3.4	The Panel recalled the importance of traceability of observations to standards and SI units, and in particular of establishing a proper certification process and procedures for the calibration. Recording the history of calibration and providing calibration certificates from instrument manufacturers was particularly important. To start systems for record keeping for instrument calibration, replacement and validation that conform to ISO recommended specifications.	Panel members
22	DBCP-26 / 11.5.8 (2)	More systematic calibration of the instruments should be performed, traceable to IS, and documented. More stringent requirements on the accuracy of drifting-buoy measurements are needed. Accuracy claims should be validated.	Panel members

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<b>No.</b>	<b>Ref.</b>	<b>Recommendation</b>	<b>By</b>
23	DBCP-26 / 11.5.8 (3)	Post-calibration of drifter SST sensors should be performed as much as practicable (see the presentation "Examining the long term stability of SST measurements made by drifting buoys (R.O. Smith, J.J. Kennedy, N. Rayner)" made at the DBCP Scientific and Technical workshop).	Panel members
24	DBCP-28 / 6.2.2(3)	to use the SIO drifter as a reference design	Manufacturers
25	DBCP-28 / 8.4.4	to participate in the intercomparison activities that were led by the PP-WET, and also encouraged WMO-IOC Regional Marine Instrument Centres (RMIC) who have wave measurement responsibilities to take a more active role in the project	Panel members
26	DBCP-28 / 8.4.6	to actively outreach the relevant activities with the progress in the inter-comparison exercise	Panel members
<b>INSTRUMENT PRACTICES/INTERCOMPARISONS</b>			
27	DBCP-27 / 8.4.4 DBCP-26 / 8.4.4 DBCP-26 / 8.4.8 (iii)	The Panel encouraged its member countries to participate in the intercomparison activities that being led by the PP-WET pilot project.	Panel members
28	DBCP-27 / 8.4.6 DBCP-26 / 8.4.6	The Panel recognized that the pilot project would contribute to JCOMM in developing standards and best practice, as well as to the relevant WIGOS exercise, and encouraged the co-chairs and SC members to actively outreach these relevant activities with the progress in the inter-comparison exercise.	PP-WET
29	DBCP-26 / 8.4.8 (i)	Continue to support the PP-WET Pilot Project for the next year.	PP-WET
30	DBCP-26 / 8.4.8 (ii)	Encourage the co-chairs and SC members to contribute the results of the intercomparison exercise to JCOMM and WIGOS in developing standards and best practice.	PP-WET
31	DBCP-26 / 11.5.8 (1)  DBCP-25 / 5.2.3 & 6.3	Inter-comparisons of drifting-buoy measurements for different manufacturers should be regularly performed in order to assess and improve measurement accuracy.  The Panel noted the usefulness of the drogue sensor evaluation for the SVP buoys, which was conducted by the NOAA/AOML, and recommended to continue this valuable exercise with extended involvement of all currently operating buoy manufacturers.	AOML
32	DBCP-25 / 7.4.6	The Panel encouraged the co-chairs and SC members to actively share outcomes of these relevant activities and progress in intercomparison exercises with the JCOMM Community.	PP WET Chair

<b>No.</b>	<b>Ref.</b>	<b>Recommendation</b>	<b>By</b>
<b>INSTRUMENT PRACTICES/METADATA</b>			
33	DBCP-26 / 9.6.6 (i)	JCOMMOPS would like to recommend that all buoy operators provide a website or web accessible CSV files of deployment information (as provided to the Iridium PP team) for all buoys similar to AOML, NDBC and Canada (examples provided in the report) as well as continuing email notifications as necessary. JCOMMOPS can in turn feed information from those websites into the JCOMMOPS database of metadata.	Panel members
34	DBCP-26 / 9.6.6 (iv)	Close cooperation between OceanSITES and the rest of the DBCP Moored Buoy community is recommended when considering metadata content and standards.	OceanSITES & Panel members
35	DBCP-26 / 9.6.6 (v)	JCOMMOPS will provide recommendation to moored buoy operators on the required content as well as possible formats (i.e csv, XML etc.) for more effective and consistent exchange of deployments.	JCOMMOPS
36	DBCP-26 / 11.2.15 (i)	That the JCOMM Management Committee considers reviewing the Terms of Reference of the DBCP in order for the Panel to also address issues relevant to rigs and platforms making automated observations.	MAN
37	DBCP-26 / 11.2.15 (ii)	Considering the importance of instrument/platform metadata for marine climatology purposes in particular, the Panel urged its members to collect, record, and make buoy instrument/platform metadata available via JCOMMOPS.	Panel members
38	DBCP-26 / 11.3.13 (ii)	The Panel agreed that it should continue to contribute to the development of WIGOS by providing assistance, as required, on (i) instrument standards and practices issues, (ii) data and instrument/platform metadata exchange, and (iii) quality management issues.	Panel
<b>SATELLITE DATA TELECOMMUNICATION</b>			
39	DBCP-26 / 9.4.4	The Panel was very pleased in the expected improvements in the Central Pacific and the Indian Ocean, but encouraged CLS to consider how it could improve the situation in the southern Atlantic or Western Pacific future.	CLS
40	DBCP-26 / 9.6.6 (ii)	Operators of Iridium platforms have continued to actively report metadata to each other upon deployment, which was valuable and should continue beyond the life of the Iridium Pilot Project.	Iridium operators



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<b>No.</b>	<b>Ref.</b>	<b>Recommendation</b>	<b>By</b>
41	DBCP-26 / 11.2.15 (v)	The Panel recommended to the Argos Joint Tariff Agreement to consider the DBCP requirements for timely data as a high priority and develop the new regional network of Local User Terminals in the view to minimize data availability delays in all ocean regions, including the South Atlantic, Ocean, and South East Pacific Oceans.	JTA
42	DBCP-26 / 11.5.7	The Panel concurred with the legacy recommendations from the draft Project Report of the JCOMM Pilot Project for WIGOS, in particular regarding establishing an international forum of satellite data telecommunication users in the view to expand the scope of the Argos Joint Tariff Agreement (JTA) to address remote data communication requirements for automatic environment observing systems coordinated through WMO and those partner organization, system deficiencies, negotiate tariffs and potential improvements of the rendered services with all relevant operators of satellite data telecommunications systems.	JTA, CBS
43	DBCP-25 / 6.3	to deploy more Iridium drifters in the Indian Ocean region and other areas where the delay of data delivery is particularly an issue.	DBCP members
<b>TECHNOLOGY DEVELOPMENT, PILOT PROJECTS</b>			
44	DBCP-25 / 5.2.4	Panel agreed that it should be engaged in the future development of wave glider and invited Liquid Robotics to continue participating in future sessions and discussion.	TT IBP
45	DBCP-25 / 7.1.8, 8.7.3	The notification of all Pilot Project buoy deployments (Iridium, Argos-3, waves, HRSST etc) must be completed by the buoy operator, as soon as possible after the deployment.	Pilot Project Team members and Buoy Operators
46	DBCP-25 / 7.4.3	The Panel encouraged its member countries to participate in the wave measurement intercomparison activities which was led by this pilot project.	DBCP members
47	DBCP-25 / 8.7.3	The Panel noted there was a need to flag HRSST and other high-performance sensors appropriately within platform metadata which would require a deployment notification to be sent to JCOMMOPS, as with other Pilot Projects.	DBCP members

## ANNEX V

## ACTION GROUP SUMMARIES

**GLOBAL DRIFTER PROGRAMME (GDP)***(Report submitted by Rick Lumpkin, NOAA/AOML, USA)*

<b>Name of Action Group:</b>	<b>Global Drifter Programme (GDP)</b>
<b>Date of report</b>	15 August 2012
<b>Overview and main requirements addressed</b>	Global Drifter Program (GPD). Goals: 1. Maintain a global 5x5° array of 1250 satellite-tracked surface drifting buoys to meet the need for an accurate and globally dense set of in-situ observations of mixed layer currents, sea surface temperature, atmospheric pressure, winds and salinity; and 2. Provide a data processing system for scientific use of these data. These data support short-term (seasonal to interannual) climate predictions as well as climate research and monitoring.
<b>Area of interest</b>	Global ocean
<b>Type of platform and variables measured</b>	Lagrangian drifters measuring surface velocity, SST; some drifters also measure sea level pressure, wind, salinity, and/or sub-surface temperature profiles
<b>Targeted horizontal resolution</b>	5 degree x 5 degree (1250 units)
<b>Chairperson/Managers</b>	Dr Rick Lumpkin, NOAA/AOML, USA Dr Luca Centurioni, SIO/CIMEC, USA
<b>Coordinator</b>	Operations Manager: Mr Shaun Dolk, NOAA/AOML, USA
<b>Participants</b>	Numerous national and international institutions
<b>Data centre(s)</b>	GDP Data Assembly Center (DAC) – Manager: Ms Mayra Pazos, NOAA/AOML, USA
<b>Website</b>	<a href="http://www.aoml.noaa.gov/phod/dac/gdp.html">http://www.aoml.noaa.gov/phod/dac/gdp.html</a>
<b>Meetings</b> <i>(meetings held in 2011/2012; and planned in 2012/2013)</i>	DBCP-WMO workshop on the Evaluation of the Impact of Sea Level Pressure Data Over the Ocean from Drifting Buoys on Numerical Weather Prediction, 21 May 2012, Sedona AZ USA.
<b>Current status summary</b> <i>(mid-2012)</i>	Annual size of array was 990. Current size as of August 6, 2012 is 1029 drifters.
<b>Summary of plans for 2013</b>	Restore array to ~1250 drifters; begin incorporating salinity data into data stream; conduct ADB study of SVPB drifters.

**TROPICAL MOORED BUOY IMPLEMENTATION PANEL (TIP)***(Report submitted by Paul Freitag, NOAA/PMEL, USA)*

<b>Name of Action Group:</b>	<b>The Tropical Moored Buoy Implementation Panel (TIP)</b>
<b>Date of report</b>	31 July 2012
<b>Overview and main requirements addressed</b>	<p>The Tropical Moored Buoys Implementation Panel (TIP) oversees the design and implementation of the following components:</p> <ul style="list-style-type: none"> <li>• The Tropical Atmosphere Ocean / Triangle Trans-Ocean Buoy Network (TAO / TRITON), a central component of the ENSO Observing System, deployed specifically for research and forecasting of El Niño and La Niña;</li> <li>• The Prediction and Research Moored Array in the Tropical Atlantic (PIRATA)</li> <li>• The Research Moored Array for African-Asian-Australian Monsoon Analysis and Prediction (RAMA)</li> </ul>
<b>Area of interest</b>	The tropical ocean regions as part of an integrated approach to observing the climate system to address the research needs of CLIVAR and the operational strategies of GOOS and GCOS. Pacific Ocean: 8°N to 8°S; Atlantic Ocean: 20°N to 10°S; Indian Ocean: 15°N to 25°S.
<b>Type of platform and variables measured</b>	<p>Tropical moorings with surface meteorological and sub-surface oceanographic sensors measuring: Surface wind, air temperature, relative humidity, SST and SSS on all surface moorings. Air pressure, precipitation, short wave radiation, long wave radiation on some surface moorings. Sub-surface temperature profiles down to 500m-750m on all surface moorings. Salinity profiles as deep as 750m on some surface moorings. Current velocity on some moorings. Also, biogeochemical measurements, including CO<sub>2</sub> and O<sub>2</sub> on select moorings. A few moorings also have specialized instruments to measure turbulence dissipation.</p> <p>Subsurface ADCP moorings measuring velocity profiles in the upper few hundred meters. Some have additional single point current meters at deeper levels.</p>
<b>Targeted horizontal resolution</b>	Tropical Pacific Ocean: 72 moorings ; Tropical Atlantic Ocean: 18 moorings ; Tropical Indian Ocean: 46 moorings
<b>Chairperson/Managers</b>	<p>Dr. Mike McPhaden, PMEL, USA, Chairman</p> <p>Dr. Kentaro Ando, JAMSTEC, Japan, Vice-Chairman</p>
<b>Coordinator</b>	Mr H. Paul Freitag, PMEL, USA

<b>Name of Action Group:</b>	<b>The Tropical Moored Buoy Implementation Panel (TIP)</b>
<b>Participants</b>	<p>TAO/TRITON: NOAA National Data Buoy Center (NDBC), NOAA Pacific Marine Environmental Laboratory (PMEL), Japan Agency for Marine-Earth Science and Technology (JAMSTEC), Agency for the Assessment and Application of Technology (BPPT)</p> <p>PIRATA: NOAA PMEL, NOAA Atlantic Marine Oceanographic Laboratory (AOML), L'Institut de recherche pour le développement (IRD), Meteo-France, Instituto Nacional de Pesquisas Espaciais (INPE), Diretoria de Hidrografia e Navegacao (DHN)</p> <p>RAMA: NOAA PMEL, JAMSTEC, Indian National Center for Ocean Information Services (INCOIS), National Institute of Oceanography (NIO), Agency for the Assessment and Application of Technology (BPPT), Ministry of Marine Affairs and Fisheries (KKP), First Institute of Oceanography (FIO), Agulhas and Somali Current Large Marine Ecosystems (<a href="#">ASCLME</a>), University of Tasmania and the Commonwealth Scientific and Industrial Research Organization (CSIRO) in Australia. Laboratoire d'Océanographie et du Climat: Expérimentations et approches numériques (LOCEAN)</p>
<b>Data centre(s)</b>	PMEL, NDBC, JAMSTEC, NIO
<b>Website</b>	<a href="http://www.pmel.noaa.gov/tao/global/global.html">http://www.pmel.noaa.gov/tao/global/global.html</a>
<b>Meetings</b> <i>(meetings held in 2011/2012; and planned in 2012/2013)</i>	<p>PIRATA-16/TACE/TAV, 14-18 March 2011, Fernando de Noronha, Brazil</p> <p>CLIVAR/GOOS Indian Ocean Panel 8th Session 25-29 July 2011, Chennai, India</p> <p>PIRATA-17/TACE/TAV 10-14 September 2012, Kiel, Germany</p> <p>CLIVAR/GOOS Indian Ocean Panel 9th Session 15-20 October, 2012, Capetown, South Africa</p> <p>TIP Workshop, 23-24 October, 2012, Jakarta, Indonesia.</p>
<b>Current status summary</b> <i>(mid-2012)</i>	<p>TAO/TRITON: 57 of 67 surface moorings reporting.</p> <p>PIRATA: 16 of 17 surface moorings reporting.</p> <p>RAMA: 22 of 24 surface moorings reporting.</p>
<b>Summary of plans for 2013</b>	<p>TAO/TRITON: Maintain 72 mooring array.</p> <p>PIRATA: Maintain 18 mooring array</p> <p>RAMA: Maintain 30 implemented sites and add 2 more sites.</p>

