DATA BUOY CO-OPERATION PANEL
TWENTY-FOURTH SESSION

Cape Town, Republic of South Africa
13-16 October 2008

FINAL REPORT

JCOMM Meeting Report No. 61

WORLD METEOROLOGICAL ORGANIZATION

INTERGOVERNMENTAL OCEANOGRAPHIC COMMISSION (OF UNESCO)

DATA BUOY CO-OPERATION PANEL
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NOTES

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C O N T E N T S

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

- Technical Coordinator's report;
- Reports by the Task Teams;
- National reports;
- Action Group reports;
- International Tsunameter Partnership report;
- Data Management Centre reports;
- DBCP Implementation Strategy
- CLS report;
- Review of satellite data telecommunication systems;
- GTS report;
- National Focal Point list;
- Contracts;
- Other financial and administrative information; and
- Technical Document list.

EXECUTIVE SUMMARY

The twenty-fourth session of the Data Buoy Co-operation Panel (DBCP) was held in Cape Town, Republic of South Africa, from 13 to 16 October 2008, at the kind invitation of the South African Weather Service (SAWS).

A technical and scientific workshop focusing on marine forecast and services, numerical weather prediction, and coastal risk management was organized during the first day of the meeting. Sixteen presentations were delivered during the workshop, which covered each of the theme areas.

The format and agenda for the session was substantially re-organized and streamlined compared to previous years. Although challenging, the exercise was adjudged to have been successful. The Session reviewed and commented on buoy programme implementation through the activities of the DBCP Action Groups, as well as sustained scientific programmes such as the Global Drifter Programe (GDP), the OCEAN Sustained Interdisciplinary Timeseries Environment observation System (OceanSITES), the Argo profiling float programme and the International Tsunameter Partnership (ITP). It also reviewed data collection and data management, exchange, quality assurance and monitoring issues, Best Practices and Standards, deployment opportunities and strategies, vandalism on data buoys, as well as the development of the future Observing Programme Support Centre (OPSC) based on the successful JCOMM in situ Observing Platform Support Centre (JCOMMOPS) and its relationship with JCOMM.

The Panel substantially updated its operating principles, and approved them. It also updated its Implementation Strategy, taking into account the WMO and IOC Strategic Planning, the development of the WMO Integrated Global Observing Systems (WIGOS), and requirements for marine services, including wave observations.

The Panel noted the appreciation the outcome and recommendations from the ad hoc planning meeting for the JCOMM Pilot Project for WIGOS (Ostend, Belgium, 29 March 2008), and agreed to make efforts to integrate its Best Practices as appropriate. It further recommended that the buoy manufacturers establish links with the HMEI.

The Panel engaged in building stronger synergies with the OceanSITES, agreed that its Technical Co-ordinator could work 30% of the time for OceanSITES, and agreed to contribute financially to the OceanSITES Project Office function at a level of USD 30,000 in 2009. However, the Panel agreed that this was a temporary contribution and urged OceanSITES to seek additional funding sources from its participants in order to achieve sustainable funding for the Project Office function as of 2010.

Noting the recommendations from the sixtieth WMO Executive Council (EC-LX), and recognising the immediate and longer-term synergies between the DBCP and the work of the International Tsunameter Partnership (ITP), the Panel agreed to extend an invitation to the ITP to become an Action Group of the DBCP.

The Panel received reports from the interim Task Teams and agreed to merge the Task Team on Quality Management with the Task Team on Drifter Technology Developments. The Panel then formally adopted its Task Teams on: (i) Data Management (TT-DM); (ii) Instrument Best Practices and Drifter Technology Developments (TT-IBPD); (iii) Capacity-Building (TT-CB); and (iv) Moored Buoys (TT-MB).

The Panel noted that the initial Iridium Pilot Project target for deploying 50 Iridium drifters had been achieved, but that the geographical distribution was not appropriate at this point. Efforts were also needed to analyze the data in order to come to clear conclusions. The Panel agreed to continue to upgrade scheme in 2009 and plan for an additional 40 units, on the understanding that 2010 would be dedicated to an analysis effort.

The Panel agreed to establish three new Pilot Projects:

1. Drawing on substantial financial support from CLS, the Pilot Project for the evaluation of Argos-3 technology is planning to deploy 50 drifters equipped with Argos 2-way PMTs. The Panel agreed to make additional funding available to the project so that all drifters might be equipped with barometers.

2. Based on the recommendations arising from the JCOMM Workshop on Wave Measurements from Buoys (New York City, New York, USA, 2-3 October 2008), the Panel agreed to establish a new Pilot Project on Wave Measurement from Drifters (PP-WMD) for a period of three years, and to allocate adequate finances in 2009 and succeeding years so that the project might get under way as soon as possible.

3. In addition, the Panel supported the establishment of a JCOMM Pilot Project on Wave measurement Evaluation and Test from moored buoys (PP-WET), and agreed to provide either financial or in-kind support. The Data Management Task Team and Instrument Best Practices and Drifter Technology Developments Task Team should actively lead the implementation of the Pilot Project through its Steering Team.

The Panel agreed to support organization of a Capacity-Building Workshop for East and South Africa to be held during the summer of 2009. The Workshop's goal is to build regional capacity for the East and South Africa Region and Western Indian Ocean in relation to climate science, observations, socio-economic applications and stakeholder outreach.

The Session recommended that the Argos Joint Tariff Agreement (JTA) address the issue of data timeliness in identified regions, and in the Indian Ocean, in particular, and make appropriate recommendation to Collecte Localisation Satellites (CLS).

The Panel discussed DBCP 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.

The Panel re-elected Mr David Meldrum as its Chairperson, Mr Ken Jarrott as Vice-chairperson for the Southern Hemisphere, and elected Mr Al Wallace as Vice-chairperson for North America, and Mr V. Rajendran as the Vice-chairperson for Asia. The Panel agreed to organize its twenty-fifth session at the IOC headquarters in Paris, France, in late September 2009.

GENERAL SUMMARY OF THE WORK OF THE SESSION

1. OPENING AND KEYNOTE ADDRESS

1.1 The Chairperson of the Panel, Mr David Meldrum, opened the twenty-fourth session of the Data Buoy Co-operation Panel (DBCP) and its associated Scientific and Technical Workshop at 0900 hours on Monday, 13 October 2008, in Cape Town, Republic of South Africa. On behalf of the Panel, Mr Meldrum welcomed all participants to the session and to the workshop, noting that the Panel and its activities had evolved considerably since its last session in South Africa in 1995. In so doing, he reminded the participants that South Africa had been a driving force in the Panel's activities since its inception, that it had observational and forecasting responsibilities for an enormous area, and that it had been in the forefront in deploying and using data buoys for operational purposes.

1.2 The Chairperson expressed his sincere thanks, on behalf of the Panel and all participants, to the South African Weather Service (SAWS), and the local organisers for hosting the session and workshop, and for providing such excellent facilities and support and warm hospitality.

1.3 On behalf of the Republic of South Africa government and the SAWS Board, Dr Jonas Mphepya welcomed participants to the meeting and to Cape Town and expressed his pleasure and great honour to host this workshop and session.

1.4 On behalf of the Secretary-General of the World Meteorological Organization (WMO), Mr Michel Jarraud, and the Executive Secretary of the Intergovernmental Oceanographic Commission (IOC), Dr Patricio Bernal, the respective Secretariat representatives also welcomed participants to the workshop and DBCP session. In doing so, they expressed the sincere thanks of both organizations to SAWS, to Dr Jonas Mphepya, as well as to Mr Johan Stander and his staff for their excellent support for the meetings, for the Panel and for the work of WMO and IOC. The Secretariat representative concluded his remarks by assuring the continued commitment of WMO and IOC to support and strengthen the work of the DBCP through the Observations Programme Area of the Joint WMO-IOC Technical Commission for Oceanography and Marine Meteorology (JCOMM).

2. SCIENTIFIC AND TECHNOLOGY WORKSHOP

2.1 Under this agenda item, the Panel briefly reviewed the results of the preceding scientific and technical workshop. The workshop opened at 0945 hours on Monday, 13 October 2008 in Cape Town, Republic of South Africa and ended on the same day at 1715 hours. The themes of the workshop covered technology developments, operational practices, applications of collected data and national practices. This year's workshop included a special focus area on the use of wave information and development of improved wave networks. Sixteen presentations were delivered, which covered each of the themed areas.

2.2 Both drifters and moorings technology were highlighted in the focus area on Technology Developments. The Scripps Institution of Oceanography (SIO), described a reconfigured Autonomous Drifting Ocean Station (ADOS) drifter into a coastal mooring that measured temperature and pressure every 10-meters – referred to as a restrained ADOS-V. Marlin-Yug Ltd. provided information on the Surface Velocity Programme (SVP) Barometer drifter (SVP-B) transmitting through Iridium and using the reduced size hull (34 cm float with 61 cm drogue) and the modification of the barometric port to obtain reliable atmospheric pressure in any conditions. Pacific Gyre described their evaluation of drifters with an integrated sonic anemometer attached, and showed that the new instrument provided encouraging results. Clearwater Instrumentation discussed the integration of their drifters with the Argos 3-PMT and the major enhancements to the system. Finally, the U.S. National Data Buoy Center discussed new moored buoy techniques, focusing on a new buoy that integrates three programmes, the weather, Tropical-Atmosphere-

Ocean (TAO) and Deep-ocean Assessment and Reporting of Tsunami (DART®) buoys into one mooring system.

2.3 A number of evaluation studies were also presented throughout the day. SIO provided an update on the operational deployments of drifters into targeted tropical cyclones that obtained pressure, sea-surface temperatures, sub-surface water temperatures and wind speed. All deployments had high survivability and reliability throughout the events. The host country's weather service, the South African Weather Service (SAWS), described how they optimize their buoy deployments in the South Atlantic to maximize the benefit to regional weather forecasts. Forty-six drifters were deployed in 2008, providing important weather and ocean observations in support of increased forecast accuracy. Pacific Gyre showed that drifter performance is affected by the locations where drifters are deployed, and provided a specific example of a deployment that, taken at face value would be considered to be a batch of bad buoys, was actually a deployment over icy areas. India's National Institute of Ocean Technology described their operational challenges in maintaining a moored buoy network in areas of high vandalism. Their challenging goal is to maintain high data availability while ensuring a low ratio of vandalism. Météo-France and the Surface Marine programme of the Network of European Meteorological Services (E-SURFMAR) of the Network of European Meteorological Services (EUMETNET) provided their evaluation of SVP-B drifters that report through Iridium, as part of the DBCP drifter Iridium Pilot Project. Currently, the deployments have been successful with low time delays and high data availability. The U.S. Global Drifter Program described their annual report on drifter evaluations and the performance statistics for four drifter manufacturers.

2.4 There were a number of national and international studies at the workshop. The U.S. National Oceanic and Atmospheric Administration (NOAA) discussed ongoing efforts to develop critical partnerships in the Indian Ocean region, supporting continued efforts by the DBCP and NOAA to implement capacity-building and enhanced ocean observations throughout the world. Korea's Meteorological Administration (KMA) showed how ocean observations are ingested into numerical weather prediction systems to improve and advance their operational wind wave prediction systems. Kenya's Meteorological Services, described their analysis and modelling efforts in understanding the upwelling region off the Somali Coast, and offered to work with the DBCP and NOAA to improve observation capabilities in the region and the understanding of gyre dynamics.

2.5 Finally, the session ended with three special focus presentations. The Chairperson of JCOMM Expert Team on Wind-Waves and Storm Surges (ETWS) and the Chairperson of DBCP discussed the results of the Waves Workshop, which was held the week prior to the DBCP session. They also presented two proposed pilot projects: the first on developing wave measurements from drifters using Global Positioning System (GPS) and other technologies, the second on wave measurement tests and evaluations to understand and improve wave measurements from fixed platforms. The WMO representative put the results of the workshop in context by reviewing the quality assurance, Best Practice and data delivery procedures that are necessary to ensure that global drifter and moored buoy activities are managed appropriately.

2.6 The Panel expressed its appreciation to the Workshop Chairpersons, Dr Bill Burnett (USA) and Mr Johan Stander (South Africa) for their excellent work in organizing and chairing the workshop. The proceedings of this Workshop will be published in the DBCP Technical Document series, on CD-ROM, and via the DBCP website. The authors were requested 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 2008 at the latest **(action, Authors, 30 November 2008)**.

2.7 The Panel noted with appreciation that Dr Burnett would continue to act as the Workshop Co-chairperson for 2009. The Panel also welcomed the offer from Mr Jean Rolland to act as Co-chairperson for the Workshop and assist in organizing it from a regional perspective **(action, Dr Bill Burnett and Mr Jean Rolland, DBCP-XXV)**.

3. OPENING OF THE SESSION

3.1 The twenty-fourth session of the DBCP itself was opened by the Panel Chairperson, Mr David Meldrum, at 0900 hours, Tuesday, 14 October 2008, in the conference room of the of Protea Hotels Sea Point, Cape Town, Republic of South Africa. The Chairperson welcomed participants again to the session and once more thanked the SAWS for hosting it and providing excellent facilities.

3.2 The Panel adopted its agenda (***Annex I***) and decided on its working hours and other arrangements for conducting the session. The joint Secretariat then introduced the documentation in accordance with the provisional agenda.

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

4. REPORTS FROM THE CHAIRPERSON, VICE-CHAIRPERSONS AND THE EXECUTIVE BOARD

4.1 Report by the Chairperson of the DBCP

4.1.1 The Chairperson reported on his activities during the last intersessional period. Missions undertaken by the Chairperson on behalf of the Panel are tabulated below. Wherever possible, his travel was arranged to coincide with missions on behalf of his own institution, the Scottish Association for Marine Science (SAMS) to minimize costs for the Panel.

Date	Destination	Purpose	Estimated cost (USD)
13 - 16 Mar. 08	IOC, Paris, France	Discussed with IOC Secretariat (Lee, Alverson, Clark and Fischer) regarding future DBCP and JCOMMOPS activities and support	**800**
30 Mar. – 1 Apr. 08	Warnemünde, Germany	Represented DBCP at Ocean Sensors 08 Workshop on identifying future needs and technologies for ocean observation	**1000**
20-22 Apr. 08	WMO, Geneva, Switzerland	Discussed with WMO Secretariat (Charpentier) regarding DBCP session agenda and documentation requirements	**800**
13 - 15 Jul. 08	IOC, Paris, France	Discussed with IOC Secretariat (Lee) regarding employment and travel arrangements for the TC, session documentation and waves workshop	**600**
29 Sept. - 6 Oct. 08	Annapolis and New York, USA	Participated and represented DBCP at Argos Users Conference; Co-chaired JCOMM workshop on wave observations from buoys	**2600**

4.1.2 The Panel noted with appreciation that all of the Chairperson's DBCP-related staff costs continue to be borne by the Scottish Association for Marine Science (SAMS), as well as his travel to the current session. The future of this support is uncertain, and the Chairperson will keep the Panel informed on any related developments.

4.1.3 Other intersessional activities of the Chairperson included the continued promotion of the Iridium Pilot Project, interaction with all sectors of the buoy community, its user base and JCOMM in the identification of future actions and evaluation opportunities for the Panel, and the composition of numerous letters and e-mails. In concluding his report, the Chairperson thanked his many colleagues for their valuable support, not least the Vice-chairpersons, the Technical Co-ordinator and the joint Secretariat.

4.2 Reports by the DBCP Vice-chairpersons

4.2.1 The Vice-chairperson for the southern Hemisphere, Mr Ken Jarrott, briefly reported on his activities on behalf of the Panel during the last intersessional period, and, in particular, concerning his role as a liaison with the International Tsunameter Partnership (ITP). Further information in this regard is provided under agenda item 9.

4.2.2 The Vice-chairperson for North America, Mr Al Wallace, briefly reported on his activities on behalf of the Panel during the last intersessional period.

4.3 Report by the DBCP Executive Board

4.3.1 Mr David Meldrum presented a report on behalf of the Executive Board. Owing to changes in their core roles, Mr Edgard Cabrera and Ms Candyce Clark resigned from the Executive Board during the year and were replaced by Mr Etienne Charpentier and Mr Keith Alverson, respectively. The Panel recorded its sincere appreciation for their efforts on behalf of the DBCP and wished them well in their new positions. The Executive Board is presently comprised of Mr David Meldrum (DBCP Chairperson), Mr Ken Jarrott (DBCP Vice-chairperson), Mr Al Wallace (DBCP Vice-chairperson), Dr Sidney Thurston (Panel member), Mr Etienne Charpentier (WMO Secretariat), Mr Keith Alverson (IOC Secretariat), and Ms Hester Viola (DBCP Technical Co-ordinator).

4.3.2 The Panel noted that the Executive Board had been consulted during the last intersessional period to approve the following actions and expenditures, within the guidelines established at DBCP-XXIII:

- The promotion of the Technical Co-ordinator from P2A to P2B on the renewal of her contract with the United Nations Educational, Scientific and Cultural Organization (UNESCO);
- Approval of a letter to the Argos Operations Committee (OPSCOM) joint chairpersons regarding unrestricted access to raw Argos data;
- Missions by the DBCP Chairperson;
- Iridium upgrades for the DBCP Iridium Pilot Project; and
- Approval of draft documents such as the DBCP brochure and the DBCP Operating Principles prior to their submission to the full Panel.