**EUCOS SURFACE MARINE PROGRAMME (E-SURFMAR)***(Report submitted by Jean Rolland, Météo France)*

<b>Name of Action Group:</b>	<b>Surface Marine programme of the Network of European Meteorological Services, EUMETNET (E-SURFMAR)</b>
<b>Date of report</b>	31 July 2012
<b>Overview and main requirements addressed</b>	The EUMETNET Composite Observing System (EUCOS) surface marine (E-SURFMAR) programme is an optional programme involving 17 out of the 29 EUMETNET members, who fund the activity on a GNI basis. Its main objectives are to coordinate, optimise and progressively integrate the European meteorological services activities for surface observations over the sea – including drifting and moored buoys, and voluntary observing ships. E-SURFMAR is responsible for coordination of buoy activities carried out by the European meteorological services, and the programme supports a Data Buoy Manager (DBM) to manage these activities. The DBM is supported and advised by the E-SURFMAR Data Buoy Technical Advisory Group (DB-TAG) which is an action group of the DBCP.
<b>Area of interest</b>	Ocean areas potentially affecting NWP over European countries. This covers the North Atlantic Ocean North of 10°N and the Mediterranean Sea (90°N-10°N; 70°W - 40°E).
<b>Type of platform and variables measured</b>	Drifting buoys: air pressure, SST, (wind) Moored buoys: air pressure, wind, air temperature, SST, waves (directional spectra), relative humidity.
<b>Targeted horizontal resolution</b>	250 km x 250 km, >150 drifting buoys, 4 moored buoys for satellite calibration/validation.
<b>Chairperson/Managers</b>	Manager E-SURFMAR: Mr Pierre Blouch, Météo-France Chairperson, Data Buoy Technical Advisory Group (DB-TAG): Mr Jon Turton, UK Met Office
<b>Coordinator</b>	Data buoy Manager: Mr Jean Rolland, Météo-France
<b>Participants</b>	Belgium, Croatia, Cyprus, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, The Netherlands, Norway, Portugal, Spain, Sweden, and the United Kingdom
<b>Data centre(s)</b>	Météo-France as SOC ISDM (Canada) as RNODC/DB
<b>Website</b>	<a href="http://www.eucos.net">http://www.eucos.net</a> , <b>under the heading "EUCOS Public" in "EUCOS networks"</b> <a href="http://esurfmar.meteo.fr">http://esurfmar.meteo.fr</a> (restricted working area web site for E-SURFMAR participants)
<b>Meetings</b>	DB-TAG meets once a year. DB-TAG9 Las Palmas 3-4 May 2012
<b>Current status (mid-2012)</b>	77 E-SURFMAR drifting buoys in operation (68 Iridium, 9 Argos)+ 39 others reporting AP. 4 E-SURFMAR supported moored buoys in operation, plus a further 40 others operated by members and partners.
<b>Summary of plans for 2013</b>	Maintain a network of 100 operating drifting buoys, and to support the 4 reference moored buoys in operation.

**INTERNATIONAL BUOY PROGRAMME FOR THE INDIAN OCEAN (IBPIO)***(Report submitted by Jean Rolland, Météo France)*

<b>Name of Action Group:</b>	<b>International Buoy Programme for the Indian Ocean (IBPIO)</b>
<b>Date of report</b>	31 July 2012
<b>Overview and main requirements addressed</b>	The International Buoy Programme for the Indian Ocean (IBPIO) was formally established at a meeting in La Reunion in 1996. The primary objective of the IBPIO is to establish and maintain a network of platforms in the Indian Ocean to provide meteorological and oceanographic data for both real time and research purposes. More specifically, the IBPIO supports the World Weather Watch Programme (WWW); the Global Climate Observing System (GCOS); the World Climate Research Programme (WCRP); the Global Ocean Observing System (GOOS); tropical cyclone forecast and monitoring; as well as the research activities of the participating institutions. The programme is self-sustaining, supported by voluntary contributions from the participants in the form of equipment and services (such as communications, deployment, storage, archiving, co-ordination).
<b>Area of interest</b>	Indian Ocean North of 55°S and between 25°E and 120°E
<b>Type of platform and variables measured</b>	Drifting buoys: Air pressure, SST, (wind) Moorings: air pressure, wind, air temperature, SST, waves, relative humidity, SSS, current...
<b>Targeted horizontal resolution</b>	500 km x 500 km
<b>Chairperson/Managers</b>	Mr Graeme Ball, BoM, Australia
<b>Coordinator</b>	Mr Jean Rolland, Météo-France
<b>Participants</b>	Australia (ABOM), France (Météo-France), India (NIO, NIOT, INCOIS), Kenya (KMD), South Africa (SAWS), Mozambique (EMU); USA (GDP, Navocean), TIP (Tropical Moored Buoy Implementation Panel).
<b>Data centre(s)</b>	ISDM (Canada) as RNODC/DB, Météo-France as SOC AOML, NOAA/PMEL
<b>Website</b>	<a href="http://www.shom.fr/meteo/ibpio">http://www.shom.fr/meteo/ibpio</a>
<b>Meetings</b>	Annual meetings in conjunction with DBCP meetings. IBPIO 15 in Fremantle (Australia) in October 2012
<b>Current status (mid-2012)</b>	129 drifters (107 with Air Pressure) 44 moored buoys (30 for RAMA 65% of the planned 46 site array)
<b>Summary of plans for 2013</b>	Maintain a network of 150 drifters. Maintain the moored buoy arrays.

**DBCP-PICES NORTH PACIFIC DATA BUOY ADVISORY PANEL (NPDBAP)***(Report submitted by Shaun Dolk, NOAA/AOML, USA)*

<b>Name of Action Group:</b>	<b>DBCP-PICES North Pacific Data Buoy Advisory Panel (NPDBAP)</b>
<b>Date of report</b>	31 July 2012
<b>Overview and main requirements addressed</b>	The goals of the NPDBAP are to deploy 60 SVPB drifters a year, and maintain 75 active buoys in the region.
<b>Area of interest</b>	North Pacific Ocean and marginal seas generally north of 30°N
<b>Type of platform and variables measured</b>	Lagrangian drifters measuring sea level pressure, SST, and sea-surface velocity
<b>Targeted horizontal resolution</b>	5° x 5°
<b>Chairperson/Managers</b>	Co-Chairperson for the NE Pacific: Al Wallace, MSC, Canada Co-Chairperson for the NW Pacific: Position vacant and to be proposed by PICES
<b>Coordinator</b>	Mr Shaun Dolk, NOAA / AOML
<b>Participants</b>	Al Wallace, Chris Marshall, Joe Linguanti, Ignatius Rigor, and Shaun Dolk
<b>Data centre(s)</b>	Global Drifter Assembly Centre (DAC) Integrated Science Data Management (ISDM), Canada
<b>Website</b>	<a href="http://npdbap.noaa.gov/">http://npdbap.noaa.gov/</a>
<b>Meetings</b> <i>(meetings held in 2011/2012; and planned in 2012/2013)</i>	Yearly meetings usually held in conjunction with DBCP meetings. Next meeting planned 02 October, 2012 in Fremantle, Australia
<b>Current status summary</b> <i>(mid-2012)</i>	From 01 August 2011 to 27 July 2012, 90 drifters were deployed in the North Pacific Ocean. Of the 90 drifter deployments, 58 units were equipped with barometer sensors and the remaining 32 drifters were standard SVP type drifters.
<b>Summary of plans for 2013</b>	The goal for 2013 is to reach 100 drifter deployments, for which 60 drifters will be equipped with barometer sensors.

**INTERNATIONAL ARCTIC BUOY PROGRAMME (IABP)**

<b>Name of Action Group:</b>	<b>International Arctic Buoy Programme (IABP)</b>
<b>Date of report</b>	17 September 2012
<b>Overview and main requirements addressed</b>	Participants of the IABP continue to work together to maintain a network of drifting buoys on the ice of the Arctic Basin to provide meteorological and oceanographic data for real-time operational requirements and research purposes including support to the World Climate Research Programme (WCRP) and the World Weather Watch (WWW) Programme.
<b>Area of interest</b>	Central Arctic Ocean and its marginal seas, excepting Exclusive Economic Zones, where agreements of the Coastal States have not been obtained
<b>Type of platform and variables measured</b>	Buoys on ice and/or in water measuring: Basic meteorological variables such as atmospheric air pressure and air temperature. Other variables such as: atmospheric pressure tendency, air chemistry (e.g. ozone), snow and sea-ice properties, as well as sub-surface oceanographic characteristics (e.g. temperature and salinity)
<b>Targeted horizontal resolution</b>	250 km x 250 km
<b>Chairperson/Managers</b>	Chairperson: Christine Best, Meteorological Service Canada
<b>Coordinator</b>	Ignatius Rigor, Polar Science Center, University of Washington, USA
<b>Participants</b>	Participants range from Science Institutions to Universities to Government Agencies. <a href="http://iabp.apl.washington.edu/overview_participants.html">http://iabp.apl.washington.edu/overview_participants.html</a>  Participant contributions are shown on this site <a href="http://iabp.apl.washington.edu/overview_contributions.html">http://iabp.apl.washington.edu/overview_contributions.html</a>
<b>Data centre(s)</b>	
<b>Website</b>	<a href="http://iabp.apl.washington.edu/">http://iabp.apl.washington.edu/</a>
<b>Meetings</b> <i>(meetings held in 2011/2012; and planned in 2012/2013)</i>	Annual meetings spring or early summer in the Northern Hemisphere. 22nd Annual Meeting of the International Arctic Buoy Programme [IABP], hosted by the World Climate Research Program, World Meteorological Organization, was held in Geneva, Switzerland, 5 – 7 June 2012
<b>Current status summary</b> <i>(mid-2012)</i>	As of June 2012, 73 buoys were reporting. Most of these buoys used Iridium (51), rather than Argos (22).



<b>Name of Action Group:</b>	<b>International Arctic Buoy Programme (IABP)</b>
<b>Summary of plans for 2013</b>	<p>Summer is the primary deployment season in the Arctic.</p> <p>Participants will deploy 50+ buoys ranging from: SVP's providing surface air pressure, buoys providing air pressure and air temperature, Ice Mass Balance buoys, Oceanographic Profiling buoys measuring temperature and salinity to great depths and buoys that measure atmospheric air components such as ozone.</p> <p>Plans for future years will be similar.</p>

**WCRP-SCAR INTERNATIONAL PROGRAMME FOR ANTARCTIC BUOYS (IPAB)***(Report submitted by Christian Haas, Canada)*

<b>Name of Action Group:</b>	<b>WCRP-SCAR International Programme for Antarctic Buoys (IPAB)</b>
<b>Date of report</b>	September 2012
<b>Overview and main requirements addressed</b>	<p>The Participants of the WCRP/SCAR International Programme for Antarctic Buoys (IPAB) work together to maintain a network of drifting buoys in the Southern Ocean, in particular over sea ice, to provide meteorological and oceanographic data for real-time operational requirements and research purposes.</p> <p>The IPAB was established in 1994 became an Action Group of the Panel in October 1994.</p>
<b>Area of interest</b>	South of 55°S and that region of the Southern Ocean and Antarctic marginal seas within the maximum seasonal sea-ice extent.
<b>Type of platform and variables measured</b>	<p>Ice buoys measuring the following:</p> <p><u>Basic variables:</u> Buoy position, atmospheric pressure and SST</p> <p><u>Other variables:</u> Air temperature, ice and / or snow temperature, atmospheric pressure tendency, wind, snow and sea-ice properties and oceanographic variables</p>
<b>Targeted horizontal resolution</b>	500 km x 500 km
<b>Chairperson/Managers</b>	Dr Petra Heil, AAD and ACE CRC, Hobart, Australia
<b>Coordinator</b>	Dr Christian Haas, York University, Toronto, Canada
<b>Participants</b>	<ul style="list-style-type: none"> <li>- Alfred Wegener Institut, Germany</li> <li>- Australian Antarctic Division, Australia</li> <li>- Bureau of Meteorology, Australia</li> <li>- British Antarctic Survey, UK</li> <li>- Finnish Institute for Marine Research, Finland</li> <li>- GI, University of Alaska Fairbanks, USA</li> <li>- IARC, University of Alaska Fairbanks, USA</li> <li>- National Ice Center, USA</li> <li>- National Snow and Ice Data Center NSIDC, USA</li> <li>- Meteorological Service NZ LTD, New Zealand</li> <li>- Norwegian Polar Institute, Norway</li> <li>- Polar Science Center, Univ. of Washington, USA</li> <li>- National Institute of Polar Research, Japan</li> <li>- JAMSTEC, Japan</li> <li>- Programma Nazionale di Ricerche in Antartide, Italy</li> <li>- DAMTP, UK</li> <li>- SAMS, UK</li> <li>- York University, Toronto, Canada</li> <li>- CLS/Service Argos, France</li> <li>- South African Weather Service, South Africa</li> <li>- Meteorological Office, UK</li> <li>- CRREL, USA</li> </ul>