4.3.3 The Panel agreed with these actions and expenditures and thanked the Executive Board for its efficient work on its behalf during the intersessional period.

5. REPORT FROM THE TECHNICAL CO-ORDINATOR

5.1 The Technical Co-ordinator (TC) of the Data Buoy Cooperation Panel (DBCP), Ms Hester Viola, reported on her activities during the period from 1 September 2007 to 31 August 2008. During this time, Ms Viola was stationed at CLS Toulouse, France and was employed by UNESCO.

5.2 This year, changes had occurred within the JCOMMOPS, which meant that next year, nominally one third of her time would be allocated to the OceanSITES Project Office support instead of the JCOMM Ship Observations Team (SOT). There would be a period of several months when a significant amount of time would be spent working with the Argo TC on transitioning SOT activities and knowledge. This year, JCOMMOPS is being joined by a half-time technical person – Mr Laurent Cros from CLS.

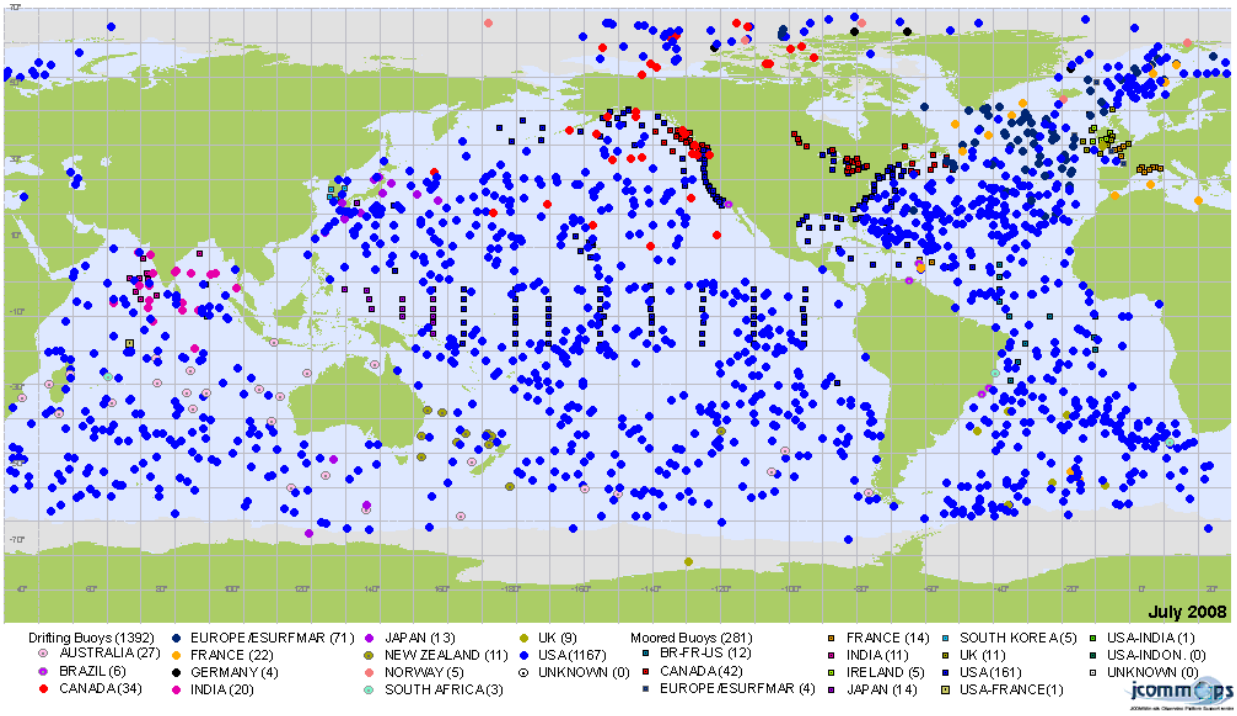
5.3 During the previous year, Ms Viola's time (relating to DBCP) was spent in the following ways:

- User assistance;
- JCOMMOPS - information system operations and maintenance (database, new web server, metadata uploads and reporting);
- Producing monthly maps;
- DBCP Iridium Pilot Project Technical Coordination;
- Working on Metadata within JCOMMOPS database;
- Looking at GTS (new data and delays) and Quality-Control Relay traffic;
- Loading monthly Buoy Monitoring statistics into the JCOMMOPS database;
- Maintaining mailing lists, contact details and user groups on DBCP, JCOMMOPS and JCOMM websites;
- Seeking new deployment opportunities and communicating them to buoy operators;
- Maintaining and updating websites (DBCP, JCOMMOPS, SOT, and Ship of Opportunity Programme (SOOP) sites);
- Producing reports and maps, as required, as well as a quarterly report on work undertaken;
- Attending monthly meetings with CLS and IOC;
- Preparing for and attending meetings; and
- Preparing for the DBCP session.

5.4 The TC outlined the status of the global buoy network and mentioned some of the tasks completed during the intersessional period. She then highlighted some of the issues that required action by the Panel.

5.5 The total number of buoys globally was stable in the last year (more than in the past). The Panel seems to be well prepared to maintain its network above 1250 buoys, and recently, the

spread across the globe has been fairly even, clearly showing that the efforts of Panel (the Global Drifter Program in particular) have paid off. Efforts can still be made in sharing deployment opportunities (within DBCP and with other programmes), assessment of buoy lifetimes and where buoys need to be placed, to ensure an even coverage across the globe.



Map 1: DBCP monthly status by country for July 2008.
(Data Buoys reporting on the GTS via Météo-France)

5.6 There has been a steady growth in the number of buoys reporting Air Pressure in the last year, but it was not as marked as during the previous year.

Variable	Any	Air P	P Tend.	SST	Air T	Hum.	Wind	Waves	Sub/T
Drifting Buoys	1377	603	546	1233	39	1	7	12	4
Moorings	292	200	161	256	254	151	251	186	83

Table 1: Drifting and Moored buoys – variables being reported on the GTS

5.7 The broader plan, as part of the JCOMM Observations Coordination Group's phased-in Implementation Plan, is to eventually equip at least 700 drifting buoys with barometers outside of the tropics (as of July 2008 there were ~550 = 78%, compared to ~440 last year). The Panel asked the Executive Board to address this issue and to make recommendations under agenda item 13.

5.8 Points for the Panel to discuss were highlighted, such as deployment planning and provision of metadata for moored buoys on the JCOMMOPS website. The draft DBCP logo and brochure updates were presented for comment. The TC demonstrated the proposed DBCP website structure and invited the Panel to comment on the website structure and layout. Discussion was postponed to agenda item 10.1. The extension of the DBCP, to include all moored buoys, was also considered by the Panel, as there is a significant amount of GTS data from

non-DBCP moorings / ocean platforms. This will be discussed under agenda item 6.5. Some future plans were presented and the Panel proposed priority tasks for the TC Workplan. These items are reflected in ***Annex XIII***.

5.9 The Panel noted that the JCOMMOPS Terms of Reference (TOR) required updating in order to take into account the new role of the TC with regard to OceanSITES. It requested the Observations Coordination Group (OCG) to address the issue in view to make appropriate recommendation to the third session of JCOMM (JCOMM-III, Marrakech, Morocco, 4-11 November 2009) **(action, OCG, early 2009)**.

5.10 The Panel asked the TC to assist the National Data Buoy Centre (NDBC, USA) in the design of a new Binary Universal Form for Representation of meteorological data (BUFR) template for the moored buoy data **(action, TC, October 2009)**. The Panel nominated Mr Bruce Bradshaw to participate as the DBCP representative in the JCOMM Data Management Programme Area Task Team on table driven codes and requested the Secretariat to forward this nomination to the Chairperson of the Task Team **(action, Secretariat, ASAP)**.

5.11 The Panel expressed its warm appreciation to Ms Viola for the considerable amount of work undertaken on its behalf during the past intersessional period.

6. REPORTS FROM THE TASK TEAMS

6.1 At the last DBCP session, the Panel proposed to establish Task Teams to work proactively on key issues identified by the Panel, and to ensure that the Workplan would be implemented during the intersessional period. According to the DBCP Operating Principles, also agreed upon at DBCP-XXIII, Task Team Chairpersons are appointed by the Panel and the teams report to the Panel at its regular sessions. The Panel proposed to establish Task Teams to deal with: (i) Data Management (TT-DM); (ii) Quality Management (TT-QM); (iii) Technological Developments (TT-TD); (iv) Capacity-Building (TT-CB); and (v) Moored Buoys (TT-MB). However, the Panel could not agree on definite Terms of Reference. The Panel tasked the selected Chairpersons to coordinate with identified experts, other proposed Task Team Chairpersons, the TC, and the Secretariats during the intersessional period in order to propose new and appropriate Terms of Reference and membership for discussion at this Panel session.

Task Team on Capacity Building

6.2 The Panel received with interest the report by Dr Sidney Thurston (NOAA, USA). Significant progress in the observing network in the Indian Ocean was recognized, particularly through the initiative of the Indian Ocean Research Moored Array for African-Asian-Australian Monsoon Analysis and Prediction (RAMA). Partnerships for New Global Earth Observation System of Systems (GEOSS) Applications (PANGEA) continued their CB efforts in the Indian Ocean region. The full report of the Task Team on Capacity-Building is reproduced in the accompanying CD-ROM. In closing his presentation, Dr Thurston emphasized the importance of broad regional representation in the membership of the TT, and re-invited the Panel members to participate in the work of the TT.

6.3 The Secretariat informed the Panel that the JCOMM Capacity-Building Strategy was under revision in preparation for JCOMM-III. Considering the cross-cutting nature of Capacity-Building, it was recommended that the Workplan of the Task Team take into account this process. The Panel also noted that the Capacity-Development would eventually coincide with the goals of programme outreach.

6.4 The Panel then discussed the future plans for training and workshops. It was generally agreed that the priority should be primarily placed on Africa, particularly the Western Indian Ocean and Gulf of Guinea regions. In this context, the Panel encouraged its members from these regions to become members of the Task Team and to reflect the regions' interest and requirements in the

Workplan. The Task Team was also encouraged to seek support from related regional alliances with common goals and objectives, such as the South African Development Community (SADC).

6.5 The Panel agreed to extend the Membership of the Task Team in order to include representatives from: (i) the Northern and Southern parts of the Western Indian Ocean region; and (ii) South Africa.

6.6 The DBCP Capacity-Building Task Team met to begin planning for the Capacity-Building Workshop for East and South Africa, which is tentatively scheduled to be held during summer 2009. The Workshop's goal is to build regional capacity for the East and South Africa Region and Western Indian Ocean related to climate science, observations, socio-economic applications and stakeholder outreach. The Task Team is planning for interested nations to draft their areas of interest and responsibility to be discussed at a preliminary scoping and coordination workshop to be held in early 2009 in South Africa with the expectation that practical collaborative projects can then commence soon after the summer Capacity Building Workshop. In addition to national representation from the region, large Regional Programs such as the "Agulhas and Somali Current Large Marine Ecosystem" (ASCLME) Project, the African Centre for Climate and Earth System Science (ACCESS), and others will be invited to participate.

Task Team on Data Management

6.7 Ms Hester Viola presented a written report prepared Ms Mayra Pazos (AOML, USA) on behalf of the Task Team on Data Management. The full report of the Task Team is reproduced in the accompanying CD-ROM.

6.8 The TC and joint Secretariat reported on the status of code developments for distribution of buoy data.

6.9 The Panel recommended to include a representative of the SAWS as part of the Task Team membership.

Task Team on Quality Management

6.10 Dr Bill Burnett (NDBC, USA) presented a report on behalf of the Task Team on Quality Management. The full report of the Task Team is reproduced in the accompanying CD-ROM.

6.11 The Panel recalled the recommendation from the Task Team that buoy operators should make efforts to recover as many drifters as possible for post-evaluation purposes. The Panel noted that this was an expensive exercise that was not always practicable. The Panel nevertheless recommended that Panel members should attempt to recover drifters when this could be achieved in a cost-effective way.

6.12 The Panel discussed whether labels should be placed on buoys in order for those recovered on beaches or picked up by ships to have the possibility to be returned to the manufacturers. The Panel suggested that individual operators should eventually decide whether or not it might be appropriate to place labels on drifters.

6.13 The Panel requested the Task Team to address the repetitive transmission issue and to develop a recommendation statement accordingly **(action Task Team, October 2009)**.

6.14 The Panel noted the expressed need for metadata and urged the manufacturers to collaborate with buoy operators and JCOMMOPS and submit the instrument / platform metadata using the recommended mechanisms **(action, Manufacturers, ongoing)**.

Task Team on Technology Developments

6.15 Mr Jean Rolland (Météo-France) reported on behalf of the Task Team on Technology Developments. The full report of the Task Team is reproduced in the accompanying CD-ROM.

6.16 The Panel requested the Task Team (TT) to address the following issues and to report at the next Panel session **(action, TT, October 2009)**:

- Updating the DBCP Technical Document (TD) No. 4 (*SVPB Design Reference*) to include recommendations for reporting air pressure tendency, the encoding of missing data with all bits set to zero, as well as some recommendations on data formats (e.g., DBCP-M2 to be used with Argos data transmission, and Iridium format version 3.3);

- Evaluating the overall cost of operating large hulls vs. smaller hulls, and configuration options in general;

- Addressing standardization of Argos message formats, including for the PMT;

- Improving the reliability of operational buoys while recognizing that some of the deployments are still experimental; and

- Improving and documenting the evaluation techniques.

6.17 The Panel recommended to take into account the WMO Quality Management Framework (QMF) in the Terms of Reference for the Task Team.

Task Team on Moored Buoys

6.18 Mr Jon Turton (Met Office, United Kingdom), reported on behalf of the Task Team on Moored Buoys. The Panel agreed with the Action Plan proposed for the Task Team during the next intersessional period. In particular, priority should be placed on documenting the existing moored buoy systems and compiling and maintaining this information, preferably at JCOMMOPS. The Panel noted that this effort could also be regarded as a contribution of the DBCP to the WMO-IOC-UNEP-ICSU Global Ocean Observing System (GOOS) and the GOOS Scientific Steering Committee (GSSC). The full report of the Task Team is reproduced in the accompanying CD-ROM.

6.19 The Panel recommended that the Task Team should liaise with the ITP and buoy operators in charge of implementing Tsunami Warning Systems.

6.20 The Panel also recommended to include representatives from Canada (Mr Al Wallace), and Australia (Mr Ken Jarrott) in the Task Team.

General discussion regarding the Task Teams

6.21 Based on these reports, and discussions between the Task Team Chairpersons, and the Executive Board (including the joint Secretariat), it appeared that there was some overlap between the Task Teams on Quality Management (QM), Data Management (DM), and Technology Development (TD) regarding their Terms of Reference. There was also some overlap regarding the membership (3 to 5 persons in common between any two TTs), and especially between the Task Teams on TD and QM (5 people).

6.22 Noting that the goal pursued by the Panel in defining its working structure was to build the most effective system in order to make progress on the issues: not to multiply the number of Task

Teams, there might be some substantial advantages in merging two, or three of the Task Teams. Possible options identified were:

a) Keeping the three DM, QM, TD Task Teams and looking carefully at the Terms of Reference to avoid any duplication;

b) Merging the TD and QM Task Teams to become a "Task Team on Instrument Best Practices and Drifter Technology Developments" (e.g., 22 people);

c) Merging the QM and DM Task Teams to become a "Task Team on quality and data management" (e.g., 15 people); and

d) Merging the three Task Teams to become a "Task Team on Best Practices, and Drifter Technology Developments" (e.g., 24 people).

6.23 In spite the fact that TD was more aligned to the development of new systems while QM addressed the quality monitoring of existing systems, the discussions led to a proposal to merge the TD and QM Task Teams. For example, it was not clear with the Terms of Reference proposed at the last Panel session, which Task Team should be responsible for reporting progress on Iridium buoys, address updates required for the SVP-B manual, or look at the evaluation of lithium batteries on SVP-B (Argos or Iridium). As addressed in the report from the Task Team on Moored Buoys, technology development aspects between drifters and moored buoys systems needed to be addressed appropriately and in a way that avoided duplication. Thus, it was proposed that the Task Team on Technology developments specifically addressed the satellite data telecommunication aspects, and the technology issues directly relevant to drifting buoys. The Task Team on moored buoys would address those technology aspects more relevant to moorings (mooring technology, acquisition systems, sensor technology, vandalism proof designs, etc.), identify the best technology of the moment available and address Best Practices issues.

6.24 The Panel finally unanimously agreed to merge two of the Task Teams, refine their names, Terms of Reference and appoint Chairpersons. The four DBCP Task Teams would therefore be:

- Task Team on Instrument Best Practices and Drifter Technology Developments (TT-IBPD), chaired by Dr Bill Burnett;
- Task Team on Moored Buoys (TT-MB), chaired by Mr Jon Turton;
- Task Team on Data Management (TT-DM) (data processing and distribution of the data, GTS issues, archival of the data), chaired by Ms Mayra Pazos; and
- Task Team on Capacity-Building (TT-CB), chaired by Dr Sidney Thurston.

6.25 The adopted Terms of Reference for the Task Teams are reproduced in Annex V of the DBCP Operating Principles (***Annex III***).

7. PILOT PROJECTS

7.1 Iridium Pilot Project

7.1.1 The TC presented the current status of the buoy network within the Iridium Pilot Project: 51 active buoys (out of 75 deployed during the project) as of August 2008. The updates made to the project website were demonstrated, as well as the new automated daily status file (.csv file on the JCOMMOPS website).