<b>Name of Action Group:</b>	<b>WCRP-SCAR International Programme for Antarctic Buoy (IPAB)</b>
<b>Data centre(s)</b>	<ul style="list-style-type: none"> <li>▪ Alfred Wegener Institute for Polar and Marine Research, Germany: <a href="http://www.pangaea.de/search?q=ipab">http://www.pangaea.de/search?q=ipab</a></li> <li>▪ National Snow and Ice Data Center NSIDC, USA: <a href="http://nsidc.org/data/docs/daac/nsidc0084_ipab_antarctic_buoys.gd.html">http://nsidc.org/data/docs/daac/nsidc0084_ipab_antarctic_buoys.gd.html</a></li> </ul>
<b>Website</b>	<a href="http://www.ipab.aq/">http://www.ipab.aq/</a>
<b>Meetings</b> <i>(meetings held in 2011/2012; and planned in 2012/2013)</i>	<p>The 6<sup>th</sup> IPAB Participant Meeting was held on June 4 and 5, 2012, at WCRP/WMO in Geneva Switzerland, in conjunction with the International Arctic Buoy Programme IABP Meeting.</p> <p>The next meeting is planned to coincide with the IGS sea ice symposium in Hobart, Tasmania, in 2014.</p>
<b>Current status summary</b> <i>(mid-2012)</i>	<p>IPAB activities have significantly increased recently, with the deployment of 16 buoys in the Bellingshausen and Amundsen Seas in November/December 2010, including mostly new technology developed for acquisition of additional atmospheric, ice, and ocean data. In addition, the University of Washington, and National Ice Center have received seed funding for the deployment of 20 and more buoys each year from 2012 to 2013 primarily in the Ross and Amundsen seas. 18 of these were deployed between December 2011 and February 2012. The Meteorological Services of South Africa, Australia, and New Zealand continue to operationally deploy numerous SVP's in the Southern Ocean, primarily north of the sea ice edge.</p>
<b>Summary of plans for 2012/13</b>	<p>Main deployments will be during the Australian SIPEX 2012 cruise in September/October 2012 in East Antarctica (40+ buoys, mostly without GTS), and during USIPAB cruise to Ross/Amundsen Sea in January/February 2013 (26+ buoys). ANTXXIX/6 (AWI's Polarstern cruise into the Weddell Sea) will provide deployment opportunities for June to August 2013.</p>

**INTERNATIONAL SOUTH ATLANTIC BUOY PROGRAMME (ISABP)***(Report submitted by Mayra Pazos, NOAA/AOML, USA)*

<b>Name of Action Group:</b>	<b>International South Atlantic Buoy Program</b>
<b>Date of report</b>	31 July 2012
<b>Overview and main requirements addressed</b>	The main objective of ISABP is to establish and maintain a network of platforms in the Tropical and South Atlantic Ocean in order to provide meteorological and oceanographic data for both real-time and research purposes. The task includes support to the World Weather Watch Programme (WWW), the Global Climate Observing System (GCOS), the World Climate Research Programme (WCRP), and the Global Ocean Observing System (GOOS), as well as to the research activities of participating institutions.
<b>Area of interest</b>	South Atlantic Ocean north of 55S plus Tropical Atlantic Ocean up to 20N
<b>Type of platform and variables measured</b>	Lagrangian drifters measuring sea level pressure, SST, salinity and sea-surface velocity  Moored Buoys measuring winds, sea level pressure, humidity, radiation, fluorimeter, currents, waves, SST .  Wave sensors
<b>Targeted horizontal resolution</b>	5 degrees x 5 degrees
<b>Chairperson/Managers</b>	Mr Ariel Troisi, SHN, Argentina
<b>Coordinator</b>	<b>Mayra Pazos, AOML-NOAA, USA</b> Johan Stander, SAWS, South Africa
<b>Participants</b>	Dr Sonia Cavalcante, Brazil
<b>Data centre(s)</b>	Historical drifter data are assembled, quality controlled at AOML, Miami, then sent to ISDM for archival and further distribution. Real time data is also archived at ISDM  Data from moored buoys is available at GOOS Brasil home page: <a href="http://www.goosbrasil.org.br">http://www.goosbrasil.org.br</a>
<b>Website</b>	<a href="http://www.jcommops.org/dbcp/isabp/index.html">http://www.jcommops.org/dbcp/isabp/index.html</a> <a href="http://www.oceanlan.org/isabp/en/index.html">http://www.oceanlan.org/isabp/en/index.html</a> <a href="http://www.goosbrasil.org.br">http://www.goosbrasil.org.br</a>

<b>Name of Action Group:</b>	<b>International South Atlantic Buoy Program</b>
<b>Meetings</b> <i>(meetings held in 2011/2012; and planned in 2012/2013)</i>	Meetings are hold every odd year, normally in May-July. Last meeting, ISABP- 13 took place in Buenos Aires, Argentina, on April 19, 2010  Next meeting planned by Videoconference in October/2012
<b>Current status summary</b> <i>(mid-2012)</i>	As of August 20, 2012, there were a total of 140 drifters in the South Atlantic region, (56 SVP, 84 SVPB), six operational moored buoys and one wave sensor.
<b>Summary of plans for 2013</b>	Continue to address observational gap areas specially, in the Gulf of Guinea and Angola Basin; pursue recommendation of conducting studies and evaluate the impact of drifter pressure data and SST on the skills of numerical weather forecasting models for the region; increase number of SVPB in the region.  Beginning a contribution of ARGO Drifter deployments and revising a strategy of launching.

**OCEAN SUSTAINED INTERDISCIPLINARY TIMESERIES ENVIRONMENT OBSERVATION SYSTEM (OceanSITES)**

*(Report submitted by Ms Kelly Stroker, OceanSITES Coordinator, JCOMMOPS)*

<b>Name of Action Group:</b>	<b>OceanSITES</b>
<b>Date of report</b>	31 August 2012
<b>Overview and main requirements addressed</b>	OceanSITES is a worldwide system of long-term, deepwater reference stations measuring dozens of variables and monitoring the full depth of the ocean, from air-sea interactions down to 5,000 meters.
<b>Area of interest</b>	Global
<b>Type of platform and variables measured</b>	Deep-water reference stations
<b>Targeted horizontal resolution</b>	
<b>Chairperson/ Managers</b>	Uwe Send, SIO Bob Weller, WHOI
<b>Coordinator</b>	Kelly Stroker, Project Office
<b>Participants</b>	Executive Committee, Steering Team Members, and Data Management Team Members
<b>Data centre(s)</b>	2 Global Data Assembly Centers  <a href="ftp://ftp.ifremer.fr/ifremer/oceansites/">IFREMER Coriolis</a> (FTP). ftp://ftp.ifremer.fr/ifremer/oceansites/  <a href="ftp://data.ndbc.noaa.gov/data/oceansites/">US NDBC</a> (FTP). ftp://data.ndbc.noaa.gov/data/oceansites/
<b>Website</b>	<a href="http://www.oceansites.org">www.oceansites.org</a>
<b>Meetings</b> <i>(meetings held in 2011/2012; and planned in 2012/2013)</i>	<b>2011</b> 8 <sup>th</sup> Steering Committee Meeting, La Jolla, CA Dec, 2011 5 <sup>th</sup> Data Management Team Meeting, La Jolla, CA Nov 2011 <b>2013</b> 9 <sup>th</sup> Steering Committee and 6 <sup>th</sup> Data Management Team Meetings will be held in Spring, 2013 in Seoul, Korea.

<b>Name of Action Group:</b>	<b>OceanSITES</b>
<p><b>Current status summary</b> <i>(August-2012)</i></p>	<p>The OceanSITES Network consists of over 100 reference sites with over half of the network transmitting data in real-time and submitting data to one of the Global Data Assembly Centers (GDAC).</p> <p>At the December, 2011 La Jolla OceanSITES meeting, it was decided to make use of the many existing OceanSITES platforms in deep water to make an "instant" contribution towards the gap in deep-ocean observations as identified at OceanObs09. OceanSITES moorings at 20 regions around the world already carry deep temperature/salinity (T/S) sensors. OceanSITES members want to deploy another 50 within a year, which requires 50 sensors for the initial deployments and another 50 for swapping out and calibrations. OceanSITES PIs are pledging to add such sensors to their existing moorings, and the left bar shows how already pledged. We are also seeking to fill a pool of 50 matching sensor for the swap-outs via donations from institutions, agencies, companies - the right bar shows the status of that matching pool.</p>
<p><b>Summary of plans for 2013</b></p>	<p>In 2013, OceanSITES plans to have its next face-to-face meeting in Seoul, Korea. The OceanSITES Executive Committee will continue to meet regularly as will the Data Management Team. The station catalog will be ingested fully into the JCOMMOPS database and the website and project office tasks will be continued.</p>

**INTERNATIONAL TSUNAMETER PARTNERSHIP (ITP)***(Report submitted by Richard Crout, NOAA/NDBC, USA)*

<b>Name of Action Group:</b>	<b>International Tsunameter Partnership</b>
<b>Date of report</b>	31 July 2012
<b>Overview and main requirements addressed</b>	<p>The International Tsunameter Partnership (ITP) was established under the auspices of the IOC International Cooperation Group for the Indian Ocean Tsunami Warning and Mitigation System (IGC/IOTWS). Its purpose is to support the establishment, effectiveness and on-going viability and enhancement of tsunami detection and warning systems using deep ocean monitoring stations (tsunameters). The ITP has since become an Action Group of the Data Buoy Cooperation Panel (DBCP), which is a subsidiary body of the Joint WMO-IOC Technical Commission for Oceanography and Marine Meteorology (JCOMM).</p> <p>Main requirements met;</p> <ol style="list-style-type: none"> <li>1. An exchange of information on new technologies and products and platform applications, including non-buoy-based tsunameter systems (cabled and glider), multi-role tsunameter platforms,</li> <li>2. Shared experiences and lessons learned on operational practices for tsunameter systems qualification, deployment, maintenance and operational monitoring. Evolution of sensor technology is challenging maintenance, and fault analysis reveals a number of issues to be addressed in the future.</li> <li>3. Determined the status of real-time Tsunameter data exchange for all buoy types across all networks.</li> <li>4. Reiterated challenges of vandalism and potential hostile action against tsunameter systems (especially in the Indian Ocean).</li> <li>5. From a Workshop at the OCEANS'11 Kona Conference, identified issues and identified emerging technologies (including cabled networks, nano-BPRs, and HF radar) that could address the near-field tsunami warning problem.</li> <li>6. Updated information on evolving tsunameter systems.</li> </ol> <p>The ITP Action Group wishes to acknowledge the many contributions made by the outgoing Chairperson, Ross Hibbens.</p>
<b>Area of interest</b>	Tsunami Detection
<b>Type of platform and variables measured</b>	Deep ocean tsunameter consisting of a moored surface buoy or shore to sea cable system and a bottom pressure recorder measure absolute sea level height with time
<b>Targeted horizontal resolution</b>	Along tsunamigenic zones based on national warning center requirements.



<b>Name of Action Group:</b>	<b>International Tsunameter Partnership</b>
<b>Co-Chairperson/Managers</b>	Dr. R. Venkatesan – India – NIOT Dr. R. Crout – USA – NDBC (temporary)
<b>Coordinator</b>	N/A
<b>Participants</b>	Eddie Bernard – US – PMEL Richard Crout – US - NDBC Hamed Al Gheilani – Oman – Ministry & Fisheries Djoko Hartoyo – Indonesia – BPPT Donna Kocak – US - Csnet Robert Lawson – US – SAIC David McGilvray – Australia – Australian Maritime Systems Christian Meinig – US – PMEL David Murphy – US – SeaBird Electronics K. Premkumar - India – Win Marine Consultancy Nick Street - UK – Sonardyne Ken du Vall – US – Lighthouse R&D Dr. R. Venkatesan – India – NIOT
<b>Data centre(s)</b>	There is currently no international data center that archives the high resolution data for tsunameters. Tsunami Watch Centers manage the real-time tsunameter data they receive based on operational needs.
<b>Website</b>	
<b>Meetings</b> <i>(meetings held in 2011/2012; and planned in 2012/2013)</i>	Meeting #7 of the International Tsunameter Partnership (ITP), Geneva, Switzerland, 1 Oct 2011. Meeting #8 of the International Tsunameter Partnership (ITP), Fremantle, Australia, 2 October 2012
<b>Current status summary</b> <i>(mid-2012)</i>	Refer to Annex-1
<b>Summary of plans for 2013</b>	Refer to Annex-1

**ANNEX VI**

**REPORT FROM THE EXECUTIVE BOARD MEETING**  
*(Fremantle, Australia, 4 October 2012)*

***Participants:***

Al Wallace	(Chairperson and Vice-Chairperson for North America)
Johan Stander	(Vice-Chairperson for the Southern Hemisphere)
Jean Rolland	(Vice-Chairperson for Europe)
R. Venkatesan	(Vice-Chairperson for Asia)
Sydney Thurston	(Member at large)
Frank Grooters	(Finance Advisor)
Candyce Clark	(OPA Chair)
David Meldrum	(OPA Vice-Chair)
Kelly Stroker	(Technical Coordinator)
Tom Gross	(Secretariat – IOC )
Etienne Charpentier	(Secretariat – WMO)
Peter Dexter	(BoM, Australia)
Boram Lee	(Secretariat – WMO)

The Executive Board (EB) considered a number of items including membership, succession planning for Board members, recruitment of the technical coordinator, and budget items.

**1. Membership**

The EB first consider membership of the executive. Andy Sybrandy accepted to represent the manufacturers in the EB as ex-officio member.

Tom Gross is now representing the IOC in the EB.

**2. Succession planning for the Chair, and vice-Chairs**

The EB understands the need for succession planning.

Jean Rolland indicated that he desired not to continue to be the DBCP vice-Chair for Europe after this Panel Session. The EB agreed that Jon Turton (UK) could be a good candidate to replace Jean. Nevertheless, the Panel will consider any possible additional candidates.

The position of vice-Chair for the SH will have to be revisited probably as of DBCP-29.

The EB noted that if re-elected, Al Wallace would agree to continue for a fourth term.

Sid Thurston accepted to continue to be a member of the EB.

**3. Panel Session format**

Next year's agenda should be adjusted in such a way that:

- The Task Teams shall report on their recommendations, and not on their activities during the main session; less time shall therefore be allocated to the TT reports during the plenary Session, as most of the reporting will have happened during the side meetings session;
- More time shall be given to the TT on Data Management during the side meetings session;
- The Task Team on Instrument Best Practices shall meet in plenary, and at least 90 minutes be given for the discussion;
- Johan Stander will work with the Secretariat to propose a possible new format for the Scientific and Technical workshop.

The Board recommended that the TC should take action at least on a quarterly basis to seek feedback from Panel members regarding the advancement of the action plan.

**4. Technical Coordinator's position**

The Board noted Kelly Stroker's decision to return to the USA by January 2013.

Taking into account the generally lengthy process for recruitment, the Board agreed that actions should be taken as soon as possible to, 1) assist the Panel's work for the period immediately after the resignation of Ms Stroker until her successor would start the duties; and 2) proceed with the recruitment of a new Technical Coordinator. Relating to the former issue, the Board welcomed Ms Stroker's offer to assist the work of the Panel and to train the successor of the TC's work, after the formal resignation from the IOC position through a possible arrangement that would enable her to work from USA.

The Board expressed its satisfaction for the services provided by Ms Stroker for the last 13 months according to the TC's Terms of Reference, and thanked her for her work and for her offer of service to smoothen the transition to the new Technical Coordinator.

The Board also noted that OceanSITES expressed its appreciation for Ms Stroker's work and interest in her employment to be continued.

The Board then received a report by the WMO and IOC Secretariats on the current situation regarding the Technical Coordinator's position: The US contribution to DBCP would be made to the JCOMM fund-in-trust held in WMO, and the Technical Coordinators of DBCP and Argo was transferred from IOC/UNESCO to WMO to maintain the employment of the Technical Coordinators under the international/intergovernmental umbrella, effective 1 October 2012 (see also Doc.11.1). Funds held in IOC accounts for the DBCP Technical Coordinator salary will be exhausted before the end of September 2012.

The Board acknowledged that the Parent Organizations (UNESCO/IOC and WMO) were ready to provide every possible support to secure the TC employment and associated process for national contributions, as well as to facilitate the short-term arrangement to fill the gap, and agreed that the Panel should focus on assessing the Panel's requirements for TC support and clearly identifying the technical requirements regarding the TC's employment condition, to be considered for the new recruitment of TC.

#### Options for Continuous Technical Coordination

Taking into account the current situation, the Board in consultation with the WMO and UNESCO/IOC Secretariat explored several options to continue technical support for the Panel's work, after the resignation of Ms Stroker, as follows:

1. Continuing the recruitment of Ms Stroker under the current arrangement and request WMO for an arrangement to switch her duty station from Toulouse/France to Colorado/USA;
2. Commencing the recruitment process for a new TC immediately under the same condition (fixed-term position in UN, duty station at Toulouse/France), and recruiting Ms Stroker through a Special Service Agreement (SSA) of WMO during the transition period so that she provide TC support for the Panel from Colorado/USA;
3. Commencing the recruitment process for a new TC under a new condition, after the Panel's assessment on technical requirements, with a short-term arrangement with Ms Stroker as above (No.2).

Regarding the option No.1, the Board noted it would take some time to reach an agreement between the recruiting Organization (WMO) and the host country (USA), which would not be concluded before January 2013 (preliminarily noticed resignation by Ms Stroker).

The options No.2 and No.3 were basically feasible solutions for the Panel. The Board noted that a Special Service Agreement (SSA) could provide continuous employment up to 9 months in 12 months (that is, maximum contract period cover 9 months followed by a mandatory break of 3 months before opening an identical SSA for the same employee), which implied the 9-month transition period allowed for the Panel.

The Board agreed that, as the matter of priority, the Panel's technical requirements for the long-term recruitment need to be defined as soon as possible and possibly while the short-term contract for TC work (SSA) is valid (9 months).

Regarding the possibility to set a duty station of the DBCP TC in an other place than Toulouse/France, under the option No.3, the Panel noted its implication for the JCOMMOPS to be a "distributed" or "virtual" center, which should be carefully reviewed in identifying the technical requirements.

**The Board recommends that:**

- Immediately after the Session and as soon as possible, the Board consult with the WMO and UNESCO/IOC Secretariat to arrange for a Special Service Agreement (SSA) of WMO immediately after Ms Stroker's resignation, so that she could provide TC support for the Panel from Colorado/USA;
- Immediately after the Session and as soon as possible, the Board lead the assessment/clarification of technical requirements for the DBCP Technical Coordinator, and further for JCOMMOPS, in order to re-define the recruitment condition (e.g. duty station) of the new TC. This should be completed and communicated to the WMO and UNESCO/IOC Secretariats as soon as possible, so that the recruitment process for a new TC would be commenced and completed with minimum delay, and avoid any potential impact to the Panel caused by the gap in TC service.

**5. DBCP Budget**

**5.1 Status of the Trust Fund**

The Board reviewed the status of the Trust Fund and agreed that it was healthy;

**5.2 Contributions for next year and beyond**

The Board reviewed existing contributions to the Trust Fund, and noted that one important contributor while providing an increased contribution for 2012 may not be in a position to sustain the level of funding in the longer term.

However, the Board noted that new contributions may potentially balance the lack of funding from that contributor to some extent. A couple of contributors have actually agreed to increase their contributions, and it is foreseen that at least one new contributor will join.

In addition, it was noted that some extra funds will be available from the USA to support the Ship Coordinator's position, and that this should also allow to decrease the DBCP contribution to that position.

Nevertheless, the Board recognized that a short term and longer term strategies should be defined for seeking new contributions to the Trust Fund. These should particularly focus on highlighting, (i) national benefits based on actual buoy programmes in the country; and (ii) applications of buoy data and targeting data users, including research and operational users.

The Board also agreed that the in kind contributions to the activities of the Panel (e.g. national support to capacity building workshops and activities) should be given more visibility within the DBCP financial reporting in some qualitative way. Still small new contributions to the Trust Fund will be useful. And are encouraged.

The Board agreed that the maximum expenditures agreed by the Panel in previous years have probably be overestimated, and the more realistic figures should be proposed in the future.

The Board noted that the situation of the US funding is not yet reflected in the documents presented to DBCP-28. The financial advisor (F. Grooters) will work with the Secretariat to produce updated budget to take into account the US funding, for inclusion in the final report of the Session as an annex.

He will also discuss the future format of the DBCP budget with the Secretariat to take into account the variety of Trust Funds that are being used within WMO and IOC for that budget.

The Board noted that the relocation of the TC (both for Kelly, and for the new TC to be recruited) ought to be budgeted.

### 5.3 Proposed maximum expenditures for next year

The EB reviewed the budget and directed expenditure reductions in a number of areas. The EB recommends supporting a number of initiatives in the coming intersessional period as detailed in the table below.

<i>Expense</i>	<i>Maximum expenditure</i>	<i>Comment</i>
Fourth WIO CB workshop	20,000	Main commitment
Regional DBCP meeting in Asia (NPOMS)	10,000	Seed commitment; same format as NPOMS-1
SVP Inter-comparison	7,000	
Drogue loss	0	
PP-SLP	45,000	
Iridium air time	3,000	
Iridium plus barometer upgrades to the South East Pacific (poor timeliness areas)	15,000	
Upgrades for HRSST drifters	7,000	
Ship Coordinator's position	20,000	
Review and updating of WMO and IOC Publications	0	
Missions of the chair and other DBCP representatives as meetings of interest	20,000	
Logistics contract with CLS for JCOMMOPS (to be paid via WMO as of 2012) – Cooperation agreement to be made with CLS).	18,000	Euro 13750.
Support of missions of the Argo Technical Coordinator	15,000	One year only (as recognition to the role of the Argo TC to JCOMMOPS, and to the transition provided when there was no DBCP TC)
Support to missions of the Technical Coordinator	30,000	
SSA Contract for the Technical Coordinator ( <i>ad hoc</i> )	150,000	
Separation cost for the Technical Coordinator	20,000	

### 6. Implementation Strategy

Members are encouraged to review the strategy.

### 7. Working priorities for the Technical Coordinator

With Kelly working from the USA in the future, the Board agreed that there must be some better feedback mechanism to be put in place for her to report on her activities on behalf of the Panel.

The Board recommended that the TC should review the SVPB design manual (DBCP TD No. 8) in order to make it consistent with current construction practices.

**8. Other issues**

The Board agreed that the following issues ought to be addressed by the Panel with the following recommendations:

- Capacity Building – producing minimum guidelines on expectations with regard to the organization of Capacity Building;
- IPAB – this issue has now been resolved.
- Surface Glider technology, and DBCP role – the surface glider community is encouraged to organize itself, and eventually become an Action Group of the DBCP;
- Drifter stickers – To be shortened, to focus on safety issues; TT-IBP to address the issue, and decide on the issue. India to assist for the design;
- Drifter procurement – the BOM needs a letter from the Panel acknowledging that:
  - There are recognized manufacturing problems affecting all drifting buoys which means that it is not possible to guarantee a minimum in-water lifetime performance;
  - The DPCP is working with all manufacturers to solve these problems to return the performance to satisfactory levels in the next year or two.

**9. Closing of meeting**

The meeting then concluded.

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**ANNEX VII**

**INTERIM STATEMENTS OF ACCOUNT**

**IOC  
INTERIM STATEMENT OF ACCOUNT  
FOR THE PERIOD 1 JANUARY TO 31 JULY 2012**



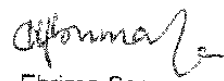
**Memo**  
BFM/FRA/2012/473  
14 August 2012

To: ADG/IOC

From: BFM/FRA

Subject: **IOC Special Account - 193DBC2000**

As requested, please find enclosed a Financial Report as at 31 July 2012 for the above-mentioned fund.

  
Ebrima Sarr

cc: BFM/BMR  
BSP/CFS





193DBC2000

**INTERGOVERNMENTAL OCEANOGRAPHIC COMMISSION**
**DBCP/SOOP Technical Coordinator: Salary, Missions and Other Costs**
**Statement of Account from 1 January 2012 to 31 July 2012**

(Expressed in US Dollars)

<b>Cash Balance Brought Forward as at 1 January 2012</b>	<b>98,070.58</b>
<i>Deduct:</i>	
<b>Disbursements</b>	
Salary costs	74,308.14
Programme Support Costs	7,430.81
<b>Cash balance as at 31 July 2012</b>	<b>16,331.63</b>
Unliquidated Obligations	-
<b>Funds available as at 31 July 2012</b>	<b>16,331.63</b>

**WMO**  
**INTERIM STATEMENT OF ACCOUNT**  
**FOR THE PERIOD 1 JANUARY TO 31 JULY 2012**



World Meteorological Organization  
 Organisation météorologique mondiale

Secrétariat  
 7 bis, avenue de la Paix – Case postale 2300 – CH 1211 Genève 2 – Suisse  
 Tél.: +41 (0) 22 730 81 11 – Fax: +41 (0) 22 730 81 81  
 wmo@wmo.int – www.wmo.int

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**DATA BUOY CO-OPERATION PANEL**

**Interim Statement of income and expenditure**

**For the period 1 January to 31 July 2012**

Amounts in United States dollars

1. Balance brought forward , 1 January 2012	592,303
2. Income:	
2.1 Contributions	<u>55,539</u>
3. Total available funds during reporting period	647,842
4. Expenditure	
4.1 Direct project costs	
4.1.1 Individual consultants	(6,036)
4.1.2 Travel of staff to other WMO meetings	4,866
4.1.3 Travel and per diem of experts	9,539
4.1.4 Travel - other representatives to attend other WMO meetings	20,694
4.1.5 LoA WMO KMD for Third IOC/WMO/DBCP Workshop, 16-20 April 2012	23,000
4.1.6 CLS America, Drifters	7,066
4.1.7 Grants	<u>5,553</u>
4.1.8 Total direct costs	64,682
4.2 Indirect project costs	
4.2.1 Support costs at 3%	1,940
4.2.2 Bank charges	162
4.2.3 Differences in exchange	<u>14,861</u>
4.2.4 Total indirect costs	16,963
4.3 Total project expenditure	<u>81,645</u>
5. Balance of fund at 31 July 2012	<u>566,197</u>

	<b>Contributions</b>	
Australia		14,534
CLS /Service Argos, France		34,028
New Zealand		2,326
South Africa		<u>4,651</u>
Total contributions		<u>55,539</u>

Certified correct:

*Luckson Ngwira*  
 Luckson Ngwira  
 Chief, Finance Division  
 22 August 2012

**ANNEX VIII****TABLE OF NATIONAL CONTRIBUTIONS FOR 2013**

Budget Country	JCOMMOPS	DBCP	OceanSITES	SOT	JTA	COMMENT
Australia	EUR 11,700		USD 5,000			JCOMMOPS: including DBCP and SOT
Canada	CAD 27,500					JCOMMOPS, including DBCP and SOT
CLS					USD 65,000	USD 15,000 for JTA Chairperson USD 30,000 for the JTA-Executive Committee USD 10,000 for the IOC Secretariat (paid directly to IOC) USD 10,000 for the WMO Secretariat
E-SURFMAR		EUR 40,000				Belgium, Croatia, Cyprus, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, The Netherlands, Norway, Portugal, Spain, Sweden, and the United Kingdom
Germany				EUR 3,600		Support to SOT
India		USD 5,000				
New Zealand	Eur 1,800					JCOMMOPS, including DBCP and SOT
South Africa		EUR 4,000				
USA		USD 115,000	(USD 30,000)	USD 80,000		Contribution to DBCP TC and SOT made to WMO as of 2012



Notes:

1. Table is based on the finalized interim accounts based on WMO and IOC statements in Annex VII, and planned income / expenditures for the remainder of the year, 2012 and 2013
  2. US\$ 20000 in addition to the US\$ 30000 for CB
  3. US\$ 10000 for Regional DBCP Meeting Asia under Collaborative Arrangements
  4. SVP Inter-comparison (US\$ 7000), PP-SLP (US\$ 45000) and Upgrades for HRSST drifters (US\$ 7000) in total US\$ 59000 under Techn. Development/Evaluations (incl. PPs)
  5. JCOMMOPS Logistical Support (€ 13750) left unchanged (US\$ 11826 + US\$ 5914 = US\$17740 already placed under WMO)
  6. Support ARGO TC (US\$ 15000) under Collaborative Arrangements
  7. SSA for DBCP TC under TC Contract for US\$ 150000
  8. Separation Cost (=Relocation Cost) under that heading.
-

## ANNEX IX (Continued)

TABLE 2 – ARGOS JOINT TARIFF AGREEMENT (JTA) EXECUTIVE COMMITTEE BUDGET

Argos Joint Tariff Agreement (JTA) budget within DBCP Trust Fund  
(as of 28 June 2012, estimates in blue)