7.1.2 The TC thanked the project participants for e-mailing one another to notify deployment information and committed to creating a new notification form for use by the participants for

deployment notification and planning. The Iridium Upgrade scheme offered for this pilot project had been very successful and had thus far allowed many buoy operators to test the technology.

7.1.3 The TC then presented statistics about lifetimes of project buoys by manufacturer. It was noted that some manufacturers were working very actively on improving lifetimes. The TC also noted that the data format recommended for the project had been working well for the needs of the project and had not been revised. The TC expressed her appreciation to Météo-France for undertaking GTS distribution for the project and ongoing analysis of delays and performance of pilot project buoys.

7.1.4 The coverage of the buoys was presented in a series of maps showing current positions of the buoys and historical tracks of all buoys in the project. The coverage was currently restricted to the Northern Atlantic, Southern Atlantic, Indian Ocean and small regions of the Northern Pacific. Buoys were needed in the Central and Southern Pacific and in the Central Atlantic.

CLS processing

7.1.5 CLS had implemented an Iridium processing centre and set-up an operational link between the Iridium and the Argos processing systems. As a result, drifters transmitting through Iridium could now benefit from the entire Argos processing capabilities, including GTS processing and insertion. The system had been tested with the support of Météo-France; delays were slightly higher than the existing Pilot Project processing system, but were still acceptable. The sources of the additional delays were being investigated by CLS.

7.1.6 As offered by CLS at the previous DBCP session, data processing will be free of charge for drifters deployed during the duration of the IPP project (i.e., until end July 2010 for drifters deployed up till end July 2009). Pilot Project participants will continue to pay for airtime via their Iridium Value Added Reseller (VAR) (CLS or other).

7.1.7 CLS confirmed that in the future, they would be able to accept data formats other than the one recommended by the pilot project, if and when required by buoy operators or manufacturers.

7.1.8 Buoy operators opting to use the Iridium service at CLS, and who wish to request GTS distribution of the data, should follow the process below:

a.) Send an e-mail to Mr Yann Bernard at iridium-buoy@cls.fr listing buoy modem IMEIs, corresponding WMO Numbers and details of the data format implemented on the buoy(s);

b.) Mr Bernard will respond with an e-mail address to which buoy data should be sent. This will either be sbdmail@iridium.cls.fr (if decoding of the data format is already operational), or sbdmail-qt@iridium.cls.fr (if decoding of the data format has yet to be implemented). The required e-mail address is specified by the user to his VAR; and

c.) The user should also specify the e-mail address dbcpiridium@gmail.com so that buoy traffic will be automatically captured by the DBCP archive.

7.1.9 The Panel made the following recommendations:

7.1.9.1 Project participants are asked to provide Iridium IMEI numbers to JCOMMOPS via the e-mail list iridium-pp@jcommops.org, when the numbers are received from the Iridium Provider or Value Added Reseller (VAR), preferably before the buoys are tested.

7.1.9.2 To be considered as part of the project, and for buoys to appear on maps and in status reports, the notification of deployment must be completed by the buoy operator as soon as possible after the deployment.

7.1.9.3 Buoy operators are encouraged to communicate via e-mail (iridium-pp@jcommops.org) or through the Metadata Entry tool (http://wo.jcommops.org/cgi-bin/WebObjects/meta) with approximate deployment areas for all new IMEI numbers once they are manufactured (plus ships they are going on) ahead of time. In the future, this operation can be completed via the JCOMMOPS dedicated notification page. The WMO number can then be entered upon deployment, along with details of the deployment. This information would then be automatically e-mailed to the project participants.

7.1.9.4 All manufacturers are encouraged to work together to develop the best practice concerning measures to improve buoy lifetimes and share the information with project participants.

7.1.9.5 The Panel noted that the initial target for deploying 50 units had been achieved, but that the geographical distribution was not optimal at this point. Efforts were also needed to analyze the data in order to come to clear conclusions. The Panel agreed to continue the upgrade scheme in 2009 and plan for an additional 40 units. It was agreed by the Panel that 2010 would be dedicated to the analysis effort. Meanwhile, the Panel recommended that the Pilot Project should define precise criteria for measuring success **(action, Iridium PP, October 2009)**.

7.1.9.6 The Panel noted that a number of details in the upgrade offer letter were now out of date and agreed to update the terms and conditions for the upgrade **(action, Chairperson, ASAP)**.

7.2 Argos-3 Pilot Project

7.2.1 CLS reported on the proposal to establish an Argos-3 Data Buoy Evaluation Pilot Project. It was recalled that there are currently more than 2,000 drifting buoys and 3,000 profiling floats in operation that are relaying their ocean and meteorological data via Argos-2, the second generation Argos system. The third generation Argos system, Argos-3, has been operational on one satellite since August 2007. The next satellites carrying Argos-3 will be launched in February 2009 and July 2010, respectively. According to CLS, the increased capabilities of Argos-3 should significantly improve the performance of existing Argos equipped data buoys. Argos-3 drifters were expected to be smaller and less expensive, transmit more data and have longer lifetimes. Argos-3 floats were also expected to have much shorter surface times, higher resolution profiles and significantly less energy consumption, resulting in increased lifetimes. In the expectation that DBCP members could significantly benefit from these improvements, CLS proposed the establishment of a DBCP evaluation Project, along the lines of the existing Iridium Pilot Project, to evaluate Argos-3 capabilities for the buoy community.

7.2.2 CLS proposed the following approach. With support from CLS, two drifter manufacturers and one float manufacturer were now performing the necessary engineering work to replace the standard Argos Platform Transmitter Terminals (PTTs) in their products with the new Argos-3 PMT manufactured by Kenwood. Each would develop a prototype Argos-3 platform, test it, and apply modifications if needed, then produce 10 pre-production drifters (2-3 floats) for evaluation by interested members of the community.

7.2.3 CLS believed that a DBCP Argos-3 Pilot Project was the best way to independently and objectively evaluate the Argos-3 for use by the global buoy community. Following the rationale adopted by the Iridium Pilot Project, CLS suggested that a community-wide steering group be established to: (i) identify users interested in deploying the pre-production buoys to evaluate Argos-3; (ii) define the evaluation criteria, methods and procedures; (iii) coordinate and harmonize the desired multiple evaluations; and (iv) provide a community-wide forum to present and disseminate the evaluation results and conclusions.

7.2.4 As a means of encouraging rapid implementation of the proposed project, CLS offered to provide 50 SVPs (10 buoys from each manufacturer), including 25 SVP-Bs, while the participants would support the Argos service charges. The Panel thanked CLS for this generous offer.

7.2.5 The Meeting made the following recommendation:

7.2.5.1 The Panel considered this proposal and agreed that there was a potential to increase the quantity of buoy data delivered onto the GTS as well as improving data timeliness. It therefore proposed to move immediately to the recruitment of a steering group from within the former Task Team on Technology Developments and other identified experts. Terms of Reference and Membership for the Steering Team (*to be developed during and immediately after the Panel Session*) are provided in ***Annex XII***.

7.2.5.2 The Panel was anxious to commit any necessary resources to the project in order to achieve a full and successful outcome: as a first step, it agreed to fund the equipping of the remainder of the initial fleet of 50 buoys with barometers, namely 25 buoys.

7.2.5.3 The Panel recommended to address the Argos format issues, and make recommendations **(action, Argos-3 PP, October 2009)**.

7.3 Wave observing technology developments

7.3.1 The Panel was informed of the outcome of the JCOMM Technical Workshop on Wave Measurements from Buoys, which was held in New York City, New York, United States of America, from 2 to 3 October 2008. The workshop was organized jointly with the DBCP and the JCOMM Expert Team on Wind Waves and Storm Surges (ETWS). It was noted that the results of this workshop would be published within the JCOMM Technical Report series.

7.3.2 The Panel reviewed the recommendations and actions which were delivered from the workshop. They are reproduced as ***Annex IV*** to this document. The Panel agreed that the related recommendations should be added to the DBCP and its Task Teams' Workplans, and that priorities should be clearly defined.

7.3.3 Two proposals for pilot projects were then reviewed by the Panel. After discussion, the Panel agreed to establish the Pilot Project on Wave Measurements from Drifters (PP WMD) within the DBCP framework, and to create a corresponding budget line within the DBCP Trust Fund. It also encouraged the national / regional buoy operators, manufacturers, and scientific community to participate in the Pilot Project. It was recognised that the technology proposed for wave measurement from drifters (GPS) might not be capable of yielding the desired results. The Panel therefore agreed that the ongoing funding of the Pilot Project should depend on a successful demonstration of the technology by the end of the first year.

7.3.4 The Panel also endorsed the proposal of the Pilot Project on Wave measurement Evaluation and Test from moored buoys (PP WET). Considering its cross-cutting characteristics and wide scope, the Panel agreed that this should be carried out as a JCOMM Pilot Project with a limited time scale, jointly led by DBCP and JCOMM / ETWS. The Panel also noted the close link between the objectives of this Pilot Project and DBCP Task Teams, and agreed that the relevant Task Teams should be actively involved in the implementation of this Pilot Project. It also emphasized that the implementation of this Pilot Project should be in close coordination with the Water Temperature instrument / platform Metadata Pilot Project (META-T), and should further the JCOMM components of the WIGOS. The Panel decided to reflect this activity in the Workplan and financial plan for 2009. The Terms of Reference of the two Pilot Projects are reproduced in ***Annex IV*** .

7.3.5 The Panel made the following recommendations:

- Revise the Panel Workplan, as well as the Task Teams' Workplans, taking into account the recommendations of the workshop for the implementation of the Pilot Projects;

- Establish the DBCP Pilot Project on Wave Measurement from Drifters for a period of up to three years, subject to the reservation expressed in 7.3.3, with possible provision of a one year extension afterwards;

- Allocate adequate finances in 2009 and succeeding years so that the project might get under way as soon as possible; and

- Support the establishment of the JCOMM Pilot Project on Wave measurement Evaluation and Test from moored buoys, and provide either financial or in-kind support. The PP-WET Steering Team is invited to consult with the TTs as appropriate.

7.3.6 The Panel noted that the proposed Pilot Project for wave measurements from drifters would result in proposing new fields to be included in BUFR template. It requested the TC to investigate implications and to report at the next Panel session **(action, TC, October 2009)**.

7.3.7 The Panel agreed that the existing requirements for wave observations as documented by the ETWS and JCOMM (e.g., satellite / model validation, extreme events, long period swell for the industry, climate assessment) (http://www.jcomm-services.org/ETWS-Observation-Requirements.html) should be compiled and clearly stated by the Pilot Projects as part of their documentation **(action, PP WMD and PP WET, ASAP)**.

7.3.8 The Executive Board was asked to review the proposals and make recommendations to the Panel. Further decisions and funds allocated by the Panel for these two Pilot Projects are reported under agenda item 13.6.

8. REPORTS FROM THE ACTION GROUPS

8.1 Under this agenda item, the Panel was presented with reports by its Action Groups, viz:

(i) the Tropical Moored Buoys Implementation Panel (TIP) (verbal presentation by Mr Paul Freitag, representing the TIP);

(ii) the Surface Marine programme of the Network of European Meteorological Services, EUMETNET (E-SURFMAR) (verbal presentation by Mr Jon Turton, representing the E-SURFMAR officers);

(iii) the International Buoy Programme for the Indian Ocean (IBPIO) (verbal presentation by Mr Graeme Ball, Chairperson of the IBPIO);

(iv) the DBCP-PICES North Pacific Data Buoy Advisory Panel (verbal presentation by Mr Al Wallace, Co-chairperson of the NPDBAP);

(v) the International Arctic Buoy Programme (IABP) (verbal presentation by Mr Bruce Bradshaw);

(vi) the WCRP-SCAR International Programme for Antarctic Buoys (IPAB) (no report had been presented to the Panel);

(vii) the International South Atlantic Buoy Programme (ISABP) (verbal presentation by Ms Lithakazi Mkatshwa, representing the ISABP);

(viii) the OCEAN Sustained Interdisciplinary Timeseries Environment observation System (OceanSITES) (verbal presentation by Dr Uwe Send, Co-chairperson of the OceanSITES); and

(ix) the Global Drifter Programme (GDP) (verbal presentation by Dr Lucas Centurioni on behalf of the GDP).

8.2 Summaries of the presentations are reproduced in ***Annex X***. As usual, the full reports of the Action Groups will be reproduced in the Panel's Annual Report.

8.3 The Panel deferred any proposals for the formation of new regional or programmatic Action Groups to agenda item 13.2.

8.4 Some comments and discussion followed the above presentations:

(i) E-SURFMAR: The DBCP initiative with regard to wave observations is an activity of interest to E-SURFMAR. Iridium deployments are made in the area of interest of the E-SURFMAR. However, E-SURFMAR agreed to assist with the deployment of Iridium drifters in the Equatorial Atlantic Ocean using the AMT Cruise for example.

(ii) GDP: the Panel noted with concern that the GDP level of funding was not increasing, hence limiting the number of barometers to be installed on drifters. An additional concern was the increase of the cost of drifters of the order of USD 100/unit, hence potentially leading to a decreased of the number of barometers committed by the GDP. The Panel urged members to make use of the upgrade offer by the NOAA Atlantic Oceanographic and Meteorological Laboratory (AOML) in order to continue to increase the number of barometers on operational buoys. The Panel recalled that the CBS ICT-IOS, at its fifth meeting (Geneva, Switzerland, September 2008) has recommended that: (i) all drifters be equipped with barometers; and (ii) Numerical Weather Prediction (NWP) centres engage in impact studies regarding the use of surface pressure in the presence of surface vector wind. The Panel also asked the Secretariat to make the final reports from the last workshop on the impact of observational systems on NWP (Geneva, Switzerland, 2008) available to Panel members **(action, Secretariat, ASAP)**;

(iii) IABP: There is a lack of observations from the Eurasian Sector of the Arctic Basin. The Panel noted the challenge to sustain the network beyond the International Polar Year 2007-2008 (IPY);

(iv) IBPIO: The Panel noted with concern that only 20% of the data were received within 50 minutes. In addition, a small increase was noted in RMS(Obs-FG) statistics which required investigation **(action, TT IBPD, October 2009)**. The Panel recommended that CLS continue efforts to reduce the delays regarding the Indian Ocean and to inform the Panel on how well the region will be served by Argos-3 **(action, CLS, October 2009)**;

(v) ISABP offered to assess impact of Air Pressure (AP) and Sea-Surface Temperature (SST) on NWP. It is difficult to improve the coverage of the Gulf of Guinea due to ocean circulation patterns;

(vi) NPDBAP is giving priority to installing barometers on all drifters in its area of interest. The NPDBAP also wishes to assess the impact of Sea Level Pressure (SLP) on NWP;

(vii) OceanSITES: The proposal that the TC eventually provides support to OceanSITES Project Office at a level of 30% was well received by the OceanSITES Science Team; this created momentum. NDBC is now operating a second GDAC and twelve sites will provide scientifically QC'ed data within twelve months from one source. Two working groups have been established to agree on unified QC and Best Practices. OceanSITES also agreed to follow the CLIVAR free-access data policy. OceanSITES actively participated at the JCOMM workshop on wave measurements from buoys. OceanSITES is contributing USD 30,000 to JCOMMOPS in 2008 and another USD 30,000 in 2009. DBCP members were invited to slightly increase their contributions in order to commit to the OceanSITES Project Office function undertaken by the TC; and

(viii) TIP: The Panel noted with appreciation the good progress with regard to the development of RAMA in the Indian Ocean. Vandalism continues to be an issue (e.g. mooring lines fouled with fishing lines) and proposed solutions include the design of vandalism resistant buoys.

9. INTERNATIONAL TSUNAMETER PARTNERSHIP

9.1 The Panel received a report by Mr Ken Jarrott, Chairperson of the International Tsunameter Partnership (ITP) and Vice-chairperson of the DBCP, on the tsunami warning systems and the issues arising from the discussions of the ITP. This report is reproduced in the accompanying CD-ROM.

9.2 The Panel noted that the sixtieth WMO Executive Council (EC-LX) requested JCOMM to promote cooperation between the DBCP and the International Tsunameter Partnership (ITP) with a view to better formalize, improve and understand the synergies in incorporating the tsunami warning buoys into the WMO co-sponsored Global Ocean Observing System (GOOS).

9.3 From that perspective, and recalling the discussions in this regard at the previous DBCP session, many of the present activities of the ITP relate directly to the role that the DBCP has exercised since its inception, and to its current expertise base and communal data tools. A stronger engagement with the DBCP would accelerate the ITP's work in the near term, and would continue to be advantageous in the longer term, with clear and persistent common interests. Conversely, the wider ocean observing community should find value in the ITP members' experience with mission-critical real-time data dissemination, with new observation platform developments and with additional capacity for deploying and servicing deep ocean stations.

9.4 The Panel agreed that while existing informal links between the DBCP and the ITP are of value, a more formal association would deliver greater benefits to both groups. A clear way to realise such benefits would be to incorporate the ITP as an Action Group of the DBCP. The Panel agreed that practical and more formal means for engagement and interchange between the ITP and the DBCP over the next twelve months should be pursued. The ITP governance arrangements and its reporting relationship to the tsunami warning communities should be considered in the context of international tsunami waning systems moving out of their establishment phase and into a longer term sustaining and evolution period.