Year	Item	Income & Expenditure CHF	1 CHF USD	Income & Expenditure USD	Expenditure for JTA USD	JTA balance USD	Expenditure for WMO USD	WMO balance USD	Comment
<b>2010</b>	<b>Initial JTA balance</b>					<b>0</b>		<b>0</b>	
	CLS Contribution to DBCP TF at WMO (2010)			55.000,00	45.000	45.000	10.000	10.000	
	Mission, J. Stander, JTA-EC, Sydney, 04/2010			-4.273,00	-4.273	40.727	0	10.000	
	Mission, E. Charpentier, JTA-EC, Sydney, 04/2010			-3.321,00	-3.321	37.406	0	10.000	
	Mission, J. Stander, JTA-30, Oban, 10/2010			-2.402,00	-2.402	35.004	0	10.000	
	Mission, Greg Reed, IPET-DMI, 4/2010			-1.823,00	0	35.004	-1.823	8.177	
	Frank Grooters JTA contract (SSA), 10/2010			-15.437,00	-15.437	19.567	0	8.177	
<b>2011</b>	<b>CLS Contribution to DBCP TF at WMO (2011)</b>			<b>35.269,00</b>	<b>25.269</b>	<b>44.836</b>	<b>10.000</b>	<b>18.177</b>	
	Mission, J. Stander, JTA-EC, Miami, 4/2011			-1.224,00	-1.224	43.612	0	18.177	
	Mission, D. Meldrum, RMIC2, Tianjin, 7/2011			-3.247,00	0	43.612	-3.247	14.930	
	Mission, S. Issara, RMIC2, Tianjin, 7/2011			-3.829,00	0	43.612	-3.829	11.101	
	Mission J. Trinanes, IPET/DRC, Melbourne, 9/2011			-1.638,00	0	43.612	-1.638	9.463	
	Mission ROC Botswana, JTA-31, Geneva, 9/2011			-4.051,00	-4.051	39.561	0	9.463	
	Mission J. Stander, JTA-31, Geneva, 9/2011			-3.781,00	-3.781	35.780	0	9.463	
	Frank Grooters JTA contract (SSA), 10/2011			-15.000,00	-15.000	20.780	0	9.463	
	Mission, E. Charpentier, Toulouse, 12/2011			-2.178,00	0	20.780	-2.178	7.285	
<b>2012</b>	<b>CLS Contribution to DBCP TF at WMO (2012)</b>			<b>34.028,00</b>	<b>24.028</b>	<b>44.808</b>	<b>10.000</b>	<b>17.285</b>	
	Mission J. Stander, JTA-EC, Toulouse, 4/2012			-3.231,00	-3.231	41.577	0	17.285	
	Mission E. Charpentier, JTA-EC, Toulouse, 4/2012	-2216	1,06045	-2.349,96	-1.175	40.402	-1.175	16.110	Combined with Satcom preparatory workshop mission, to be shared equally between WMO & JTA
	Mission J. Stander, JTA-32, Fremantle, 10/2012	-3151	1,06045	-3.341,48	-3.341	37.061	0	16.110	Planned expenditure; CHF
	Frank Grooters JTA contract (SSA), 10/2012			-15.000,00	-15.000	22.061	0	16.110	Planned expenditure; USD
<b>2013</b>	<b>CLS Contribution to DBCP TF at WMO (2013)</b>			<b>32.939,46</b>	<b>22.939</b>	<b>45.000</b>	<b>10.000</b>	<b>26.110</b>	<b>Proposed income for 2013</b>
	RMIC workshop for RA-I, Casablanca, October 2012	-10000	1,06045	-10.604,50	0	45.000	-10.605	15.506	10000 Planned expenditure; CHF
	Frank Grooters JTA contract (SSA), 10/2013			-15.000,00	-15.000	30.000	0	15.506	15000 Planned expenditure; USD

## ANNEX X

### REVISED WORKPLAN FOR 2012/2013 OF THE DBCP PILOT PROJECT ON THE IMPACT OF SEA LEVEL PRESSURE FROM DRIFTERS ON NUMERICAL WEATHER PREDICTION (PP-SLP)

*Luca R. Centurioni*

Scripps Institution of Oceanography and  
Cooperative Institute for Marine Ecosystems and Climate (CIMEC),  
9500 Gliman Drive, La Jolla, California 92093 USA  
lcenturioni@ucsd.edu

#### 1. Background

The activities of the PP-SLP for the period October 2011-September 2012 were reported at the 28<sup>th</sup> DBCP Meeting that was held in Fremantle, Australia. These are:

- A WMO-DBCP workshop entitled: "Evaluating the impact of sea level atmospheric pressure data over the ocean from drifting boys" was organized and held in Sedona, Arizona, on 21 May 2012. A report, including presentations, is available at: [http://www.wmo.int/pages/prog/www/OSY/Meetings/Wshop-Impact-NWP-5/dbcp/dbcp\\_slp1.html](http://www.wmo.int/pages/prog/www/OSY/Meetings/Wshop-Impact-NWP-5/dbcp/dbcp_slp1.html);
- The results from the workshop were presented and discussed at Scientific and Technical Workshop of the XXVIII DBCP meeting, as well as during the PP-SLP side meeting and were reported to the Panel during the session;
- Dr Centurioni started drafting a paper based on the outcome of the workshop for submission to BAMS.

The main conclusions of the first year of activity are:

- The impact of SLP data from drifters computed with the adjoint approach is very large and is computed routinely by NWP centers;
- Few OSE studies specific to the effect of drifters have been conducted;
- The workshop participants (UKMO, NASA, MeteoFrance and ECMWF) will co-author the BAMS paper.

#### 2. Proposed work for the 2012-2013 inter-sessional period

From on the above conclusions it is proposed to:

- Engage experts from other NWP centers on the PP-SLP activities (NPS-Monterey, BoM, Environment Canada);
- Finalize and publish the BAMS paper;
- Run one or more OSE's dedicated to assess the effect of several thinning scenarios of the drifters barometer array to complement the impact studies (OSE and impact studies are fundamentally different and offer different perspectives of the problem);
- Explore if there are NWP centers who are willing to entertain the OSE effort as an in-kind contribution, per-haps on a regional domain, and/or
- Commission the OSE study to a tbd center;
- Participate directly (Centurioni and Lumpkin) in the design of the OSE experiment to make sure that it addresses the needs of the DBCP community;
- Write a proposal to the DBCP board to fund the OSE;
- Publish the findings in a peer-reviewed journal.

**ANNEX XI**

**DBCP IRIDIUM PILOT PROJECT - UPDATE**

Although the deployment phase of the IPP had effectively terminated in 2010, there had nonetheless been continuing activity in two main areas:

- a) The Panel had decided at its session in 2010 to use remaining funds to upgrade GDP drifters with Iridium for deployment in the S Pacific in the area that continued to suffer from poor timeliness via Argos. As a result, 10 drifters were deployed in early 2012, and were reporting timely data onto the GTS via the Joubeh/Scotia portal (see Fig 1).
- b) A number of operational agencies, notably ESURFMAR, Environment Canada, Météo France, MetService NZ, the UKMO, the GDP, SAWS and the Australian BoM, were increasingly deploying Iridium-equipped drifters and making their data available to the IPP to assist with its longer-term evaluation activities.

As a result, the original IPP target of 50 drifters had been vastly exceeded, and nearly 600 had been deployed, with a total of 188 drifters active and participating in the IPP during August 2012. Of particular note this year is the first significant activity by the US in deploying Iridium-equipped drifters with data being circulated on the GTS (see Fig 2).

In general, the potential for obtaining better lifetimes was increasing, largely through better power management schemes and the implementation of the latest generation GPS receivers, whose energy consumption was an order of magnitude better than the receivers available at the start of the IPP. In practice, buoy lifetimes had generally decreased (Fig 3), except for one manufacturer (Fig 4), as had been noted also for Argos-equipped platforms. This was an area of considerable concern.

As regards the financial situation of the IPP, whose expenses were being managed through Letters of Agreement between the WMO and SAMS, the attention of the Chair and the Secretariat had been drawn to the need for continuing provision of funding for the airtime of remaining IPP drifters, including those that had been recently deployed in the S Pacific. So far, the Panel had spent nearly USD51k on Iridium-related activities, yet still had airtime obligations to SAMS of about USD6k at 31 August 2012, increasing at the rate of about USD500 per month. The Panel is invited to discuss how it wishes to manage this situation.

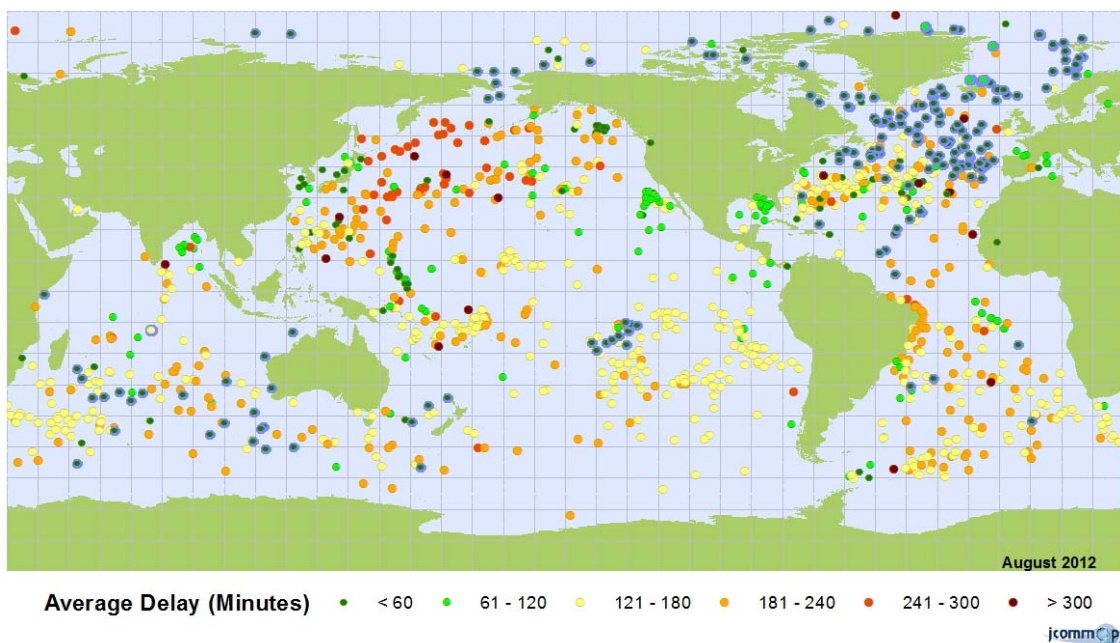
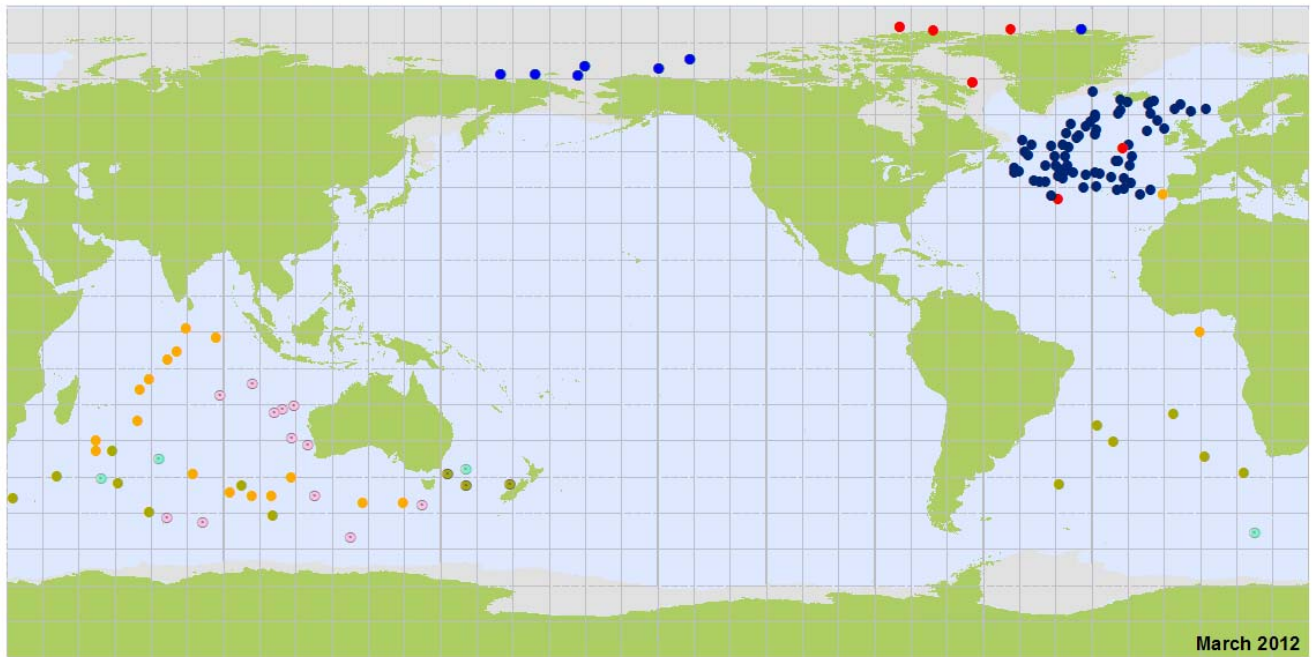


Fig 1. The low data latency (< 60 mins) of Iridium-equipped drifters (blue/grey circles is evident).

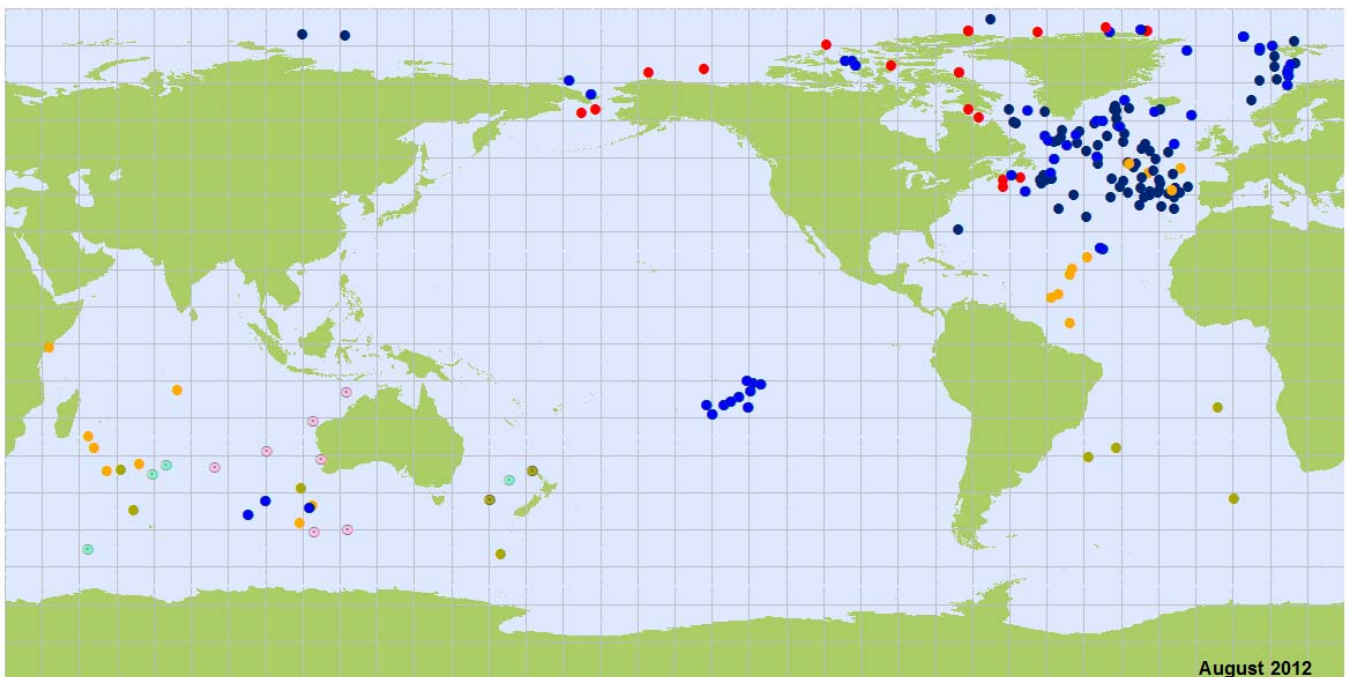




**DBCP Pilot Projects (Iridium and Argos-3 Drifters by Country)**

**Iridium Drifting Buoys (133)**

● CANADA (8)	● FRANCE (18)	● SOUTH AFRICA (4)	● USA (7)
○ AUSTRALIA (12)	● EUROPE/ESURFMAR (68)	● NEW ZEALAND (3)	● UK (13)



**DBCP Pilot Projects (Iridium Drifters by Country) Iridium Drifting Buoys (188)**

● CANADA (19)	● FRANCE (18)	● SOUTH AFRICA (4)	● USA (53)
○ AUSTRALIA (7)	● EUROPE/ESURFMAR (77)	● NEW ZEALAND (2)	● UK (8)



Figure 2. Active platforms have increased by 55 since March, largely due to increased US activity.

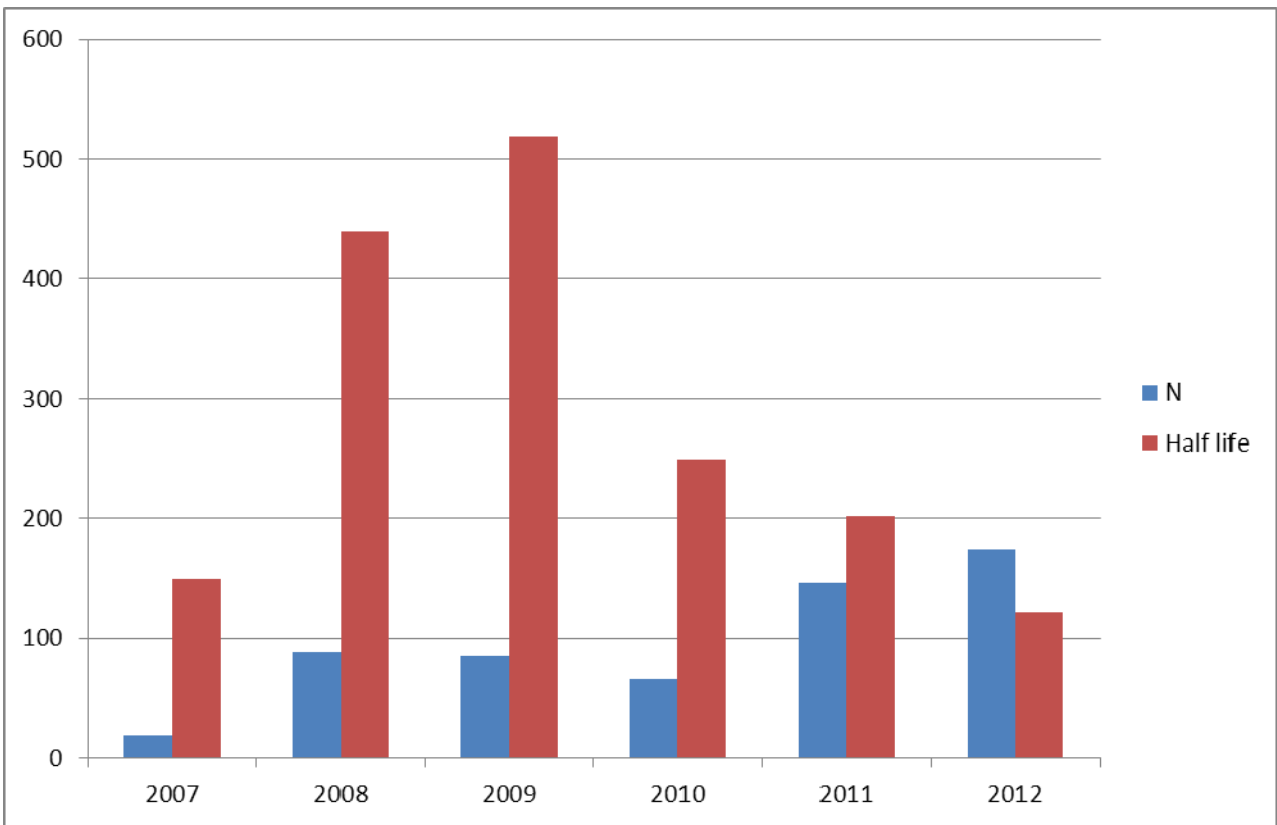


Figure 3. Buoy half-lifetimes have decreased markedly since the beginning of the IPP.

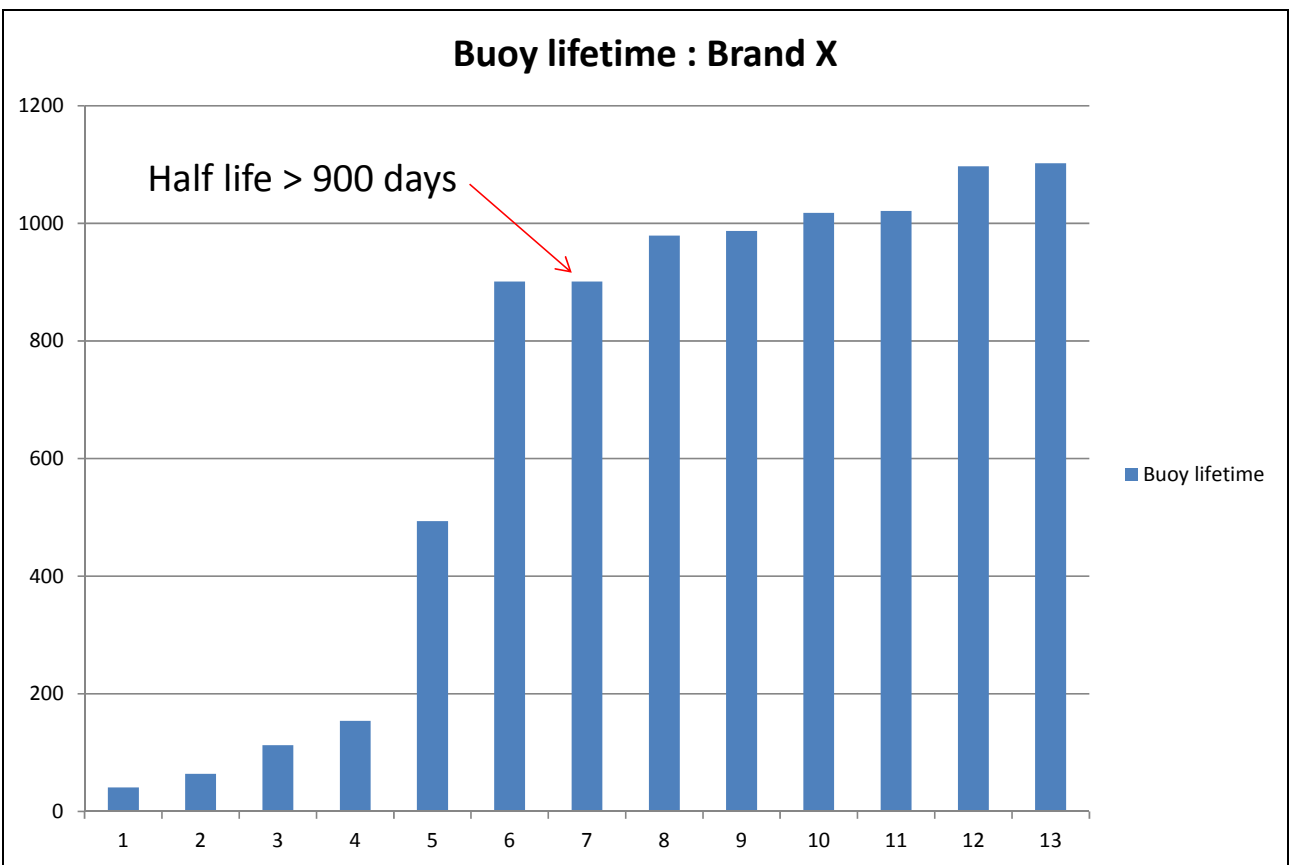


Figure 4. One manufacturer has demonstrated much higher than average lifetimes.

**ANNEX XII**

**WORKPLAN (OCTOBER 2012 TO SEPTEMBER 2013) OF THE DBCP  
ET-WCH PILOT PROJECT ON  
WAVE MEASUREMENT EVALUATION AND TEST (PP-WET)**

1. Coordinate intercomparisons of wave measurements from different platforms, on an opportunistic basis;
2. Publish intercomparison results and updated status reports on Pilot Project web site;
3. Develop a plan for a continuous testing and evaluation program;
4. Promote widely the pilot project goals and objectives, and results, to encourage enhanced participation and additional partners, including investigation of an alternative testing site on an ocean platform, and greater involvement of Regional Marine Instrumentation Centres (RMIC);
5. Contribute to training material to educate users about how to deploy and operate wave sensors appropriately;
6. Contribute, as appropriate, to the JCOMM Standards and Best Practice Guides, including a recommended approach to making reliable, high-quality spectral wave measurements, including directional spectra;
7. Decide whether to continue the pilot project for a further year and investigate follow-on mechanisms;
8. Present results to DBCP-29 and other scientific fora.

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**ANNEX XIII**

**GOALS OF DBCP CAPACITY BUILDING WORKSHOPS**

**GOALS FOR THE FOURTH DBCP IN-REGION  
WESTERN INDIAN OCEAN CAPACITY BUILDING WORKSHOP (WIO-4)  
(Zanzibar, Tanzania, April 2013)**

- Continue to Build Capacity Within Regional Institutes to Apply Indian Ocean Observing System (IndOOS) Data, such as from RAMA and others, for Enhanced Predictive Capability for the Region as for Extreme Events, Fisheries and Ecosystem Management, and other applications,
- Enhance Coordination and Cooperation between TT-CB and WMO Regional Association (RA-I), the IOC Sub Commission for Africa and the Adjacent Island States, Agulhas-Somali Current Large Marine Ecosystem (ASCLME) and Western Indian Ocean Marine Science Association (WIOMSA),
- Demonstrate the Crucial Role of Ocean Observations for Understanding and Predicting Regional Weather, Ocean and climate,
- Discuss ways to mitigate implementation constraints by Regional Piracy,
- Continue to Build In-Region Modelling Development Teams (MDT) and Observation Development Teams (ODT), including for the implementation of buoy programmes,
- Learn practical implementation aspects for the deployment of operational data buoys at sea, the collection of buoy data, and related data management,
- Learn Practical Application of Regional Ocean, Met and Climate Models for Addressing Impacts from Climate Change in the Coastal and Marine Environment,
- Utilize advances in Information and Communication Technology (ICT) to facilitate more effective Outreach and Capacity Building Activities on a larger scale.

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**GOALS OF THE PROPOSED SECOND DBCP CAPACITY BUILDING WORKSHOP FOR THE**

**“NORTH PACIFIC OCEAN AND MARGINAL SEAS (NPOMS) WORKSHOP”  
(East Asia, July 2013)**

- Continue to Open the dialogue among regional scientists, ocean observers, operators and system developers in Japan, China, Korea and other countries in the North Pacific Ocean and Marginal Seas, from research institutes, universities, government agencies and non-governmental organizations (NGOs),
- Continue to Build Capacity for operating, maintaining and developing data buoy networks to share data and information of the critical North Pacific Ocean and its Marginal Seas to include East Sea/Sea of Japan, East China Sea and South China Sea,
- Continue to engage interests of regional community of ocean and atmospheric scientists into the wider buoy community, to validate and improve the quality of data buoy and observed data for weather and ocean forecasts based on various operational models,

- Providing a systematic, community-based framework to exchange best practice and up-to-date knowledge in the development of buoy observing technology, application of ocean observing information to inter-disciplinary research and services of regional interest, such as mesoscale convection, typhoon and coastal surges, fisheries, and energy.
- 

**GOALS OF THE PROPOSED SECOND DBCP CAPACITY BUILDING WORKSHOP ON**

**“REGIONAL WORKSHOP ON BEST PRACTICES FOR  
INSTRUMENTS AND METHODS OF OCEAN OBSERVATION”  
(*South Asia, November 2013*)**

- Continue to build upon the fruitful first workshop ([www.jcomm.info/dbcp-cb-asia1](http://www.jcomm.info/dbcp-cb-asia1)) and help implement capacity for Asian developing countries to include working with Industry,
  - The Workshop is primarily designed for scientists, researchers, engineers and managers of Asian Countries to receive information on current best practices regarding calibration and testing instruments for ocean observation systems.
-

**ANNEX XIV**

**TEMPLATE FOR THE REPORT BY  
CHAIR AND VICE-CHAIR PERSONS TO THE SESSION OF THE DBCP**  
*(place and date)*

- 1) **Executive Summary**
- 2) **DBCP related meetings attended**
- 3) **JCOMM/WMO/IOC related meetings/workshop attended**
- 4) **DBCP Programme activities**
- 5) **Cross functional/regional activities**
- 6) **Capacity Development**
- 7) **Challenges by region (SH, Europe, US etc)**