9.5 The Panel therefore decided to set up a small task group, comprised of Mr Ken Jarrott (lead), and other Panel members to address these issues and report at the next Panel session **(action, Mr Ken Jarrott, October 2009)**.

10. ISSUES FOR THE PANEL

10.1 Information exchange

10.1.1 The TC reported on DBCP information exchange issues, including, and, in particular, the operation of the DBCP web server and the status of DBCP publications.

10.1.2 The Panel was reminded that the official address for the DBCP website is as follows: http://www.jcommops.org/DBCP/. It is a dynamic website embedded in the JCOMMOPS system. It should be noted that all older web addresses have been discontinued and redirect to JCOMMOPS accordingly. Specific pages of this website have been updated to reflect recent changes (i.e., some re-wording, cosmetic changes and restructuring for clarity and to reduce duplication). A new structure and mock-up of type of layout was presented to the Panel.

10.1.3 The Panel recommended that the DBCP website could be redesigned with improved (e.g., faster response) and more simple navigation, but that it should remain consistent with the JCOMM website and that required developments should be cost-effective and well coordinated with IOC **(action, JCOMMOPS, October 2009)**.

10.1.4 The JCOMMOPS "News" section includes a DBCP specific news section directly accessible via:

http://wo.jcommops.org/cgi-bin/WebObjects/JCOMMOPS.woa/wa/news?prog=DBCP.

Panel members interested in having news published via the DBCP news section are invited to provide the TC with one page of text plus one or two pictures.

10.1.5 The DBCP mailing lists have not changed this year, though some were created on the JCOMMOPS e-mail server for OceanSITES to assist in communication between participants. Details on the mailing lists, and how to register, can be obtained at: http://www.jcommops.org/mailing_lists.html#DBCP (information on other JCOMMOPS mailing lists, including for SOOP, Argo, JCOMM and the SOT can also be obtained from this web page). All attendees at the Panel session will be included on the list: dbcp@jcommops.org.

10.1.6 Regarding the brochure, the Panel agreed on the following:

- The audience is basically ship captains, ship operators, and Port Meteorological Officers (PMOs) involved with the deployment of drifters;
- Some information on vandalism should be included (e.g., do not damage);
- There is no need to include information on the Panel's structure;
- Information on the use of the data and benefits for maritime safety, as well as socio-economical benefits, is useful information to include (e.g., how the data are going to impact those at sea);
- The TC should liaise with the SOOP Implementation Panel (SOOPIP), which had recently redesigned its brochure;
- The size of the brochure should be limited to two pages and the brochure provided in paper form. The Panel thanked Australia for its kind offer to print the brochure as a contribution in kind; and
- An additional, more complete, 4-page brochure targeting a larger audience should also be produced but would be made available in electronic form only (.pdf).

10.1.7 New DBCP-related publications and revisions to existing documents were outlined.

Revisions to DBCP Publications:

- DBCP Technical Document No. 3: *Guide to Data Collection and Location Services* using Service Argos is currently under review with CLS.

Recent DBCP Publications:

- DBCP Technical Document No. 33, *DBCP Annual Report* for 2007;

- DBCP Technical Document No. 32, *Presentations at the DBCP Scientific and Technical Workshop* (Jeju, Republic of Korea, 15-16 October 2007);

Other DBCP related documents:

- The Review of Satellite Communications Systems can be located under: http://www.jcommops.org/doc/satcom/satcom.pdf ; and

- A draft of the DBCP brochure has been prepared and was presented at the meeting.

10.2 Deployment opportunities and strategies

10.2.1 The TC reported that she had sent deployment opportunity information via the monthly e-mail to the DBCP community, and that some Panel members had provided information in response to this.

10.2.2 Some of the new deployment opportunities had been communicated via e-mail to individual or groups of buoy operators as they were discovered. The TC outlined new opportunities, and reminded the Panel about the Argo Deployment planning application.

10.2.3 New possible sources of deployments this year include:

- Maintenance cruises for the TAO extension in the tropical Indian Ocean (RAMA);

- Cruises of German research vessels (IFM-GEOMAR) POLARSTERN, METEOR & MERIAN, SONNE & POSEIDON;

- Japan has several Arctic cruises that could be used to deploy buoys in the Northern Pacific Ocean. The ship in use for the next two years is the MIRAI;

- The DART Tsunami buoy deployment and maintenance cruises will provide an ongoing opportunity in the Pacific and Central Atlantic Oceans. Cruise planning is completed each year by the NOAA National Data Buoy Centre (NDBC); and

- The Partnership for Observation of the Global Oceans (POGO) Research Cruise database contained information which could be of use to Panel members. Panel members can also enter information about cruises for others to use via: http://www.pogo-oceancruises.org/cruises/.

10.2.4 It is important to note that DBCP and Argo have now both completed their desired arrays in terms of numbers, but that the Argo array does not have the same gaps as the DBCP array. Combined deployment opportunities are possible and could be mutually beneficial. The TC offered to look at this issue as a matter of priority, in liaison with the Argo TC and platform operators **(action, TC, October 2009)**.

10.2.5 The Argo Project has implemented advanced planning for deployments of floats in the future, which can assist in sharing ship time and deployment opportunities with colleagues. The DBCP could equally implement a similar deployment planning process to identify gaps and

help find opportunities for shared ship time with Argo. For example, the Iridium Pilot Project buoys could serve as a starting point for this, to assess if it is feasible. An alternative target area might be the North Pacific / Arctic, where planning is completed each year by the IABP, but not integrated into JCOMMOPS systems or maps.

10.2.6 The DBCP TC's work on OceanSITES may also present more deployment opportunities in future.

10.2.7 The Panel noted with appreciation that, at the JCOMM Workshop on Wave Measurements from Buoys, the OGP had offered deployment opportunities within the Gulf of Guinea.

10.3 Data timeliness, and GTS data dissemination

10.3.1 The TC reported on the present status, and possible future improvements in the network of delayed-mode (global) and real-time (regional) ground receiving stations for observations received via Argos. She also presented the present status of the GTS delays encountered by observations received by both Argos and Iridium.

10.3.2 On average, GTS delays have decreased in the last year and CLS had set up a monitoring system for assessing the sources of delays. The TC reported that she had been using the tool – the Delay Monitoring System - and had defined some additional requirements, which should be incorporated later in 2008. CLS had identified that there was a delay in transferring the GTS data from the Argos system to Météo-France, which will be investigated in due course.

10.3.3 However, significant delays can still be seen in the Indian Ocean, Central / Southern Atlantic, Southern Pacific and Mediterranean. As there are no additional Local User Terminals (LUTs) planned to serve these areas, buoy operators are encouraged to consider deploying Iridium drifters in these regions. The Panel was very concerned that the issue, although addressed by CLS to some extent over recent years, had not yet been resolved in terms of significantly improving data timeliness for buoys reporting from these areas.

10.3.4 The Panel then noted and discussed the following GTS-related issues:

- Duplicate (SHIP) messages created by EDZW (Offenbach) and potential issues for network monitoring;

- Allocations of Long WMO numbers (7 digits), strictly for buoys reporting in BUFR, may have implications for data centres. The Panel requested the Secretariat to write to the National Focal Points (NFPs) for buoy programmes, provide them with the list of blocks allocated to each country, and ask them to release unused WMO numbers if possible **(action, Secretariat, early 2009)**;

- GTS distribution of Chinese Drifting Buoys;

- Coastal Moorings, Oil Platforms and "Mooring-like" platforms within the DBCP network monitoring;

- TC assistance to Colombia and Peru, which had sought advice on how to share their data on the GTS; and

- The TC's attendance at the meeting of the Expert Team on Data Representation and Codes, to present requirements for BUFR amongst the JCOMM Community. The TC noted that a new BUFR template was put forward by the team for Tsunameter Buoy data, and the BUFR template to represent WAVEOB messages was reviewed and changes requested (both by the Australian Bureau of Meteorology). The Australian Bureau of Meteorology (BOM) asked that the DBCP

review the new / modified templates in order that they serve the needs of the community. The TC further asked that Panel members assist her with this issue.

10.3.5 The Panel noted with appreciation that the SAWS proposed to purchase three LUTs (Gough, Marion and Antarctica) and was planning to install them as of April 2009. Further discussion regarding the LUTs appears under agenda item 11.3.

10.4 Vandalism

10.4.1 The Panel reviewed actions undertaken during the last intersessional period for preventing vandalism on data buoys (e.g., advertisement of data buoy use, education and vandalism-proof designs) and considered their effectiveness. The TC presented information on distribution of the brochure prepared to counter vandalism on buoys, and then outlined some planned work relating to Best Practices and Standards. The Panel noted with appreciation that CLS had translated the DBCP Vandalism Brochure into Japanese and asked its regional offices to distribute it to fishing fleets. The Panel thanked CLS for this action.

10.4.2 The Panel agreed that it would be useful to investigate the production of specific video clips showing buoy deployments and providing information about the use of buoy data, including weather forecasts and maritime safety. Such clips could then be broadcast or otherwise publicised to fishing communities in their local language.

10.4.3 For those cases where the platforms implemented high data rate Iridium telecommunications, it was proposed to investigate installing webcams onboard the buoys, and regularly transmit images to shore. This could potentially permit to identify those vandalizing the buoys, or at least deter them from doing such acts.

10.4.4 The Panel asked Mr Ken Jarrott to make proposals for an anti-vandalism strategy and report at the next Panel session **(action, Mr Ken Jarrott, October 2009)**.

10.5 Metadata

10.5.1 The Panel was briefed on the progress of the buoy metadata collection scheme implemented at JCOMMOPS. Buoy operators are encouraged to communicate via e-mail (support@jcommops.org) or through the Metadata Entry tool (http://wo.jcommops.org/cgi-bin/WebObjects/meta) with metadata for planned or newly deployed buoys – especially moored buoys not using the Argos system.

10.5.2 The TC thanked those moored buoy operators who already do this and encouraged the others to use similar methods as well. The TC mentioned that in addition to the existing methods, she had developed an Excel spreadsheet which can be used to record the metadata required and generate a .csv file which can be e-mailed to JCOMMOPS. The TC can provide a copy (plus advice and user assistance) to anyone interested in providing metadata to the TC in this way.

10.5.3 The Water Temperature Instrument / Platform Metadata Pilot Project (META-T PP) has defined requirements for the metadata that should ideally be sent with a GTS message to support data users' needs. The traditional BUOY GTS code does not support this; however, BUFR messages can include such metadata. The TC noted nonetheless that the BUFR template currently in use does not include all of the metadata needed. The Panel requested the TC to work with Panel members and with the WMO Commission for Basic Systems (CBS) Expert Team on Data Representation and Codes (ET/DRC) to define requirements for metadata as part of the BUFR template for buoy data, and to propose a new template **(action, TC, Mid-2009)**.

10.5.4 The goal of gathering metadata for buoy platforms at JCOMMOPS is to make the information available to data processing centres and for future analysis of the datasets by modellers or climatologists. The JCOMMOPS will routinely provide the metadata to the Ocean Data Acquisition Systems (ODAS) metadata servers, which will be developed as part of the

META-T Pilot Project (USA and China). To implement this, the JCOMMOPS needs to undertake some technical development in the coming months, which the TC will coordinate.

10.5.6 The Panel once again urged platform operators to provide the metadata to JCOMMOPS **(action, members, ongoing)**.

10.6 Technological developments in support of user requirements

10.6.1 The Panel discussed recent technological developments or plans for new developments to support user requirements (NWP, ocean modelling, climate variability and predictability, climate forecasting and ocean research) in the most cost-effective way.

10.6.2 The Panel recalled the discussions under agenda item 7.3. The Panel discussed how to follow up regarding the development of cost-effective wave observing technology, and / or opportunities to organize other data users and technology workshops linked with the DBCP capacity-building activities.

10.6.3 The TC reported that improvements in Iridium buoy technology (lifetimes, reliability, message formats, etc.) had been the focus for most manufacturers in the last year.

10.6.4 The Panel recalled the discussions at its previous session where it reviewed again the requirements expressed by the GCOS-GOOS-WCRP Ocean Observations Panel for Climate (OOPC) at its twelfth session (OOPC-XII, Paris, France, 2-5 May 2007). These included, in particular, the recording and transmission of hourly SST data in order to be able to resolve the diurnal cycle of the SST with the accuracy required by the GODAE High-Resolution SST Pilot Project (GHRSST). The Panel had noted that the PTT real-time clock could be used with sufficient accuracy. On the other hand, more accurate real-time clocks had already been installed on some prototypes.

10.6.5 During the last intersessional period, Dr Craig Donlon, Director of the Group for High-Resolution SST (GHRSST) International Project Office, wrote to the DBCP Chairperson in order to refine those requirements and formally ask the DBCP to consider addressing them through the development of appropriate technology. The letter resulted in some informal discussions between DBCP and GHRSST experts.

10.6.6 The Panel requested that the TC to coordinate with appropriate experts and to develop a new document summarizing requirements for the reporting of high-temporal resolution SST data **(action, TC, ASAP)**. A fuller discussion of this issue appears under agenda item 12.5.

10.6.7 The Japan Agency for Marine-Earth Science and Technology (JAMSTEC) had developed a drifting buoy with a CO_2 sensor onboard. They would also like to include a barometer port. In this context, the TC provided contact details of manufacturers who could assist them with this issue. The TC will also work with them to encourage the insertion of the data onto the GTS **(action, TC, October 2009)**.

10.7 Instrument Best Practices

10.7.1 The Panel considered possible actions related to the documentation on instrument calibration, Best Practices and Standards for implementation of buoy networks, which might eventually benefit both global and coastal applications.

10.7.2 The Panel recalled, in particular, that the Meeting of the joint Steering Group for the Ocean Data Portal (ODP) and the WIGOS Pilot Project for JCOMM (Geneva, Switzerland, 18-19 September 2008) had recommended that the JCOMM Observing Panels (DBCP; SOT, Global Sea-level Observing System - GLOSS) and associated programmes (International Ocean Carbon Coordination Project – IOCCP -, OceanSITES, Argo) address the issue of documenting their Best Practices in light of the WIGOS developments. A strategy was proposed for the updating of the

WMO *Guide to Meteorological Instruments and Methods of Observation* (WMO Publication No. 8) to better integrate oceanographic issues. Future updates should eventually be submitted through the JCOMM Focal Point on CIMO matters (Dr Teng, NOAA / NDBC) and the WMO Commission on Instruments and Methods of Observation (CIMO) Focal Point for WMO Publication No. 8.

10.7.3 The Panel invited buoy manufacturers to investigate participating in the Association of Hydro-Meteorological Equipment Industry (HMEI - http://www.hydrometeoindustry.org/) as a way to be represented at JCOMM meetings **(action, Manufacturers, October 2009)**.

10.7.4 See also agenda item 12.6 for further information related to Best Practices.

10.8 Other issues to be discussed, as proposed by the Task Teams and Action Groups

10.8.1 The Panel considered other technical issues requiring international coordination or action. In particular, it reviewed issues raised by the Task Teams.

Quality Management issues

10.8.2 The TC recalled that systematic errors are reported either via a dedicated web page or through the buoy-qir@vedur.is mailing list. Information regarding the present quality of buoy data was summarized for air pressure and sea-surface temperature.

10.8.3 The TC reported that there was good utilization of the Quality Control (QC) Relay tool (http://wo.jcommops.org/cgi-bin/WebObjects/QCRelay) this year for buoy data quality feedback. Figures for each country were outlined. Most operators responded very quickly to the reports. The TC made some improvements to the web interface for this tool during the year, based on user requests, but broader updates are planned for JCOMMOPS platforms as a whole.

10.8.5 The TC also presented an overall summary of buoy quality. The quality of buoy data, air pressure and sea-surface temperature remained very good this year. The number of accepted observations increased for all parameters.

10.8.6 Recalling the discussion under agenda item 8.4, and the report from the GDP, the Panel recognized that the number of barometers installed on operational buoys were likely to decrease in the near future, unless steps were taken soon by the National Meteorological and Hydrological Services (NMHSs) to purchase more barometer upgrades. The Panel requested the WMO Secretariat urgently write to key NMHSs in order to seek their commitments on this matter (**action, WMO Secretariat, ASAP**).

(The Executive Board meeting took place separately after discussing agenda item 10 in plenary and before discussing item 11)

11. INFORMATION REPORTS

11.1 Argo

Argo status

11.1.1 Dr Uwe Send (SIO, USA) presented a report on behalf of the Argo Steering Team regarding the status of the Argo profiling float project and its future plans. In November 2007, Argo reached the 3000th active float goal, and currently has around 3200 floats deployed in the world's oceans. So far this year, 215 floats have been deployed in the Pacific Ocean, 188 in the Atlantic Ocean and 66 in the Indian Ocean. Additionally, a few floats have been deployed in the Arctic Ocean and the Mediterranean Sea. The total number of floats is close to 500 float deployments for the year, compared to a deployment goal of ~800 per year.

11.1.2 Almost 90% of Argo profile data are available to users within 24 hours of a profile being made. These data are subject to similar integrity and quality checks as the real-time Expendable Bathy-Thermograph (XBT) data stream. However, some salinity sensors drift with time due to biological fouling and physical deformation. The backlog of data needing delayed-mode corrections for these errors has been reduced. Currently, 53% of the floats needing to be put through the delayed-mode quality control process have been completed. While this number is up from last year's 47%, more work needs to be done to reduce the backlog of files needing to be examined.