Name

Title

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**ANNEX XV**

**DBCP RESPONSE TO THE GCOS IMPLEMENTATION PLAN**

The OOPC had written its latest recommendations on ocean observations for climate in the GCOS 2010 Implementation Plan<sup>1</sup>. These reflected a mild evolution of previous recommendations, expanding the number of Essential Climate Variables for the ocean and emphasizing integration. Of note for the DBCP were the following requested actions:

- (i) [Action O5] Complete and maintain a globally-distributed network of 30-40 surface moorings as part of the OceanSITES Reference Mooring Network.
- (ii) [Action O7] Continue the provision of best possible SST fields based on a continuous coverage-mix of polar orbiting IR and geostationary IR measurements, combined with passive microwave coverage, and appropriate linkage with the comprehensive *in situ* networks noted in O8.
- (iii) [Action O8] Sustain global coverage of the drifting buoy array (total array of 1250 drifting buoys equipped with ocean temperature sensors), obtain global coverage of atmospheric pressure sensors on the drifting buoys, and obtain improved ocean temperature from an enhanced VOS effort.
- (iv) [Action O11] Implement a programme to observe sea-surface salinity to include Argo profiling floats, surface drifting buoys, Ship-Of-Opportunity Programme (SOOP) ships, tropical moorings, reference moorings, and research ships. Performance indicator: data availability at International Data Centres.
- (v) [Action O16] Implement a wave measurement component as part of the Surface Reference Mooring Network.
- (vi) [Action O17] Establish an international group to assemble surface drifting buoy motion data, ship drift current estimates, current estimates based on wind stress and surface topography fields; prepare an integrated analysis of the surface current field.
- (vii) [Action O18] Plan, establish and sustain systematic *in situ* observations from sea-ice buoys, visual surveys (SOOP and Aircraft), and ULS in the Arctic and Antarctic.
- (viii) [Action O27] Complete implementation of the current Tropical Moored Buoy, a total network of about 120 moorings.
- (ix) [Action O29] Work with research programmes to develop autonomous capability for biogeochemical and ecological variables, for deployment on OceanSITES and in other pilot project reference sites.
- (x) [Action O32] Develop and implement comprehensive ocean data management procedures, building on the experience of the JCOMM Pilot Project for WIGOS.
- (xi) [Action O33] Undertake a project to develop an international standard for ocean metadata.
- (xii) [Action O37] Develop enhanced and more cost-effective telecommunication capabilities, including two-way communications for dynamic control of systems, instruments and sensors.
- (xiii) [Action O41] Promote and facilitate research and development (new improved technologies in particular), in support of the global ocean observing system for climate.

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1: Implementation Plan for the Global Observing System for Climate in Support of the UNFCCC (2010 update), GCOS-138, GOOS-184, <http://www.wmo.int/pages/prog/gcos/Publications/gcos-138.pdf>

## ANNEX XVI

### TERMS OF REFERENCE, DRAFT WORKPLAN AND INITIAL MEMBERSHIP OF THE STEERING GROUP FOR THE DBCP-GHRSSST PILOT PROJECT FOR HIGH RESOLUTION SST DRIFTERS (PP-HRSST)

Following a dialogue between the DBCP and the Group for High Resolution Sea Surface Temperature (GHRSSST), the 26<sup>th</sup> session of the DBCP recognised that drifter SST was critical for the validation of satellite-derived SST, and that the resolution and accuracy of currently reported drifter SST was inadequate. The Panel accordingly decided to establish a Pilot Project for HRSST, overseen by a Steering Group (SG), and with a defined workplan and a three-year duration. A draft of the Terms of Reference of the SG, its possible membership, and a workplan are listed below.

#### Terms of Reference of the SG

1. The SG will work closely with the GHRSSST to:
  - a. agree and review instrumentation standards
  - b. identify optimal target ocean areas that will be likely to deliver a high number of matchups and demonstrate the impact of drifter HRSST within the project lifespan
  - c. secure sufficient funding to allow the project to proceed expeditiously
  - d. work with buoy agencies and manufacturers to allow a sufficient number of upgraded HRSST drifters to be procured and deployed in the chosen target area(s)
  - e. ensure that HRSST data flow onto the GTS and are clearly identified as HRSST in associated meta-data and/or bulletin headers
  - f. assist in the analysis of the impact of the data on satellite SST retrievals
  - g. report to the Panel at its annual sessions and in the published literature
2. The SG chair and vice chair will be appointed by the Panel, and will recruit other members of the team, drawn from buoy operators, manufacturers, the scientific community, GHRSSST, end-users and other interested parties.
3. The SG chair will convene annual meetings of the SG, will communicate regularly with SG members by e-mail, and will report annually to the Panel.

#### Workplan

##### *Year 1: Planning (now past)*

1. Form SG and agree on working procedures – **not achieved**
2. Recruit additional members as required, including key players from within the GHRSSST – **not achieved**
3. Review progress to date with Metocean HRSST-1 and HRSST-2 drifters – **partially achieved**
4. Ensure that proposed technology solutions adequately address GHRSSST requirements - **achieved**
5. Identify the cost of an HRSST upgrade and identify buoy operators and manufacturers willing to participate in the PP – **partially achieved**
6. Work proactively with GHRSSST and buoy operators to define and cost a practicable PP plan – **in progress**
7. Present this plan to the annual GHRSSST science meeting (June 2012) and secure GHRSSST financial support – **not achieved**



8. Draw up a detailed costed implementation plan for approval at DBCP-XXVIII – **partially achieved**

*Year 2: Implementation*

1. Complete Year 1 work items
2. Pursue proposal to ESA for coordinated deployment campaign in support of Sentinel-3
3. Agree a deployment schedule with buoy operator(s)
4. Procure HRSST upgrades
5. Oversee calibration/recalibration protocols
6. Implement BUFR encoding for HRSST data
7. Monitor buoy deployments, data flow and data ingestion by GHRSSST
8. Present at GHRSSST science meeting (June 2013)
9. Make interim report to DBCP-XXIX

*Year 3: Analysis*

1. Continue with deployments as far as possible within budget
2. Attempt recovery of failed or failing buoys for analysis and sensor post-calibration
3. Review technology and data-flow performance and make recommendations as appropriate
4. Work with GHRSSST to identify impacts and shortcomings of PP
5. Agree recommendations for future activities, if any
6. Report to GHRSSST science meeting (June 2014)
7. Final report to DBCP-XXX
8. Work with GHRSSST on a journal article
9. Disband

**Membership**

Chair: David Meldrum, appointed by the Panel  
Vice-Chair: (DBCP appointee, TBA)

DBCP Chair	( <i>ex officio</i> )
DBCP TC	( <i>ex officio</i> )
Buoy programme manager(s)	TBA
Buoy data analyst(s)	TBA
Buoy manufacturer(s)	Volunteer from MetOcean (Clifton Flint) + others TBA
GHRSSST representative(s)	TBA
Oceanographic user(s)	TBA
Secretariat	( <i>ex officio</i> )

**ANNEX XVII**

**IRIDIUM ONE-STOP-SHOP PROPOSAL  
(DRAFT)**



**IRIDIUM AIRTIME AND DATA SERVICES FOR THE DBCP**

**SUMMARY**

*It is recommended that the community take full advantage of the lessons learned by the DBCP during the past 20 years with regard to the value of having a single point of contact for operational buoy data collection, QC and processing and thus endorse the idea of a DBCP proposal to implement an operational **One-Stop Shopping Service** for Iridium airtime and associated data services for data buoys. By doing so the probability would be eliminated for data quality issues, similar to those experienced in the late 1980s, to arise with ocean observations collected using Iridium. The provider of the **Service** would be selected through an open Invitation for Tender process. The **Service** would be self-sustaining via a pricing structure that would enable the provider to not only cover the real cost of providing the airtime and data services but also have a suitable margin that could then be shared with JCOMMOPS for their support in coordinating global operational ocean data at the international level.*

**BACKGROUND**

Some data buoy operators are selecting the Iridium satellite system as their communication method of choice for transmitting data from their ocean-met platforms. The selection of Iridium rather than the Argos data collection system is generally, though not completely, based on the perceived lower (than Argos) Iridium communications pricing. A close look however reveals that a number of value-added data services are included in the Argos pricing but are not included (nor are they all offered) in the Iridium (airtime) pricing. Many of these data services are desired by, if not essential to, the buoy operators. This is particularly true of the GTS processing/insertion services.

In the late 1980's, although much of the GTS insertion was being done by the two main Argos processing centers, many uncoordinated regional antenna stations collecting real-time Argos data were also independently calculating platform locations and generating their own GTS bulletins which were often of poor quality. This caused drifter-based observations as a whole to attract a negative reputation and led directly to the creation of the DBCP and the appointment of its first Technical Coordinator (TC). Through close daily interaction among the TC, the buoy community and the Argos operational data processing chain the community confidence was restored in data collected by the ocean-met buoys and a long-term mutually beneficial DBCP – Argos partnership was formed and exists today; essentially a cost-effective **One-Stop Shop for buoy data collection and services with Argos** that is a recognized global model of operational ocean data collection and processing.

**CURRENT STATUS**

Attracted by low airtime prices, buoy operators are choosing Iridium for their communications and are then either creating their own separate "back-office" data service capabilities in their institutions or are developing ad-hoc arrangements with other groups to access the services. The result is an undesirable mosaic of non-standard, independent data services of variable/unknown quality and the potential for data loss due to non-guaranteed archiving that is destined to repeat the mistakes made in the 1980s.

These relatively uncoordinated 'home-built' data services are generally paid for within the IT budgets of institutions. And, although there are expenses associated with the services, the expenses are typically "invisible" to the buoy operator since the only tangible "cost" to the operators for collecting the data is the Iridium airtime. Consequently the costs reported by these buoy programs to collect ocean observations are limited to airtime costs only and do not accurately portray the actual end-to-end expense of the buoy observations. This point is commonly overlooked as the zealous buoy operators work hard to minimize their "data collection costs."

This mosaic of non-standard, independent data services is exactly what the DBCP worked hard to eliminate years ago for buoy data collected by Argos. For sure, today the volume of buoy data collected via Iridium is still relatively small and there have to date been no known "data crises" associated with the non-standard data services. In time however, the Iridium data volume will most certainly increase and the DBCP community is strongly encouraged to be proactive regarding data services as soon as possible in order that the mistakes of the past are not repeated.

An effective operational 'one-stop shop' for Argos already exists in the DBCP structure. At a single point (the Argos Processing Centers), using standards developed and agreed to within the DBCP, the buoy data collected by Argos is converted to physical units, disseminated to the users and archived for later retrieval, quality controlled in real-time, reformatted into GTS bulletins and inserted onto the GTS. The DBCP TC has direct and open access to all nodes in the Argos Processing Chain for data path analysis and troubleshooting and there are guaranteed performance standards for operational back-up, data timeliness, etc. Operational direct links are also in place with JCOMMOPS, buoy manufacturers and buoy operators in order to advise/support buoy programs and to ensure their efficiency in terms of data collection by satellite, decoding, processing and data distribution. 'Argos User Office' services are in place to provide all necessary administrative and technical operational services, 24/7, to the buoy operators. All of these capabilities and services are included in the price for using Argos that is negotiated by the Joint Tariff Agreement (JTA).

## RECOMMENDATION

For the reasons described above, it is recommended that the community endorse the idea of a DBCP proposal to implement an operational **One-Stop Shopping Service for Iridium Airtime and Associated Data Services** for data buoys. The DBCP would seek a qualified provider by inviting interested parties to respond to a request for proposals to provide a **Service** which would include both Iridium airtime and the types of services outlined above in the description of the existing "one-stop shop" for Argos.

The **Service** would exist under the auspices of the DBCP, but the successful provider would operate independently by implementing a financially and operationally sustainable **One-Stop Shopping Service** and business model. Access to the service would be directly between the buoy operator and the provider, and prices offered by the service provider would be at a level that would both cover the real cost of providing the airtime and data services and also include a margin sufficient to operationally sustain the service. Revenue sharing with JCOMMOPS in exchange for a JCOMM 'seal of approval' would also feature in the business model.

It can be argued that such a **One-Stop Shopping Service** would be visibly more expensive to the buoy operators wishing to minimize their operating costs by creating their own data services. That argument, however, is based on the false premise that their own data services have no real cost associated with them and that the individual services are uniform and can match the current operational capabilities. In reality, the **One-Stop Shopping Service** will ultimately reduce the overall community expenses for data services as well as support a primary objective of the DBCP to insure the *'quantity, quality and timeliness of atmospheric and oceanographic data in ocean areas, to improve global forecasts of climate, weather and ocean conditions'*

**ACRONYM LIST**

AG	DBCP Action Groups
AHRPT	Advanced High Resolution Picture Transmission
AIC	Argo Information Center
AMESD	African Monitoring of the Environment for Sustainable Development
AMCOMET	African Ministerial Conference on Meteorology
AMOC	Atlantic Meridional Overturning Circulation
AOML	NOAA Atlantic Oceanographic and Meteorological Laboratory (USA)
AP	Air Pressure
APL	University of Washington Applied Physics Laboratory (USA)
Argo	Argo Profiling Float Pilot Project
AST	Argo Steering Team
ATLAS	Autonomous Temperature Line Acquisition System
AWS	Automatic Weather Station
BOBP-IGO	Bay of Bengal Programme Inter-Governmental Organization
BOM	Bureau of Meteorology (Australia)
BUFR	FM 94 BUFR GTS format: Binary Universal Form for Representation of meteorological data
BUOY	FM 18 BUOY GTS format: Report of a buoy observation
CB	Capacity-Building
CBS	Commission for Basic Systems (WMO)
CBS-MG	CBS Management Group
CCI	Commission for Climatology (CCI)
CDIP	Coastal Data Information Program
CDMP	Climate Database Modernization Programme (USA)
CEO	Chief Executive Officer
Cg	Congress (WMO)
CIMEC	Cooperative Institute for Marine Ecosystems and Climate (USA)
CIMO	Commission on Instruments and Methods of Observation (WMO)
CIIC	Climate and Cryosphere Project (WCRP, IASC, SCAR)
CLIVAR	Climate Variability and Predictability (WCRP)
CLS	Collecte Localisation Satellites (France)
CNES	Centre National D'Etudes Spatiales (France)
CNRS	Centre National de Recherche Scientifique (France)
CONOPS	WIGOS Concept of Operations
CPO	Climate Programme Office (NOAA, USA)
CREX	FM 95–XII CREX GTS format: Character form for the REpresentation and eXchange of Data
CSIRO	Commonwealth Scientific and Industrial Research Organisation (CSIRO)
DAC	Data Assembly Centre
DAR	Data Discovery, Access and Retrieval service (WMO WIS)
DART	Deep-ocean Assessment and Reporting of Tsunami (Tsunameter)