11.1.3 Float technology is an important part of the Argo array, and there have been significant developments over the past year to improve float lifetime and range. A new generation PROVOR float prototype, named the ARVOR, has successfully completed over 200 cycles, and more of these prototypes will be tested this year. APEX floats have been successfully modified to profile to 2000 m from anywhere in the world, as per the Argo standard mission. The third other major float type that comprises the array, the SOLO, also has a new float called the SOLO-2 under development, which is more efficient and can profile to 2000 m anywhere.

Argo plans

11.1.4 With the accomplishment of many of the original objectives of Argo, the Panel noted that it is now time to examine the array and the data it produces more closely in order to move towards a sustainable array. For example, even though there are over 3000 active floats, the float distribution can still be improved. While Argo has unprecedented coverage of the southern hemisphere oceans, with over half of active floats south of the equator, it is planned to increase coverage further in the South Atlantic, South Indian and Southern Ocean. Even with the high rate of real-time profiles on the Global Data Assembly / Acquisition Centres (GDACs) and the increased number of delayed-mode profiles available, Argo still continues to improve the quality and timeliness of both real-time and delayed-mode data. For instance, Argo has begun collaborating with its user community in order to develop additional quality control checks, including a method of comparing sea level anomalies from satellite altimetry to dynamic height anomalies from Argo profiles to identify suspicious floats.

11.1.5 Demonstrating the value of Argo data remains a high priority of the Argo program. With a global array in place for over four years, researchers are able to use Argo data to investigate global and regional phenomena, with over 100 papers published using Argo data in 2007 alone. The broad range of research topics includes: (i) water mass properties and formation; (ii) air-sea interaction; (iii) ocean circulation; (iv) mesoscale eddies; (v) ocean dynamics; and (vi) seasonal-to-decadal variability. Over fifteen operational agencies around the world ingest Argo data into models, for ocean state estimation, short-term forecasting and seasonal-to-decadal prediction. (See http://www-argo.ucsd.edu for links to all operational centres known to be using Argo data). Already, operational centres including the NOAA National Center for Environmental Prediction (NCEP), the European Centre for Medium-Range Weather Forecasts (ECMWF), and the U.K. Met Office are reporting improvement in their products due to the impact of Argo data.

11.1.6 The Argo Steering Team will present a paper at the GODAE Final Symposium in November 2008 and will solicit feedback on how well Argo is meeting user requirements. In March of 2009, the Second Institute of Oceanography in Hangzhou, China, will be hosting the third Argo Science Workshop, whose theme is, "The Future of Argo". Authors are invited to send abstracts for talks and posters on topics that make use of Argo data. Feedback from this workshop will be used to plan for OceanObs'09 where Argo will also be submitting a paper discussing its objectives and evolution for the next decade.

Argo Information Centre (AIC) / JCOMMOPS

11.1.7 The Panel noted that Australia, Canada, China, France, Germany, India, the Republic of Korea, United Kingdom and the United States of America are making annual contributions to the AIC / JCOMMOPS.

11.1.8 The Panel also noted that the Argo Steering Team (AST) agreed in principle to expand the Argo TC's activities to encompass SOT coordination. The Panel discussed how properly to identify SOT funding (today embedded in the DBCP Trust Fund) as a contribution to the Argo Trust Fund. A new Information Technology (IT) person started to work for JCOMMOPS as of September 2008. The Argo TC will train this IT expert on JCOMMOPS technologies. This new resource will permit JCOMMOPS to achieve further integration of its services and web products.

11.1.9 The Panel noted that the AIC monitoring tools are still gradually being improved. Progress can be measured through the AIC Monthly Report. Argo program managers, platform operators and data managers regularly use this report: see

http://argo.jcommops.org/FTPRoot/Argo/Doc/2008-07-AIC.pdf.

11.1.10 The Panel discussed the progress made regarding Argo deployment planning (via the AIC tools) and encouraged buoy operators to provide JCOMMOPS with deployment plans in advance. Whatever the tools available may be, the TC is the key to maintain planning information through a privileged link with platform operators.

11.1.11 The Panel noted that AIC developed a near-operational Support Centre, including a mechanism to relay data user feedback's to Argo data producers (see http://support.argo.net). AIC / JCOMMOPS was supporting WMO in allocating WMO Identification Numbers (IDs) for most of Argo components. Every three years, large ranges of IDs are reserved by JCOMMOPS, based on national requirements, and allocations are made ad hoc by JCOMMOPS; requests and allocations are archived in the JCOMMOPS database.

11.1.12 The Panel noted that Resolution XLI-4 of the IOC Executive Council recognized Argo as a "programme" to be sustained, acknowledged the work of the AIC (within JCOMMOPS), and adopted "Guidelines for the Implementation" of Resolution XX-6 of the IOC Assembly regarding the deployment of profiling floats in the high seas. This means that the IOC / Advisory Body on the Law of the Sea (ABE-LOS) will begin to work on the other means (e.g., drifters).

11.1.13 The Panel also noted the development of the Argo Donor Programmes, despite difficulties inherent to capacity-building initiatives. In particular, five floats were donated to the Kenyan Meteorological Department (under WMO auspices), and have been waiting for a deployment opportunity for a year.

Conclusions

11.1.14 The Panel agreed that there were important areas of intersection between Argo and DBCP, such as global deployment and ocean surface layer sampling, and that JCOMMOPS would be a key element in such cooperation, providing integrated monitoring / planning tools and coordinating the use of existing and new deployment opportunities.

11.1.15 The Panel also agreed that present DBCP deployment planning mechanisms could be improved further to benefit both programs. It requested the TC to investigate the issue (**action, TC, October 2009**).

11.1.16 The Panel agreed that Argo and DBCP should develop coordinated objectives for surface layer sampling. This relates to the discussion under agenda item 12.5.

11.2 Buoy data management centres

11.2.1 The Panel reviewed the report 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. Mr Bruce Bradshaw from ISDM presented this report.

11.2.2 The Panel noted with appreciation that ISDM was working towards provision of the data through WIS as a contribution to WIGOS.

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

11.2.4 The Panel thanked both centres for their reports. These reports are reproduced in the accompanying CD-ROM.

11.2.5 As noted at the previous DBCP session, the two respective IODE and JCOMM centres are completely separate but provide similar functions. The Panel requested again the two centres to liaise between themselves and to work out a better strategy for providing a coherent system for archiving the buoy data **(action, RNODC / DB and SOC, October 2009)**.

11.3 Argos operations and developments

11.3.1 Messrs Bill Woodward and Christian Ortega presented a report from CLS / Service Argos, on 2007 - 2008 operations and system improvements. The report provided details regarding the operation of the Argos system over the past twelve months, including, in particular: (i) status and plans for Argos satellite constellation; (ii) global and regional network of receiving stations; (iii) recent developments with regard to the Argos GTS sub-system; (iv) Argos developments and the future Argos GTS data processing system; and (v) future Argos requirements including those relating to the next generation "Argos-4".

11.3.2 The Panel noted with appreciation the successful implementation of the new Argos data processing system and its relevance to GTS processing. It also thanked CLS for developing tools for the monitoring of the performances of the real-time antennas.

11.3.3 The Panel requested that the DBCP Chairperson to write a letter to the NOAA National Environmental Satellite Data and Information Service (NESDIS) regarding the issue of accessing the NOAA Satellite data via the Svalbard receiving station **(action, DBCP Chairperson, ASAP)**.

11.3.4 The Panel noted with concern that the data availability delays in the Indian Ocean region were still not acceptable for operational purposes. As a result of the close monitoring of the real-time stations of the network, it appears that some stations deliver data to CLS with huge delays which make them useless for this purpose. This is, in particular, the case in the Indian Ocean. CLS is working in close collaboration with the antenna operators (advice, coding assistance) and is confident that these problems will be solved before the end of this year. The Panel asked the TC to closely monitor those actions as well as data timeliness and report at the next Panel session **(action, TC, October 2009)**.

11.3.5 The Panel adopted a common position for buoy operators with regard to the forthcoming Argos Joint Tariff Agreement meeting and made the following recommendation:

- CLS to improve data timeliness in areas where deficiencies have been identified (Indian Ocean; Central / Southern Atlantic, Southern Pacific and Mediterranean), propose an action plan, and report at the next Panel Session; priority should be placed at reducing delays in the Indian Ocean.

11.4 Iridium operations and developments

11.4.1 The DBCP Chairperson presented an overview of the current status with regard to the operations and development of the Iridium satellite telecommunication system.

11.4.2 The Panel noted that the Iridium satellite system continued to provide a viable and inexpensive service for data collection from data buoys. This had been clearly demonstrated

through the DBCP Iridium Pilot Project, as discussed elsewhere, and by a number of other studies. The recent acquisition of Iridium by a large venture capital company (GHL Acquisitions) seemed to clear the way for the funding of a replenishment constellation (Iridium NEXT) to deal with the expected outages in coverage that are expected to appear from 2014 onwards. Unusually, these satellites might also carry embarked environmental payloads under a free-launch scheme, with Iridium recovering costs through communications levies.

11.4.3 The Panel noted that Iridium positions, because of inadequate accuracy, were not currently being used for oceanographic purposes by AOML. The Iridium Pilot Project was tasked to study this issue, and investigate whether technical solutions could be proposed to address the oceanographic requirements within the constraints of the overall energy budget **(action, Iridium PP, October 2009)**.

11.4.4 Overall, the Panel welcomed the efforts that were being made, through its Pilot Project and elsewhere, to extend the use of Iridium for environmental purposes, and asked to be kept informed of developments in this area. It also asked interested Iridium Value Added Resellers to work with it in the creation of seamless services for data collection and dissemination.

11.5 Additional reports to be presented, as required

11.5.1 Under this agenda item, the Panel discussed Inmarsat-D/ISAT-M2M. The Panel had been aware of this system for some time, essentially a low data rate pager system using the Inmarsat constellation of four geostationary satellites. Recent enhancements to the system, now called ISAT-M2M, could make it an attractive option to data buoy operators requiring neither polar coverage nor data rates of more than a few hundred bytes per day. Indeed, a widely used application of the system was by deep-sea fishermen tracking Fish Aggregation Devices (FADs), using a GPS / ISAT-M2M equipped buoy not unlike an SVP-B in both appearance and size. Following a brief presentation on ISAT-M2M and its 2-way capabilities by Mr David Meldrum, the Panel noted a potential interest in the system and asked that both it and the satellite communications document on the DBCP website be kept up-to-date with developments.

12. ORGANIZATIONAL ISSUES

12.1 JCOMM activities

12.1.1 The Secretariat reported briefly on activities under or associated with JCOMM that had taken place since DBCP-XXIII, and were of direct interest to the Panel. Several meetings had taken place during the intersessional period, involving JCOMM Panels and Programmes, as well as other relevant bodies.

12.1.2 The Panel noted in particular the recommendations from the sixth session of the JCOMM Management Committee (MAN-VI, Paris, France, 3-6 December 2007) that JCOMM should review and align the current JCOMM Work Programme with the two organizations' Expected Results. MAN-VI also agreed that the OPSC process provided an adequate review of JCOMMOPS as requested by JCOMM-II. The Committee agreed that it needed to develop a catalogue of *JCOMM Standards and Best Practices*, and recommended to hire a consultant for one month to undertake the work, which should be completed, and the catalogue published on the web, prior to JCOMM-III (Marrakech, Morocco, 4-11 November 2009). The Panel agreed to contribute to this work as appropriate, and requested that the TC seek information from Panel members on data buoy-related instrument Best Practices, calibration procedures, and standards for inclusion in the *JCOMM Catalogue of Best Practices and Standards* **(action, TC, End-2008)**.

12.1.3 The Panel also noted the development of a plan to define a standards accreditation as well as a standards development process for ocean data management under JCOMM and IODE. It also recognized that the standards process was regarded as a contribution to the ODP-WIGOS Pilot Project for IODE and JCOMM. These issues are discussed under agenda items 10.7 and 12.6, respectively.

12.1.4 The Panel noted the cooperation between the JCOMM Expert Team on Marine Climatology (ETMC) and the ETWS for the development of a database of extreme wave events, as well as the development of marine climate indices in collaboration with the joint CLIVAR / CCl / JCOMM Expert Team on Climate Detection and Indices (ETCCDI).

12.1.5 The Panel noted the development within the JCOMM Data Management Programme Area of a document that explains how marine data can be distributed in both real-time and delayed-mode. It invited the TC and Dr Bill Burnett to participate in this exercise from a data buoy perspective **(action, TC and Dr Bill Burnett, October 2009)**. This will contribute to a catalogue of Best Practices being assembled by the JCOMM Management Committee.

User requirements (JCOMM Statement of Guidance)

12.1.6 The Panel noted the updated Statements of Guidance (SoG) reviewed and endorsed by the fourth session of the CBS Expert Team on the Evolution of the Global Observing System (ET-EGOS-IV), which was held in Geneva, Switzerland, 7-11 July 2008. There are three major met-ocean application areas that critically depend on highly accurate observations of met-ocean parameters: (a) Numerical Weather Prediction (NWP); (b) Seasonal to Inter-annual Forecast (SIA); and (c) Met-Ocean Forecasts and Services (MOFS), including marine services and ocean mesoscale forecasting. All Statements of Guidance (SoGs) are gap analysis, and include recommendations to address identified deficiencies to meet the user needs.

12.1.7 The Panel agreed that the Requirements for Seasonal to Inter-annual Forecast were relatively well addressed by the Panel through the implementation of the JCOMM Observations Programme Area (OPA) Strategic Work Plan for Building a Sustained Global Ocean Observing System in Support of the Global Earth Observation System of Systems. The latter is strongly supporting the GCOS Implementation Plan for the Global Observing System for Climate in support of the United Nations Framework Convention on Climate Change (UNFCCC) (GCOS-92). With regard to Numerical Weather Prediction, the Panel agreed that the requirements were already being considered by the Panel through its plan to upgrade all drifters with barometers as part of the DBCP Implementation Strategy.

12.1.8 However, the Panel noted that the SoG for Ocean Applications specifically addressed the requirements for met-ocean forecasts and services and that these had not been properly considered until now and could provide appropriate input for a future version of the JCOMM OPA Strategic Workplan.

12.1.9 The Panel noted the following identified gaps from the JCOMM SoG:

- Wave observations: In situ measurements are currently too sparse in the open ocean. Satellite bias correction validation requirement is for average 1000 km spacing with minimum 10% / 25 cm accuracy for wave height and 1 second for wave period;

- Sea level observations: Tsunami and storm surge-prone basins (e.g., Bay of Bengal, Gulf of Mexico and Pacific Islands) require higher density of sea level observations accompanied by observations of atmospheric pressure, and if possible winds and other environmental parameters;

- SST observations: Metadata are required for the resolution of the diurnal cycle and the foundation temperature. There is a requirement for high-quality SST in open-ocean, ideally with accuracy < 0.1 °C on 5 km spatial scale, and fast delivery (availability within 1h);

- Wind observations: Fixed and drifting buoys and Voluntary Observing Ship (VOS) outside the tropical Pacific provide observations of marginal coverage and

frequency; accuracy is acceptable. Wind observations from drifting buoys are poor in terms of spatial coverage; and

- Surface pressure observations: spatial coverage is marginal for marine services applications. Mean sea level pressure is vital to detect and monitor atmospheric phenomena over the oceans (e.g., tropical cyclones) that significantly constrain shipping. As stated in the SoG for Synoptic Meteorology, even very isolated stations may play an important role in synoptic forecasting, especially when they point out differences with NWP model outputs.

Strategy and Outreach

JCOMM Strategy

12.1.10 The Panel noted the recommendation by the sixth session of the JCOMM Management Committee (MAN-VI, Paris, France, 3-6 December 2007), that the JCOMM Strategy required substantial updating to become fully consistent with the WMO and IOC Strategic plans. This will be discussed at the seventh JCOMM Management Committee meeting (Melbourne, Australia, 8-12 December 2008).

JCOMM Electronic Newsletter

12.1.11 The JCOMM newsletter has been published on relevant websites (http://www.jcomm.info/news, and http://ioc.unesco.org/jcomm/news/), and announced through an e-mail to JCOMM members, the members of all the JCOMM subsidiary bodies, the GOOS community and any others potentially interested in our work. It contains news and information on JCOMM activities, as well external events of interest to the JCOMM community. Due to staff constraints, no additional newsletter was published since the fifth issue (June 2007). The Secretariat reported that the next issue was to be published within 2008.

Website Development

12.1.12 The JCOMM website development continues. More information has been added since the last DBCP session (see http://www.jcomm.info). In particular, the Expert Teams, their Terms of Reference and membership can be found here. The JCOMM Data Management Coordination Group (DMCG) is working on developing appropriate web pages for the Data Management Programme Area (DMPA).

The Meeting made the following recommendations:

12.1.13 Panel members are invited to address user requirements and particular observing systems deficiencies as expressed in the JCOMM Statement of Guidance for Ocean Applications **(action, Panel members, ongoing)**.

12.1.14 Panel members are invited to contribute to feeding the JCOMM database extreme wave events when such events are observed by data buoys and are recorded by Panel members **(action, Panel members, ongoing)**. The information should be submitted to the RNODC / DB who will forward it to the appropriate database.

12.1.15 The Panel recommended that the JCOMM Observations Coordination Group take into account requirements for met-ocean forecasts and services, and the gap analysis from the JCOMM Statement of Guidance for Ocean Applications to produce a future revised version of the JCOMM OPA Strategic Workplan **(action, OCG and OCG-III, March 2009)**.

12.2 IOC Strategic planning

12.2.1 The IOC Secretariat representative reported on activities undertaken within IOC in support of the Panel, as well as on decisions, by the IOC governing bodies with regard to the Panel during the intersessional period. The Panel recalled the IOC Resolution EC-XXXIX.1 (IOC Draft Medium-Term Strategy 2008-2013) which decided on the high-level objectives and associated activities of the Commission. It also recalled the IOC Biennial Strategy for 2008-2009, which defines Biennial priorities and expected results for the Commission for the first biennium of the period covered by the IOC Medium-Term Strategy 2008-2013, as given in the IOC Resolution EC-XXXIX.1.

12.2.2 The IOC Secretariat reported on the IOC Operating Plan for 2008-2009, which was endorsed by the forty-first session of the IOC Executive Council (Paris, France, June 2008). It described how the IOC programmes and other major activities (e.g., General Policy and Coordination) contribute towards accomplishing the Purpose of the IOC and achieving the High-Level Objectives and the Expected Results put forth in the IOC Medium-Term Strategy and the biennial work plans. The Panel paid particular attention to its related elements in the Plan, such as the status of JCOMM as an IOC Subsidiary Body. It also received information with interest, on priorities and activities which were identified within the framework of 2008-2009 UNESCO Programme and Budget; such as: 1) Strengthening the development of global ocean observations; and 2) Improving observations and services for marine safety.

12.2.3 The Panel agreed that the DBCP priorities and activities should be in line with those of JCOMM and further with those of IOC and WMO, and decided to take it into account in the annual revision of DBCP Implementation Strategy and Operating Plans. The Panel requested the Secretariat to provide reports on the development/improvement of the IOC Operating Plan in the annual session **(action, Secretariat, October 2009)**.

12.3 WMO Strategic planning

12.3.1 The WMO Secretariat representative reported on the outcome of the sixtieth WMO Executive Council (EC-LX, Geneva, Switzerland, 18-27 June 2008), with regard to the WMO Strategic Planning. In particular, the Council urged Members' NMHSs to commit resources for the implementation of JCOMM's strategic work plan for Building a Sustained Global Ocean Observing System as well as JCOMM and WCRP contributions to IPY as foreseen in their role for IPY legacy.

12.3.2 The Panel noted that EC-LX endorsed the schedule for delivering the draft WMO Strategic Plan 2012-2015 by the end of 2008; the draft WMO Operating Plan by the end of 2009; and the proposal for the Results-based Budget 2012-2015 by the end of 2010. The Council requested the technical commissions and regional associations to ensure that their future operating plans (goals, deliverables, performance indicators and implementation timelines) would be fully harmonized with the next WMO Strategic Plan, in particular, as regards relevant Strategic Thrusts and Expected Results.

12.3.3 The Panel also noted the discussions by the sixth session of the JCOMM Management Committee (Paris, France, 3-6 December 2007), which were consistent with the decisions taken by EC-LX in June 2008. The Panel therefore agreed to provide input to the Chairperson of the JCOMM Observations Coordination Group through the DBCP Chairperson and the Secretariat, as appropriate.

12.3.4 The Panel noted that its activities with regard to the WMO Strategic Planning fell mainly under Expected Result 4, "Integration of WMO Observing Systems", and somehow under the Expected Result 5 "Integration of WMO Observing Systems". From that perspective, the Panel agreed that it should play an active role in the development of WIGOS (see agenda item 12.6).

12.3.5 The Meeting decided on the following action item:

- To provide input to the JCOMM OCG Chairperson for the WMO Operating Plan, as appropriate **(action, DBCP Chairperson and Secretariat, End-2008)**.

12.4 Development of the OPSC

12.4.1 The Panel recalled the discussion during its twenty-third session (Jeju, Republic of Korea, October 2007) regarding the development of an Observing Programme support Centre (OPSC), and reflected in the final report of the session (see paragraph 5.2). The WMO Secretariat reported on latest developments in this regard. A joint WMO-IOC circular letter was issued shortly after DBCP-XXIII to call for the submission of Letters of Intent (LOIs) to host JCOMM Observing Programme Support Centre (OPSC). A copy of this circular letter was presented to the Panel.

12.4.2 Fifteen LOIs were received by the IOC and WMO Secretariats with good geographical distribution. As indicated in the joint circular letter, an evaluation committee comprising the JCOMM Co-presidents and one representative each from the DBCP, the Argo Steering Team and the Secretariats was established to review the Letters of Intent. The Committee met in Paris, France on 11 April 2008, reviewed the letters of intent, and recommended a short list of five candidates to remain in the evaluation and undergo more detailed evaluation. The Committee was very pleased to have such a large number of high-quality expressions of intent at its disposal for evaluation, including from those which did not eventually appear in the short list. This reflects the high-level of commitment of WMO Members and IOC Member States to coordinate ocean and marine meteorological observations through JCOMM. The Committee encouraged centres that submitted a Letter of Intent, but did not make the short list, to consider whether they would be prepared to provide some regional support to the future JCOMM OPSC.

12.4.3 The OPSC Evaluation Committee agreed to expand its membership to review more detailed proposals from the five prospective host institutions on the short list. This expanded committee will include one additional member each from the SOT, OceanSITES, IOCCP, GLOSS, WIGOS and OOPC. An Action Plan for the Committee was agreed upon, culminating in a final decision to be made in principle in December 2008 by the Secretary-General of WMO and the Executive Secretary of IOC based on the recommendations of the Evaluation Committee.

12.4.4 The Panel noted with appreciation that the sixtieth WMO Executive Council (EC-LX) and the forty-first IOC Executive Council both requested Members to commit resources through voluntary contributions to support the implementation and operations of the Centre.

12.4.5 The Panel discussed financial implications of a possible relocation of JCOMMOPS and agreed to provide for contingency funding in its budget as appropriate. This will be reflected in the agreed budget (***Annex VIII***).

12.5 GOOS / GCOS Ocean Observing Panel for Climate (OOPC)

12.5.1 A written report on the GCOS-GOOS-WCRP Ocean Observations Panel for Climate (OOPC), and prepared by its Chairperson, Dr D. E. Harrison, was presented to the Panel. In particular, the Panel reviewed the requirements expressed by the OOPC and their implications in terms of data buoy deployments, their instrumentation, sampling requirements, etc.

12.5.2 The Panel recalled that the OOPC had requested the DBCP to consider how to improve its deployment strategy to provide even higher levels of effective and even spatial coverage, working with the Argo community and others as appropriate. This issue was addressed under agenda item 10.2. The requirements for high-temporal resolution SST were addressed under agenda item 10.6.

12.5.3 The Panel noted that the OceanObs'09 Conference was planned to take place in Venice, Italy, 21-25 September 2009. The papers to be presented during the conference would be identified as group contributions with a form of Community White Paper. The Panel was invited to consider providing a proposal for Community White Papers, via the conference website (www.oceanobs09.net) in due course. It requested the DBCP Chairperson to coordinate this action and assist in identifying authors **(action, DBCP Chairperson, 15 November 2008)**.

12.5.4 While noting a similar request from OOPC, the Paned noted with appreciation that the CBS Implementation / Coordination Team on the Integrated Observing System (ICT-IOS), at its fifth session (Geneva, Switzerland, 15-18 September 2008), recommended CBS to encourage major NWP centres to conduct studies on the requirements for in situ surface pressure observations, in terms of optimal horizontal resolution required in presence of satellite wind data. The Panel also noted the request from OOPC to address similar NWP needs regarding high-resolution SST data and requested the WMO Secretariat to relay this recommendation to CBS as appropriate **(action, WMO Secretariat, ASAP)**.

12.5.5 The Panel asked its Quality Management and Drifter Technology Development to investigate developing an easy-to-calculate global statistic that reports the status of the array, also taking into account drifter distribution targets **(action, TT, next Panel session)**.

12.5.6 The Panel recalled the discussion under agenda item 10.6 regarding the provision of high-temporal resolution SST data from drifters to meet the requirements of GHRSST in order to resolve the diurnal cycle of SST and estimate the foundation temperature. The Panel set up a small ad hoc working group comprised of Mr David Meldrum (lead), Dr Derrick Snowden, Mr Johan Stander, and the TC to address the issue and make recommendations. The Working Group agreed on a number of points for the DBCP response to GHRSST, including the need to properly evaluate the cost benefit of meeting their wishes in terms of increased resolution and accuracy, especially for T(z). In general, most of the expressed needs of GHRSST could be met with current technology, but at the expense of increased cost, communications overhead and energy consumption. The Working Group recommended to organize a face-to-face meeting with a few GHRSST key players to prioritize the next steps to be taken in due course **(action, DBCP Chairperson, ASAP)**.

12.6 WMO Integrated Global Observing Systems (WIGOS)

12.6.1 The WMO Secretariat reported on the development of the WMO Integrated Global Observing Systems (WIGOS) and recalled that the WMO Fifteenth Congress (Cg-XV) agreed on establishing a comprehensive, coordinated, and sustainable system of observing systems with ensured access to its component observing systems' data and products through interoperable arrangements (Res. 30 – Cg-XV). The WIGOS / WIS will address all WMO Programmes and Co-sponsored programmes requirements, ensure availability of required information, meet data quality standards and facilitate access in real / quasi-real time as well as to archived information. Congress recommended to initiate five Pilot Projects, one of which being the integration of marine and other appropriate oceanographic observations into the Global Observing System (GOS).

12.6.2 The fifty-ninth WMO Executive Council (EC-LIX, Geneva, Switzerland, 28-30 May 2007), established a Working Group on WIGOS and WIS (EC-WG WIGOS-WIS) to follow the development of an over-arching WIGOS Development and Implementation Plan, and also to review the progress in the implementation of WIGOS / WIS "Pilot Projects". JCOMM responded quite pro-actively to the challenge proposed by the Congress and Executive Council and drafted an ambitious WIGOS Pilot Project for JCOMM as an important contribution to the development of WIGOS / WIS respecting the ownership of partner organizations regarding their components of the observing system. The Pilot Project is expected to demonstrate the strong and growing level of collaboration and coordination between the WMO and IOC stakeholders both striving to enhance and sustain global ocean observing networks and provide free and unrestricted data access in line with their respective data policies.

12.6.3 The Pilot Project for the integration of marine and other appropriate observations into the GOS, also named WIGOS Pilot Project for JCOMM, has been working pro-actively since WMO Cg-XV (May 2007) for developing its Project Plan. The deliverables of the WIGOS Pilot Project for JCOMM are: (i) developing interoperability arrangements between ocean data systems and the WIS while proving for documented and standardized data; (ii) documenting and integrating Best Practices and Standards; and (iii) Quality Management and implementation of cost-effective

Quality Management Systems (QMS). The Pilot Project multi-disciplinary approach will permit the provision of consistent, coherent, timelier and better quality data and products, while at the same time minimizing duplication.

12.6.4 The Panel noted the outcome and recommendations from the ad hoc planning meeting for the JCOMM Pilot Project for WIGOS (Ostend, Belgium, 29 March 2008), and the meeting of the joint Steering Group that followed (Geneva, Switzerland, 18-19 September 2008). In particular:

- The Meeting slightly revised its Project Plan, and adopted its Implementation Plan;
- Interoperability with the WIS would be mainly achieved through: (i) ocean data centres contributing to the Ocean Data Portal (ODP) version 1 (for the duration of the Pilot Project, and possibly v2 afterwards); and (ii) ODP becoming fully interoperable with the WIS;
- Key potentially partners were identified for providing key data-sets to the Pilot Projects as key deliverables (i.e., RNODC / DB, GHRSST, SeaDataNET, World Ocean Atlas, World Ocean Database, META-T, Argo, XBT data, ICOADS, the MCSS Global Collecting Centres (GCCs), GTSPP, HF Radars and the Virtual constellation for Ocean Surface Vector winds);
- The Meeting recommended that the JCOMM Observing Panels and associated programmes address the issue of documenting their Best Practices in light of the WIGOS developments. Strategy was proposed for the updating of the *WMO Guide on Instruments and Methods of Observation* (WMO-No. 8) to better integrate oceanographic issues. Future updates should eventually be submitted through the JCOMM Focal Point on CIMO matters and the CIMO Focal Point for WMO-No. 8;
- Better links should be established with the Association of Hydro-Meteorological Equipment Industry (HMEI);
- The Meeting discussed establishment of marine instrument centres using CIMO as a model. The NOAA National Data Buoy Centre (NDBC) offered to investigate feasibility and agreed starting acting as such on a trial basis. The JCOMM Focal Point on CIMO matters was invited to review and draft the Terms of Reference for marine instrument centres and develop a proposal to be circulated to the joint Steering Group; and
- Dr Chung-Chu Teng (NDBC) is the nominated Focal Point of JCOMM for addressing CIMO matters.

12.6.5 The Panel noted that the DBCP was promoting the GTS – therefore WIS – distribution of the data since its inception, and that regarding the delayed-mode buoy data the RNODC / DB was already making efforts in providing interoperability with the WIS as its participation in WIGOS. It invited the RNODC / DB and the SOC / DB to actively participate in the WIGOS Pilot Project for JCOMM. Efforts were also made recently by the Panel to promote the collection and exchange of buoy platform / instrument metadata through JCOMMOPS, the Water Temperature Metadata Pilot Project (META-T), and the ODAS Metadata Service (ODASMS) operated by the National Marine Data and Information Service (NMDIS – China). Considering that most of the data management and quality management aspects were already being considered under the JCOMM Data Management Programme Area (DMPA), and the WIGOS Pilot Project itself, the Panel agreed that main efforts by Panel members should be placed with regard to the integration of DBCP Best Practices and Standards into the WIGOS. This objective can be achieved through: (i) contributing to the development of WIGOS Best Practices and Standards; (ii) implementing those WIGOS agreed upon Best Practices and Standards; and (iii) contributing to the development of specialized and / or regional marine Instrument Centres.

12.6.6 The Panel noted that the sixtieth WMO Executive Council (EC-LX) (June 2008) urged Members to participate actively in the Pilot Project and engage in active cooperation with the oceanographic data centres in order to ensure the development or interoperable arrangements between their data systems and the WIS. The Executive Council also recognized the importance of JCOMM's decision as part of its ongoing mandate to produce a catalogue of existing standards and Best Practices in marine meteorology and oceanography in connection with observing systems and exchange of observations. It urged Members to consider providing assistance to this effort as a contribution to the WMO Quality Management Framework. Given the need for continuous operation of a global ocean observing system in support, inter alia, of coupled ocean-atmosphere climate modelling and operational ocean prediction, as well as the limited lifetime of individual platforms, data buoys, floats, ship-based and bottom-mounted systems, the Council urged Members to establish a system of national ocean centres or services dedicated to implementation and maintenance of ocean observing systems and to improve cooperative support and coordination through the JCOMM.

12.6.7 The Meeting made the following recommendation:

12.6.7.1 Panel members to check the Pilot Project Implementation Plan and see how they could contribute to the Pilot Project **(action, Panel members, Mid-2009)**.

12.6.7.2 Dr Bill Burnett to lead the DBCP efforts regarding instrument Best Practices in close liaison with the JCOMM Focal Point on CIMO matters (Dr Teng) and the TC, as well as with the TT IBPD and Panel members. The goal is to: (i) to compile information on existing DBCP Best Practices; (ii) identify gaps and areas where Panel members have expertise; and (iii) make recommendations for addressing those gaps **(action, Dr Bill Burnett, Mid-2009)**.

12.6.8 The Meeting decided on the following Action Items:

12.6.8.1 To invite the RNODC / DB and the SOC / DB to participate in the WIGOS Pilot Project for JCOMM and address related data management aspects including interoperability with the WIS, and quality management **(action, RNODC / DB & SOC / DB, ASAP)**. Either of these two centres could eventually contribute to the WIS by providing discovery metadata using agreed upon ISO 19115 metadata profile and acting as WMO Information System (WIS) Data Collection and Production Centres (DCPC).

12.6.8.2 Invite Panel members to investigate whether it would be appropriate and desirable that their national organizations contributes to the Pilot Project as specialized and / or Regional Instrument Centres or assist candidate instrument centres as appropriate **(action, members, Mid-2009)**.

12.6.8.3 Invite Panel members to review the Chapter 4, Part II of the *WMO Guide on Instruments and Methods of Observation* and make proposals through the Pilot Project Steering Group for its updating as required **(action, members, Mid-2009)**.

12.6.8.4 Invite Panel members to follow the Best Practices and Standards eventually proposed under WIGOS, and in particular, to provide the buoy platform / instrument metadata to JCOMMOPS, META-T servers, and the ODASMS as appropriate **(action, Panel members, ongoing)**.

12.7 Financial situation

12.7.1 The Panel noted with satisfaction the positive and secure cash balance of funds totalling USD 429,464 as of 31 December 2007.

12.7.2 As discussed and decided at the twenty-third session, new budget items such as Capacity-Building, Collaborative Arrangement and New Technical Evaluation were introduced. In 2007, USD 17,098 was charged to the Capacity-Building line item for financial support of the

Training Course on Buoy Programme Implementation and Data Management (Ostend, Belgium, 11-15 June 2007).