DB	Data Buoy
DBCP	Data Buoy Co-operation Panel (WMO-IOC)
DB-TAG	E-SURFMAR Data Buoy Technical Advisory Group
DCP	Data Collection Platform
DCPC	Data Collection and Production Centres (WMO WIS)
DCS	Data Collection System
DMCG	Data Management Coordination Group (JCOMM)
DMPA	Data Management Programme Area (DMPA)
DTM	Data Management Team
EB	DBCP Executive Board
EBD	Equivalent Buoy Density
EC	Executive Council
ECMWF	European Centre for Medium-Range Weather Forecasts
EEZ	Exclusive Economic Zone
EGOS-IP	Implementation Plan for the Evolution of Global Observing Systems (WMO)
EOV	Essential Ocean Variable
ER	Expected Result
E-SURFMAR	Surface Marine programme of the Network of European Meteorological Services, EUMETNET
ET/DRC	CBS Expert Team on Data Representation and Codes (WMO)
ET/EGOS	CBS / IOS Expert Team on the Evolution of the Global Observing System (WMO)
ETDMP	Expert Team on Data Management Practices (JCOMM)
ETMC	Expert Team on Marine Climatology (JCOMM)
ETSI	Expert Team on Sea Ice (JCOMM)
ETWCH	Expert Team on Waves and Coastal Hazard Forecast Systems (JCOMM)
ETWS	Expert Team on Wind Waves and Storm Surge (JCOMM)
EUCOS	EUMETNET Composite Observing System
EUMETNET	Network of European Meteorological Services
EUMETSAT	European Organization for the Exploitation of Meteorological Satellites
EuroSITES	European integrated network of open ocean multidisciplinary observatories
FAO	Food and Agriculture Organization
FG	First Guess Field
FTP	File Transfer Protocol
GCC	Global Collecting Centre (of MCSS)
GCOS	Global Climate Observing System
GCW	Global Cryosphere Watch
GDAC	Global Data Assembly / Acquisition Centre
GDC	Global Drifter Centre
GDP	Global Drifter Programme
GEO	Group on Earth Observations
GEOSS	Global Earth Observation System of Systems
GFCS	Global Framework for Climate Services
GHRSSST	Group for High-Resolution SST

GIPPS	Global Integrated Polar Prediction System
GIS	Geographical Information System
GISC	Global Information System Centres (WMO WIS)
GLOBE	Global Learning and Observations to Benefit the Environment
GLOSS	Global Sea-level Observing System (JCOMM)
GOOS	Global Ocean Observing System (IOC, WMO, UNEP, ICSU)
GOS	Global Observing System (WMO)
GPS	Global Positioning System
GSOP	CLIVAR Global Synthesis and Observations Panel
GSM	Global System for Mobile Communications
GSSC	GOOS Scientific Steering Committee
GTS	Global Telecommunication System (WWW)
HMEI	Association of Hydro-Meteorological Equipment Industry
HRPT	High Resolution Picture Transmissions
HRSST	High Resolution SST
IABP	International Arctic Buoy Programme
IARC	International Arctic Research Center (USA)
IASC	International Arctic Science Committee
IBPIO	International Buoy Programme for the Indian Ocean
ICG	Intergovernmental Coordination Group
ICG/IOTWS	ICG for the Indian Ocean Tsunami Warning and Mitigation System (IOC)
ICOADS	International Comprehensive Ocean-Atmosphere Data Set (USA)
ICSU	International Council for Science
ID	Identification Number
IFREMER	Research Institute for the Exploitation of the Sea (France)
I-GOOS	Intergovernmental IOC-WMO-UNEP Committee for GOOS
IMB	Ice Mass Balance
IMEI	International Mobile Equipment Identity
IMO	International Maritime Organization
IndOOS	Indian Ocean Observing System
INMARSAT	International maritime satellite private company (previously International Maritime Satellite Organization)
INSU	Institut national des sciences de l'Univers (France)
IOC	Intergovernmental Oceanographic Commission (of UNESCO)
ICT	Information and Communication Technology
IOCCP	International Ocean Carbon Coordination Project
IODE	International Oceanographic Data and Information Exchange (IOC)
IOTWS	Indian Ocean Tsunami Warning and Mitigation System (IOC)
IPAB	WCRP-SCAR International Programme for Antarctic Buoys
IPET-DRC	Inter-Programme Expert Team on Data Representation and Codes
IPD	International Polar Decade
IPP	DBCP Iridium Pilot Project
IPY	International Polar Year (2007-2008)

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ISABP	International South Atlantic Buoy Programme
ISDM	Integrated Science Data Management (formerly MEDS, Canada)
ISFET	Ion Sensitive Field Effect Transistor
ISO	International Organization for Standardization
ISRO	Space Research Organization (India)
IT	Information Technology
ITP	International Tsunameter Partnership
ITT	Invitation To Tender
IUGG	International Union of Geodesy and Geophysics
JAMSTEC	Japan Agency for Marine-Earth Science and Technology
JCOMM	Joint WMO-IOC Technical Commission for Oceanography and Marine Meteorology
JCOMM-3	Third Session of JCOMM (Marrakech, Morocco, 4-11 November 2009)
JCOMMOPS	JCOMM <i>in situ</i> Observations Programme Support Centre
JTA	Joint Tariff Agreement (Argos)
KHOA	Korea Hydrographic and Oceanographic Administration
KML	Keyhole Markup Language
KORDI	Korea Ocean Research and Development Institute
LOCEAN	Laboratoire d'Océanographie et du Climat (France)
LOI	Letters of Intent
LUT	Local User Terminal (Argos)
MAN	JCOMM Management Committee
MARCDAT	International Workshop on Advances in the Use of Historical Marine Climate Data
MCDS	Marine Climate Data System (in development by JCOMM)
MCSS	Marine Climatological Summaries Scheme
MDT	Modelling Development Team
MEDS	Marine Environmental Data Service (Canada, now ISDM)
META-T	Water Temperature instrument/platform Metadata Pilot Project (JCOMM)
METOP	Meteorological Operational satellites of the EUMETSAT Polar System (EPS)
MG	Management Group
MOFS	Met-Ocean Forecasts and Services
MOI	Mauritius Oceanography Institute
MOU	Memorandum of Understanding
MSC	Meteorological Services of Canada
NAVOCEANO	Naval Oceanographic Office (USA)
NC	National Centres (WMO WIS)
NCDC	NOAA National Climatic Data Center (USA)
NCEP	NOAA National Center for Environmental Prediction (USA)
NCOSM	National Centre of Ocean Standards and Metrology (SOA, China)
NDBC	NOAA National Data Buoy Center (USA)
NESDIS	NOAA National Environmental Satellite Data and Information Service (USA)
NetCDF	Network Common Data Format
NFP	National Focal Point



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NIOT	National Institute of Ocean Technology (India)
NMDIS	National Marine Data and Information Service (China)
NMHS	National Meteorological and Hydrological Service
NMS	National Meteorological Service
NOAA	National Oceanic and Atmospheric Administration (USA)
NODC	National Oceanographic Data Centre
NPDBAP	DBCP-PICES North Pacific Data Buoy Advisory Panel
NPOESS	National Polar-orbiting Operational Environmental Satellite System (USA)
NSF	National Science Foundation (USA)
NWP	Numerical Weather Prediction
NWS	NOAA National Weather Service (USA)
OceanSITES	OCEAN Sustained Interdisciplinary Timeseries Environment observation System
OCG	Observations Coordination Group (JCOMM)
OCO	NOAA Office of Climate Observation (USA)
ODAS	Ocean Data Acquisition Systems
ODASMS	ODAS Metadata Service (operated by China on behalf of JCOMM)
ODINAFRICA	Ocean Data and Information Network for Africa (IODE)
ODP	Ocean Data Portal (IODE)
ODT	Observation Development Team
OGP	Oil and Gas Producers
OOI	Ocean Observatories Initiative (USA)
OOPC	Ocean Observations Panel for Climate (GCOS-GOOS-WCRP)
OPA	Observations Programme Area (JCOMM)
OPAG	Open Programme Area Group
OPAG-IOS	CBS OPAG on the Integrated Global Observing System
OPeNDAP	Open-source Project for a Network Data Access Protocol
OPSCOM	Argos Operations Committee
OSE	Observing System Experiment
OSMC	NOAA Observing System Monitoring Center (USA)
OSSE	Observing System Simulation Experiment
PA	Programme Area (JCOMM)
PANGEA	Partnerships for New GEOSS Applications
PGC	Principal GTS Co-ordinator (DBCP)
PICES	North Pacific Marine Science Organization
PICO	Panel for Integrated Coastal Observations
PIRATA	Pilot Research Moored Array in the Tropical Atlantic
PMEL	NOAA Pacific Marine Environmental Laboratory (USA)
PMO	Port Meteorological Officer
PMOC	Principal Meteorological or Oceanographic Centres responsible for quality control of buoy data (DBCP)
PMT	Platform Messaging Transceivers
POES	Polar Orbiting Environmental Satellite
POGO	Partnership for Observation of the Global Oceans



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PP-HRSST	DBCP-GHRSST Pilot Project on High Resolution SST
PP-WMD	DBCP Pilot Project on Wave Measurement from Drifters
PP-WET	DBCP-ETWCH Pilot Project on Wave measurement Evaluation and Test
PTT	Platform Transmitter Terminal (Argos)
QA	Quality Assurance
QC	Quality Control
QMF	WMO Quality Management Framework
QMS	Quality Management Systems
RA	Regional Association (WMO)
RAMA	Indian Ocean Research Moored Array for African-Asian-Australian Monsoon Analysis and Prediction
RMIC	WMO-IOC Regional Marine Instrument Centre
RMS	Root Mean Square
RNODC	Responsible Oceanographic Data Centre (IODE-JCOMM)
RNODC/DB	RNODC for Drifting Buoys
RRR	Rolling Review of Requirements
RTMC	VOSCLim Real-Time Monitoring Centre
RUDICS	Iridium Router-Based Unrestricted Digital Interworking Connectivity Solution
RV	Research Vessel
SAIC	Science Applications International Corporation (USA)
SAMS	Scottish Association for Marine Science
SARAL	Satellite with ARGos and ALTika (France, India)
SAT	Site Acceptance Test
SAWS	South African Weather Service
SBD	Short Burst Data (Iridium)
SC	Steering Committee
SCAR	Scientific Committee on Antarctic Research
SCG	Services Coordination Group (JCOMM)
SeaDataNET	Pan-European infrastructure for Ocean & Marine Data Management
SensorML	OpenGIS® Sensor Model Language Encoding Standard
SFSPA	JCOMM Services and Forecasting Systems Programme Area
SG	Steering Group
SIA	Seasonal to Inter-annual Forecast
SIDERI	Strengthening the International Dimension of the Euro-Argo Research Infrastructure
SIO	Scripps Institution of Oceanography (University of California, USA)
SLP	Sea Level Atmospheric Pressure
SMOS	Soil Moisture and Ocean Salinity mission
SOA	State Oceanic Administration (China)
SOBP	Southern Ocean Buoy Programme
SOC	Specialized Oceanographic Centre (JCOMM)
SOC/DB	SOC for Drifting Buoys (operated by Météo France)
SOCIB	Balearic Islands Coastal Observing System
SoG	Statements of Guidance

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SOOP	Ship-Of-Opportunity Programme
SOOPIP	SOOP Implementation Panel (JCOMM)
SOT	Ship Observations Team (JCOMM)
SPA	JCOMM Services Programme Area (now SFSPA)
SSA	WMO Special Service Agreement
SSG	Scientific Steering Group
SSS	Sea Surface Salinity
SST	Sea-Surface Temperature
STIP	Stored Tiros Information Processing
SVP	Surface Velocity Programme (of TOGA and WOCE, replaced by GDP) drifter
SVPB	SVP barometer drifter
SVPBS	SVP drifter with salinity
SVPBTC	SVP drifter with temperatures in depth
SVPBW	SVP Barometer and Wind at a drifter
TAO	Tropical Atmosphere Ocean Array
TC	Technical Co-ordinator
TD	Technical Document
TIP	Tiros Information Processing
TIP	Tropical Moored Buoys Implementation Panel
TOGA	Tropical Atmosphere and Global Ocean programme
ToR	Terms of Reference
TOWS-WG	Working Group on Tsunamis and Other Hazards Related to Sea-Level Warning and Mitigation Systems
TRITON	Triangle Trans-Ocean buoy network
TT	Task Team
TT-CB	DBCP Task Team on Capacity-Building
TT-DM	DBCP Task Team on Data Management
TT-MB	DBCP Task Team on Moored Buoys
TT-IBP	DBCP Task Team on Instrument Best Practices & Drifter Technology Developments
TT-QM	DBCP Task Team on Quality Management (now merged into TT-IBPD)
TT-TD	DBCP Task Team on Technological Development (now merged into TT-IBPD)
TT-TDC	DMPA Task Team on Table Driven Codes
UK	United Kingdom
UN	United Nations
UNCLOS	UN Conventions on the Law of the Sea
UNDP	United Nations Development Programme
UNESCO	UN Educational, Scientific and Cultural Organization
UNFCCC	United Nations Framework Convention on Climate Change
UNGA	UN General Assembly
URL	Uniform Resource Locator
USA	United States of America
USD	United States Dollar
VAR	Value Added Reseller

VCP	Voluntary Cooperation Programme (WMO)
VOS	Voluntary Observing Ship (JCOMM)
VOSClim	VOS Climate Project
WCRP	World Climate Research Programme
WCC-3	World Climate Conference 3
WDIP	WIGOS Test of Concept Development and Implementation Plan
WDIS	WIGOS Development and Implementation Strategy
WESTPAC	IOC Sub-Commission for the Western Pacific
WHOI	Woods Hole Oceanographic Institution
WIGOS	WMO Integrated Global Observing System
WIS	WMO Information System
WMO	World Meteorological Organization (UN)
WOCE	World Ocean Circulation Experiment
WWW	World Weather Watch (WMO)
XBT	Expendable BathyThermograph
WML	Extensible Markup Language

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