12.7.3 The IOC Interim Statement was reviewed for the period 1 January-31 July 2008. It showed a positive balance of USD 190,524 as of 31 July 2008. During this period, no contributions were received on the IOC accounts for DBCP. It should be noted that, as announced at DBCP-XXIII, IOC would impose a 10% overhead charge to the DBCP accounts as of 1 January 2008.

12.7.4 The WMO Interim Statement for the period 1 January-31 July 2008 was also reviewed. It showed a positive balance of USD 275,906. USD 14,751 corresponding to expenditures for the Iridium Pilot Project was charged to the new budget item "New Technical Evaluation".

12.7.5 The Panel noted that in order to compare the current expenditure level with the budget, this interim statement shows the actual expenditure together with the budgeted amounts as decided at DBCP-XXIII.

12.7.6 The Meeting made the following recommendations:

12.7.6.1 Recognizing that the exchange rate between the US Dollar and the Euro is still affecting the DBCP budget, the Panel encouraged to Members / Member States once again to consider contributing to the DBCP / SOOP Trust Fund in Euros.

12.7.6.2 The Panel agreed and adopted the following statements:

- The final statement of the 2007 DBCP Accounts; and
- The 2008 Interim Statement of the actual income and expenditure as of 31 July 2008.

12.7.7 The Meeting decided on the following Action Items:

12.7.7.1 Action1: The Executive Board, authorized by the Panel, and taking into account the decisions and recommendations made at the twenty-fourth session of the DBCP, will set a plan for the 2009 expenditure. The Executive Board will liaise with Mr Frank Grooters (KNMI, The Netherlands) for updating the interim financial report with the most accurate and actual information. Deadline: 31 December 2008 **(action, EB, 31 December 2008)**.

12.7.7.2 Action2: The Secretariat and Mr Frank Grooters to work together to distribute the final statement for 2008 to the Panel members as soon as the IOC and WMO final Statement of Accounts for the year 2008 are finalized **(action, Secretariat and Mr Frank Grooters, 1 March 2009)**.

13. REPORT AND RECOMMENDATIONS FROM THE EXECUTIVE BOARD SESSION

a) The Executive Board reported on the outcome of its discussions in separate session and made recommendations to the Panel. The full report of the Executive Board meeting is provided in ***Annex V***. The Panel discussed the following agenda items based upon the recommendations from the Executive Board.

b) The Panel recalled the proposal from OceanSITES discussed under agenda item 8.4 where DBCP members were invited to slightly increase their contributions in order to commit to the OceanSITES Project Office function undertaken by the TC. The Panel noted that OceanSITES required USD 60,000 / year for its Project Office function, and that in principle, USA was ready to commit about USD 30,000 / year as of 2010, provided matching funding is provided by OceanSITES international partners. Such contributions could be made via the

DBCP Trust Fund. Assuming that OceanSITES will be in a position to provide appropriate funding as of 2010, the Panel also noted that USA had already committed USD 30,000 in 2008, and that there was a need for OceanSITES to receive a contribution at a level of about USD 30,000 in 2009 in order for OceanSITES to receive full support. This would permit to ensure continuity in the Project Office function from now on. Considering the benefits that the DBCP could gain from the synergies to be developed with OceanSITES through JCOMMOPS, the Panel agreed to provide USD 30,000 under "cooperative arrangements" budget line item of funding in 2009 in order to fill this gap. The Panel urged OceanSITES to seek resources from OceanSITES participants in order to ensure sustainable funding as of 2010.

c) The Panel recommended that the Iridium Pilot Project Steering Team discuss a strategy and plan for: (i) achieving appropriate coverage in the regions where gaps had been identified; and (ii) defining data sampling and distribution cycles strategy permitting to meet the user needs while minimizing electric power requirements so that the drifter lifetime can be extended.

13.1 DBCP Implementation Strategy

13.1.1 Under this agenda item, the Panel reviewed, and updated its Implementation Strategy. This review considered, inter alia, recent changes to global requirements for buoy data in support, in particular, of operational meteorology and oceanography, major research programmes including the World Climate Research Programme (WCRP), the Global Ocean Observing System (GOOS), the WMO Integrated Global Observing Systems (WIGOS), and the Global Climate Observing System (GCOS) and Global Earth Observation System of Systems (GEOSS). The following changes were made for this eighth edition:

- New foreword by the DBCP Chairperson;
- Consideration of WMO and IOC Strategic planning and support to the WMO Integrated Global Observing Systems (WIGOS);
- Consideration of the CBS Rolling Review of Requirements (RRR) and requirements for met-ocean forecasts and services;
- Requirements for sea level observations;
- Updated section on Data Collection and Exchange;
- Consideration of recommendations from WMO Executive Council regarding cooperation with the International Tsunameter Partnership (ITP);
- Review of the aims and objectives accordingly;
- Updated status maps; and
- Updated contact points.

13.1.2 The Panel invited its members to inform the Chairperson about required changes **(action, members, 31 December 2008)**.

13.2 New Action Groups

13.2.1 The Panel discussed whether any proposal for the formation of new regional or programmatic action groups of the Panel should be considered.

13.2.2 The Panel recognized the parallels between the goals and work of the DBCP and the work being undertaken through the International Tsunameter Partnership (ITP), which was established under the auspices of the IOC International Cooperation Group for the Indian Ocean Tsunami Warning and Mitigation System (ICG/IOTWS). It was noted that the ITP's short- and medium-term objectives could be materially aided by close engagement with the DBCP's expertise base and application of communal data tools similar to those developed by the DBCP. In turn, the member country and supplier associations established through the ITP complement those of DBCP. The challenges of data management, sustaining operational moored buoy networks and responding to platform vandalism are common to the ITP, the DBCP Task Team on Moored Buoys and OceanSITES, and all groups would benefit from a collective approach.

13.2.3 Recognising the immediate and longer-term synergies between the DBCP and the work of the ITP, and noting the Recommendation 3.4.21b of the WMO sixtieth Executive Council, the Panel agreed to extend an invitation to the ITP to become an Action Group of the DBCP. Mr Ken Jarrott, Chairperson of the ITP, undertook to refer the proposition to the next meeting of the ITP in November, and subject to the outcomes of that meeting, to identify issues or practical arrangements that would require attention in any such transition.

13.2.4 The Panel also noted with considerable interest that tag developments that had been put in place by the sea mammal tracking community were now yielding high-quality hydrographic data from previously inaccessible areas such as under ice shelves. The tags incorporated miniature CTDs and Argos transmitters, and were now routinely inserting data on to the GTS. A fuller description may be found at: http://biology.st-andrews.ac.uk/seaos/. There was considerable convergence between the technologies developed by this group and those being developed for miniature drifters and profiling floats. Moreover, the Group had expressed interest in benefiting from the Panel's reputation in promoting and coordinating ocean data collection, quality control and dissemination, and might wish in due course to become an Action Group of the DBCP. The Panel wished to explore this idea further and asked its Chairperson to contact key members of the Group with a view to engaging them in a more detailed dialogue. Furthermore, the Panel expressed an interest in receiving a presentation from the group at a future DBCP session or workshop.

13.3 Operating principles

13.3.1 In the process of rationalizing the DBCP modus-operandi, the Panel agreed that it needed to consolidate its operating principles to ensure efficiency for future Panel activities. Rationalizing all the rules and procedures and adding them as annexes in the DBCP Session Report and not in the proceedings of the session would increase the readability of the session reports and simplify the work of the Secretariats. In this context, the Panel recalled its decision at its twenty-third session, which approved the operating principles (Annex III of the DBCP-XXIII Final Report), the Terms of Reference for the Executive Board (established at DBCP-XXII), and drafted Terms of Reference for the Task Teams.

13.3.2 In addition, the WMO Secretariat representative recalled that the current arrangements for the management of the DBCP Trust Fund at WMO has been established in 1989 by an exchange of letters between the DBCP Chairperson at that time, Mr Christophe Billard, and the WMO Secretary-General, Professor G. O. P. Obasi. As the DBCP had slightly updated the rules for managing the DBCP resources and established an Executive Board and operating principles, the WMO Secretariat required clarification of the situation, and the documenting of current arrangements. The proposed Terms of Reference for the management of the DBCP Trust Fund at WMO are included in Annex VII of the DBCP Operating Principles (***Annex III***). The Terms of Reference for these Trust Funds could be formalized by way of an exchange of letters between the WMO Secretary-General and the DBCP Chairperson.

13.3.3 On a related note, the IOC Secretariat representative reported that the DBCP Trust Fund at IOC was established as a sub-account dedicated to specific programme / activity within the IOC

Special Account. In this context, the DBCP TF is governed by the Financial Regulations of the IOC Special Account (Annex VIII of the operating principles).

13.3.4 Based on the above information, the DBCP Chairperson – in collaboration with the DBCP Executive Board and the Secretariats – proposed a revised draft operating principles. It compiled the present understanding of the DBCP operations (as agreed at DBCP-XXIII) and proposed modification of some existing procedure, including:

- Experience and information from past DBCP sessions regarding the modus-operandi of the Panel;
- The current Terms of Reference of the DBCP Executive Board (Annex IV of the operating principles);
- The draft Terms of Reference of the Task Teams (Annex V of the operating principles);
- The definition of a DBCP Action Group (Annex III of the operating principles);
- Current budget lines which appear in the DBCP budget in DBCP-XXIII Final Report, Table 2, Annex VIII (Annex VI of the operating principles);
- The routine tasks and duties of the TC based on his / her Terms of Reference;
- The proposed Terms of Reference for the DBCP Trust Funds at WMO (Annexes VII of the operating principles); and
- List of the current key DBCP personnel (Annex IX of the operating principles).

13.3.5 The Panel reviewed the proposed operating principles. After discussion, the Panel adopted the proposal with some modifications to the proposed draft. The adopted DBCP operating principles are provided in ***Annex III***.

13.3.6 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 2008)**.

13.4 Contracts

13.4.1 The Panel reviewed the contractual arrangement for the employment of the TC, which was established by the IOC of UNESCO on 1 July 2006. The TC had been employed as a UNESCO Appointment of Limited Duration (ALD), grade P2, through funds provided by the Panel and deposited in the IOC Trust Fund.

13.4.2 The Panel recalled its decision made during the twenty-third session of the DBCP (Jeju, Republic of Korea, 2007) and after, on the within-grade reclassification of the TC position, from P2-A to P2-B. It noted that this decision was reflected in the renewed annual contract for the period from 1 July 2008 to 30 June 2009. The Panel approved this arrangement as it stood.

13.4.3 The Panel then reviewed the agreement between IOC and CLS on logistical support for the position of the TC, concerning the occupancy of premises and the use of facilities granted to JCOMMOPS. Noting identical terms and conditions to previous arrangements, the Panel approved again this agreement.

13.4.4 Various options for future arrangement of the TC employment were further discussed under agenda item 13.5.

13.5 Employment of the TC

13.5.1 The Panel noted with concern that the TC was now less than two years from the end of her contract with IOC, and agreed that new employment arrangements must be put in place as soon as possible in order to safeguard support for its ongoing activities, and to ensure an adequate career structure and professional development for the TC. The present Appointment of Limited Duration (ALD) terms did not permit extension beyond four years and the Panel would therefore inevitably face considerable disruption and loss of momentum if a new recruitment process had to be undertaken. Of necessity, this would have to commence in late 2009 to ensure some period of overlap, and it would be expected that the TC could not be expected to undertake major new developments in the last months of her tenure. The Panel therefore stood to lose a significant degree of capability unless prompt action was taken.

13.5.2 Of the options available, the transfer of the TC to a regular staff post in either IOC or WMO was clearly the best outcome for the Panel and its TC, and a request for further details of procedures, restrictions and financial implications had been addressed to IOC in advance of the session.

13.5.3 The Panel was also concerned that throughout JCOMM as a whole the employment arrangements for TCs, on whom operations were so heavily dependent, were generally unsatisfactory, and it asked the Chairperson to write to the JCOMM Co-chairpersons to highlight these concerns and the need for an adequate career structure and satisfactory status for the TCs **(action, Chairperson, ASAP)**.

13.6 Work plan, budget and priorities for the next year

13.6.1 The Panel then recalled the discussion under agenda item 7.3 regarding the establishment of two new Pilot Projects: (i) the DBCP Pilot Project on Wave Measurements from Drifters (PP WMD); and (ii) the Pilot Project on Wave measurement Evaluation and Test from moored buoys (PP WET).

13.6.2 The conditions for the possible funding of these pilot projects are further discussed under agenda item 13.8.

13.6.3 The Panel discussed and agreed on its priorities for the next intersessional period. These are reflected in the DBCP budget (***Annex VIII***) as well as in its Action Plan (***Annex XIII***).

13.7 Work priorities for the TC

13.7.1 As in previous years, the Panel reviewed and updated the overall work plan for itself and the TC for the coming intersessional period. These work plans are given in ***Annex XIII.*** The Panel also provided the TC with guidance regarding her working priorities for the next intersessional period. In particular, the Panel invited the TC to proposed a prioritization of her tasks based on her understanding of the Panel's requirements, and to submit it for review and approval to the Chairperson through the Executive Board **(action, TC, ASAP)**.

13.8 Future Commitments and the future OPSC

Future employment of the TC and related costs

13.8.1 The Panel recalled the current arrangements regarding the employment of its TC, which were reviewed at the twenty-third session of the DBCP (Jeju, Republic of Korea, 15-19 October 2007) (see Final Report from the session).

13.8.2 The Panel noted that, according to the agreed procedure, Ms Hester Viola had informed the Panel during the session that she wished to continue working as the TC of the Panel for the period 1 July 2009 – 30 June 2010, depending on the renewal of her contract.

13.8.3 The Panel approved the continued employment of Ms Viola for the period of 1 July 2009 – 30 June 2010, by IOC of UNESCO, subject to the necessary contractual arrangements and the availability of funds for this purpose. The Panel also agreed to continue the location and logistical support through the CLS in Toulouse, France, for the above-mentioned period.

13.8.4 Meanwhile, the Panel recalled that the current TC employment contract (ALD) was able to be extended to a maximum of four years but not further (i.e., until 30 June 2010). This particular issue was discussed under agenda item 13.5, taking into account the OPSC evaluation process. The Panel again emphasized the importance of long-term security for the TC employment, and reaffirmed its recommendations to the WMO and IOC that were agreed under agenda item 13.5. Meanwhile, the Panel made provisions for the possible cost for termination / transition of the TC, as reflected in the proposed budget.

13.8.5 The Panel then recalled the decision made at DBCP-XXIII that the TC would provide support to OceanSITES. Following this decision, both the OceanSITES Steering Team (Vienna, Austria, 8-13 April 2008), and the Argo Steering Team (AST-9, Exeter, United Kingdom, 18-20 May 2008) endorsed the proposal that the DBCP TC work part time (30%) for the OceanSITES, and the Argo TC would work part time (30%) for the SOT. The Panel also noted the agreement by the SOT Chairperson, Mr Graeme Ball, during this Panel session on behalf of the SOT. The Panel agreed with these arrangements, and reviewed relevant parts of the Workplan and Operating Principles (discussed under agenda item 13.3) to ensure consistency.

Management of the Trust Fund

13.8.6 The Panel recalled the discussion under agenda item 12.7, on the provisional income and expenditures for the year 2009. The Panel agreed that the scale of national contributions to the Trust Fund should remain at least at the same level as previous years (***Annex VII***), considering that the Panel's activities were increasing, and that the need for contingency funding to cover the TC's future employment and ongoing activities still existed.

13.8.7 The Panel reviewed and agreed on the line items described in the list of provisional expenditures for 2009, and reflected it in the Operating Principles. In doing so, the Panel reaffirmed that the figure for each line item of expenditure is an upper limit.

13.8.8 Despite the current healthiness of the Trust Fund, the Panel noted that the timely contribution from nations is critical to secure the TC employment contract, considering the yearly cycle of the administration within the WMO and IOC. The Panel encouraged its members to ensure that their contributions be made in good time **(Recommendation)**, and again expressed its sincere thanks to those nations that were able to contribute to the Trust Fund.

13.8.9 The Panel noted that the Panel's budget – while remaining healthy for the time being - was decreasing, and likely to become negative by 2011 due to: (i) increased activities impacting the Panel's budget; (ii) contingency funding; (iii) foreseen support to OceanSITES; (iv) constant contributions by Members / Member States to the Panel's Trust Fund; and (v) loss of income from Member contributions in support of the SOT TC. The Panel therefore requested the Secretariats to seek advice from Panel members and the Executive Board and then write to WMO and IOC Members / Member States in order to seek additional contributions to the Trust Fund **(action, Secretariat, October 2009)**.

13.8.10 The Panel recalled the discussion under agenda item 7.1.9 regarding extending the Iridium Pilot Project deployment phase, and agreed to include USD 20,000 in the estimated budget for 2010.

13.8.11 The Panel agreed that the DBCP should contribute to the new Pilot Project on Wave Measurements from Drifters (PP-WMD) and recommended to include USD 10,000 / year in the estimated budget for 2009, 2010, and 2011.

13.8.12 Similarly, the Panel agreed that the DBCP should contribute to the new JCOMM Pilot Project on Wave measurement Evaluation and Test from moored buoys (PP-WET) and recommended to include USD 10,000 / year in the estimated budget for 2009 and 2010.

13.8.13 The Panel also agreed that the DBCP should contribute to the future migration of the JCOMMOPS Information System (IS) and recommended to include USD 30,000 in the estimated budget for 2010.

13.9 Format of future sessions

13.9.1 The Panel reviewed its modus-operandi and agreed that the new mode proposed at DBCP-XXIII and trialled at this Panel session had been effective.

13.9.2 The Panel discussed the challenges derived from extending the activities of the Panel with new groups such as OceanSITES, ITP, wave observing platforms, and even instrumented sea mammals. The Panel recognized the risks involved, especially when considering that the Panel was focusing on important operational and research applications in meteorology and oceanography (e.g., NWP, ocean modelling, climate variability and predictability). At the same time, the Panel recognized that there were sufficient issues of common interest to allow exploitation of the synergies between the different component observing systems (e.g., metadata, deployment opportunities, data distribution, and satellite communications). The Panel also recognized that research and development (R&D) objectives were also important aspects that needed to be addressed by the Panel.

13.9.3 The Panel agreed that the Executive Board had been efficient in addressing priority issues, and making appropriate recommendations to the Panel, during the last intersessional period as well as during this Panel session. It thanked the Executive Board for its work and continuous support.

13.10 Recommendations

13.10.1 The Panel sincerely thanked CLS for its ongoing efforts to improve the quality of service available to its members, but remained seriously concerned about the delays in collecting buoy data from certain ocean regions. These delays, resulting in many observations failing to meet the cut-off for forecast model ingestion, brought into stark focus the cost effectiveness of data buoy operations in these areas.

13.10.2 Moreover, these delays had been brought to CLS's attention by the Panel for several years, yet an effective remedy remained to be put in place. As establishing cost effectiveness for data buoy deployments was a core objective of the Panel, the Panel was now very anxious to seek a timely resolution to these problems, and urged CLS to prioritise the matter and respond to it with a time-lined Action Plan.

13.10.3 The delay problems appeared to be the result of two separate technical issues, both of which seemed capable of relatively easy resolution if priorities were asserted:

a) the lack of adequate LUT coverage in the Indian Ocean and South Atlantic; and

b) the lack of blind orbit retrieval through the NPOESS antenna at Svalbard, principally affecting timeliness for stored datasets from the South Atlantic and Southern Pacific.

13.10.4 In consequence, the Panel made the following urgent recommendations to CLS via the JTA:

- CLS should explore all available options for improving LUT data retrieval from affected areas, and, as time was of the essence, report back during the

intersessional period with a detailed time-lined Action Plan to resolve the problems; and

- Efforts should continue to allow ingestion by NESDIS of blind orbit data being collected by the NPOESS antenna in Svalbard. The DBCP appreciated the efforts being undertaken by NESDIS on this project, but remained frustrated by the apparent lack of progress after several years. In this context, the DBCP Chairperson had agreed to make further representations to NESDIS regarding the collection of blind orbit data via Svalbard, and would welcome any further weight that the JTA might add to its request.'

13.11 Discussion and agreement by the Panel on agenda items 13.1 to 13.10

13.11.1 The Panel again reviewed the Panel's budget, table of contributions and discretionary expenditure on projects, as well as requirements for contingency funding to cover any relocation costs associated with the future JCOMMOPS / OPSC, and to meet UNESCO requirements for the deposit of advance salary and severance payments as a precondition for the continuation of the TC's employment through IOC. The IOC Secretariat was requested to advise on the appropriate level for these latter payments in due course **(action, IOC Secretariat, October 2009)**. A report from the ad hoc meeting of the Capacity-Building Task Team was presented as well as the results from the discussions regarding GHRSST requirements.

14. ELECTION OF THE CHAIRPERSON AND THE VICE-CHAIRPERSONS OF THE PANEL

14.1 The Panel re-elected Mr David Meldrum (SAMS, United Kingdom) as its Chairperson, to serve until the end of the next Panel session.

14.2 The Panel re-elected Mr Ken Jarrott (BOM, Australia) as its Vice-chairperson for the Southern Hemisphere, for the same period.

14.3 The Panel re-elected Mr Al Wallace (MSC, Canada) to serve as Vice-chairperson for North America.

14.4 The Panel elected Dr Velayutham Rajendran (NIOT, India) as its Vice-chairperson for Asia.

15. DATE AND PLACE OF THE NEXT SESSION

15.1 The Panel recalled its agreement at DBCP-XXIII 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 28 September–1 October 2009, the week following the OceanObs'09 Conference in Venice, Italy (21-25 September 2009), and ensuring minimum duplication with schedules for events of other JCOMM and related programmes, such as JCOMM-III (Marrakech, Morocco, November 2009).

16. NATIONAL REPORTS

16.1 The Panel received written reports on current and planned buoy programmes from Australia, Brazil, Canada, Ecuador, France, Germany, India, Ireland, Japan, Kenya, New Zealand, Republic of Korea, Malaysia, Portugal, Republic of South Africa, Sweden and USA. As usual, these written reports, as well as others submitted to the Secretariat before 30 November 2008, would be published in the Panel's Annual Report **(action, Secretariat, Early-2009)**.

16.2 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 December 2009**).

17. ADOPTION OF THE SESSION REPORT

17.1 The Panel reviewed and adopted the draft session report prepared by the Secretariat .

18. CLOSURE OF THE SESSION

18.1 In closing the session, the Chairperson Mr David Meldrum once again paid a special tribute to the South African Weather Service (SAWS), and especially Dr Jonas Mphepya, Messrs Johan Stander, Mark Majodina, Sydney Marais and Misses Lithakazi 'Shine' Mkatshwa, Carien Booijse for the warmth of their welcome, and the excellent facilities, support and hospitality that they had provided for the meeting, all of which had contributed substantially to its success. Mr Meldrum also thanked the participants, TC, Executive Board, Task Team Chairpersons, Action Groups and the Secretariats for their active and positive contributions to the meeting and to the work of the Panel.

18.2 Finally, the Chairperson applauded all participants for their openness and willingness to evaluate and adopt the new working arrangements for the Panel, both during the session itself and in the new structure for delivering the challenging intersessional work programme. This could only lead to a new era of success for the Panel and the observing systems that it supported.

18.3 The twenty-fourth session of the Data Buoy Cooperation Panel closed at 1725 on Thursday, 16 October 2008.

ANNEX I

AGENDA

1. OPENING AND KEYNOTE ADDRESS

2. SCIENTIFIC AND TECHNICAL WORKSHOP

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3.1 Introduction by the Chairperson
3.2 Adoption of the agenda
3.3 Working arrangements

4. REPORTS FROM THE CHAIRPERSON, VICE CHAIRPERSONS AND THE EXECUTIVE BOARD

5. REPORT FROM THE TECHNICAL CO-ORDINATOR

6. REPORTS FROM THE TASK TEAMS

6.1 Capacity-Building Task Team
6.2 Data Management Task Team
6.3 Quality Management Task Team
6.4 Technology Developments Task Team
6.5 Moored Buoys Task Team

7. PILOT PROJECTS

7.1 Iridium Pilot Project
7.2 PMT Pilot Project
7.3 Wave observing technology developments

8. REPORTS FROM THE ACTION GROUPS

8.1 E-SURFMAR
8.2 GDP
8.3 IABP
8.4 IBPIO
8.5 IPAB
8.6 ISABP
8.7 NPDBAP
8.8 OceanSITES
8.9 TIP

9. INTERNATIONAL TSUNAMETER PARTNERSHIP

10. ISSUES FOR THE PANEL

10.1 Information Exchange
10.2 Deployment opportunities and strategies
10.3 GTS delays
10.4 Vandalism
10.5 Metadata
10.6 Technological developments in support of user requirements
10.7 Instrument Best Practices
10.8 Other issues to be discussed, as proposed by the Task Teams

(The Executive Board meeting takes place separately after agenda item 10 and before agenda item 11)

11. INFORMATION REPORTS

11.1 Argo
11.2 Buoy data management centres
11.3 Argos operations and developments
11.4 Iridium operations and developments
11.5 Additional reports to be presented, as required

12. ORGANIZATIONAL ISSUES

12.1 JCOMM activities
12.2 IOC Strategic planning
12.3 WMO Strategic planning
12.4 Development of the OPSC
12.5 GOOS / GCOS Ocean Observing Panel for Climate (OOPC)
12.6 WMO Integrated Global Observing Systems (WIGOS)
12.7 Financial situation

13. REPORT AND RECOMMENDATIONS FROM THE EXECUTIVE BOARD SESSION

13.1 DBCP Implementation Strategy
13.2 New Action Groups
13.3 Operating principles
13.4 Contracts
13.5 Employment of the TC
13.6 Workplan, budget and priorities for the next year
13.7 Work priorities for the TC
13.8 Future commitments and the future OPSC
13.9 Format of future sessions
13.10 Recommendations
13.11 Discussion and agreement by the Panel on agenda items 13.1 to 13.10

14. ELECTION OF THE CHAIRPERSON AND VICE-CHAIRPERSONS OF THE PANEL

15. DATE AND PLACE OF THE NEXT SESSION

16. NATIONAL REPORTS

17. ADOPTION OF THE SESSION REPORT

18. CLOSURE OF THE SESSION

ANNEX II

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ANNEX III

OPERATING PRINCIPLES OF THE DBCP

OPERATING PRINCIPLES OF THE DATA BUOY CO-OPERATION PANEL (DBCP)

(as adopted at DBCP-XXIV)

Table of content

OPERATING PRINCIPLES OF THE
DATA BUOY CO-OPERATION PANEL (DBCP)
(as adopted at DBCP-XXIV)

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 *Annex 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.

2. PANEL MEMBERS AND PARTICIPANTS

2.1 The Terms of Reference for the DBCP are decided by the DBCP 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.

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 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 Annex 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 intersessional periods. 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 Annex II.

3.4 The Technical Co-ordinator works part-time (1/3) for as OceanSITES Co-ordinator.

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 TC 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 current contact details for key DBCP personnel are listed in Annex IX.

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 (a) 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 Terms of Reference and Membership of the current Task Teams are provided in Annex 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

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 Annex III.

6. IMPLEMENTATION STRATEGY

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.

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 Trust Fund at WMO or IOC, as appropriate. The Terms of Reference of the DBCP Trust Fund at WMO are given in Annex VII. The Trust Fund at IOC follows the Financial Regulations of the IOC Special Account that are reproduced in Annex VIII (Decisions in 157th Executive Board of UNESCO).

8.3 General rules and regulations of UNESCO on Trust Funds, which correspond to those of WMO, in principle.

8.4 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 Annex VI.

8.5 Through the present arrangement that the Technical Co-ordinator is recruited by IOC, 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 Trust Fund in WMO. Therefore, 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, 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 belongs to. 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 Panel may appoint a Panel Member as finance advisor to act on its behalf and to work with IOC and WMO Secretariats 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 Annex IX for currently appointed person).

9. ORGANIZATION AND CONDUCT OF THE DBCP SESSIONS

9.1 In odd years, the regular session of the DBCP will be held at either WMO or IOC. This aims 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 other Panel members and the Secretariats. In principle, the Panel discussion at the regular session is to be completed within 2.5 days. In order to ensure efficiency of the session as well as the comprehensive review and exchange of information, some parallel sessions and focused discussion may be introduced, as required, within the agenda. 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://www.jcommops.org/dbcp/.

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. These are edited and issued by the WMO Secretariat. The publications can be edited in paper form, CD-ROM, DVD-ROM, or be web-based only. The list of current DBCP Publications is available from the DBCP website. The actual costs of editing, publishing, and distributing the DBCP Publications are being recuperated from the DBCP 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).

The annual reports by Action Groups and the Member Countries are also to be included in the DBCP Annual Report.

10.8 The Panel's regular session report and Annual Report 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; and

– Table of national contributions.

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;

– Finalised annual financial accounts;

– Table of national contributions;

– Budget for the next year;

– List of participants;

– Action List / Workplan;

– Selected buoy and GTS statistics (showing trends in numbers, quality, delays, plus a few maps);

– Action Group summaries; and

– Acronym list.

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:

– Technical Co-ordinator's report;

– National reports;

– Action Group reports;

- Data Management Centre reports;
- CLS and Iridium reports;
- Satellite communications report;
- 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.

10.9 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.

10.10 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.

10.11 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.

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 (Annex 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 regularly contacts buoy programme managers of existing and new programmes in order to: (i) invite them, and possibly convince them, if useful, to authorise GTS distribution of their buoy data; (ii) offer technical assistance for that purpose if needed; (iii) collect information on buoy programmes, and the deployed buoys, including

metadata; and (iv) 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). 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.

12. REVIEW OF THE MANAGEMENT STRUCTURE AND OPERATING PRINCIPLES

The Panel reviews and updates its management structure, and operating principles at its regular meetings. This includes, in particular, the appropriate annexes 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 Trust Fund at WMO and IOC.

ANNEX I (of Annex III)

Terms of Reference of the Data Buoy Co-operation Panel (Resolution 4 (WMO EC-LII))

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 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 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 and GCOS;

4. Encourage the initiation of national contributions to data buoy programmes from countries which do not make them;

5. Promote the insertion of all available and appropriate buoy data into the Global Telecommunication System;

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 II (of Annex III)

Terms of Reference for the Technical Co-ordinator of the DBCP (Resolution 4 (WMO EC-LII))

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 data buoy systems;

3. Assist in setting up suitable arrangements for notifying the appropriate user communities of changes in the functional status of operational buoys;

4. Assist in the standardization of buoy data 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 operators;

7. Assist in promoting the insertion of all available and appropriate buoy 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 buoy data into appropriate permanent archives.

ANNEX III (of Annex 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.

ANNEX IV (of Annex III)

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

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. 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;

6. 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;

7. Conduct meetings annually, following an agenda drawn up by the DBCP Chairperson;

8. Consult with Panel members and the Chairpersons of the DBCP Task Teams during the intersessional period if required;

9. 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)
- DBCP Technical Co-ordinator (*ex officio*)
- Representative of the IOC Secretariat (*ex officio*)

- Representative of the WMO Secretariat (*ex officio*)

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.

ANNEX V (of Annex III)

TERMS OF REFERENCE OF THE DBCP TASK TEAMS

TERM OF REFERENCE OF THE TASK TEAM ON DATA MANAGEMENT
(as adopted at DBCP-XXIV)

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;

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 the JCOMM Meta-T Project;

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. Make recommendations to the DBCP Executive Board or the DBCP for addressing the issues above; and

9. Report to the DBCP Executive Board and the DBCP at its biennial Sessions.

Membership:

The membership is open to all Panel members. The Chairperson, appointed by the Panel, has selected the following team members:

Ms Mayra Pazos (TT Chairperson and GDP representative);

Mr Bruce Bradshaw (RNODC representative);

Mr Jean Rolland (SOC representative);

Mr Johan Stander (SAWS);

Dr Bill Burnett (NDBC data manager);

Mr Christian Ortega (CLS data manager);

Ms Hester Viola (DBCP Technical Co-ordinator (*ex officio*)); and

Mr Jeff Wingenroth (Technocean Inc.) - Representative from buoy manufacturer.

TERMS OF REFERENCE OF THETASK TEAM ON INSTRUMENT BEST PRACTICES & DRIFTER TECHNOLOGY DEVELOPMENTS
(as adopted at DBCP-XXIV)

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

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

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.);

Drifter technology developments

7. 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;

8. 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;

9. Review operational platform location systems, and whether they meet the user requirements;

10. Propose to the DBCP and its Executive Board any evaluation activities and pilot projects that it deems beneficial to data buoy operators;

11. 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

12. Evaluate, test, and promote buoy designs that are resistant to vandalism;

General

13. 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);

14. Provide the DBCP Executive Board and the DBCP, both upon request and unsolicited, with technical advice needed for addressing the issues above; and

15. 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, appointed by the Panel, has selected the following team members:

- Dr Bill Burnett, NDBC (TT Chairperson);
- Mr Andy Sybrandy, Pacific Gyre;
- Mr Bill Woodward, CLS America;
- Mr Chris Marshall, Environment Canada;
- Mr Christian Ortega, CLS;
- Mr David Meldrum, SAMS;
- Mr Frank Grooters, KNMI;
- Ms Hester Viola, Technical Co-ordinator, DBCP;
- Mr Jean Rolland, Météo-France;
- Ms Julie Fletcher, MSNZ;
- Mr Ken Jarrott, BOM;
- Ms Mayra Pazos, NOAA / AOML;
- Mr Paul Freitag, NOAA / PMEL;
- Mr Paul Whiteley, UK Met Office;
- Mr Peter Niiler, SIO;
- Mr Pierre Blouch, Météo-France;
- Ms Sarah North, UK Met Office;

- Satheesh Chandra Shenoi, NIO;
- Mr Sergey Motyzhev, Marlin Yug;
- Mr Shaun Dolk, NOAA / AOML;
- Mr Steve Piotrowicz, NOAA; and
- Mr V. Rajendran, NIOT.

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

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 Wind Waves and Storm Surges (ETWS) 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, appointed by the Panel, has selected the following team members:

- Mr Jon Turton, UK Met Office (TT Chairperson);
- Mr Paul Freitag, NOAA / PMEL;
- Dr Bill Burnett, NOAA / NDBC;
- Mr Richard L. Crout, NOAA / NDBC;
- Mr Chris Meinig, NOAA / PMEL;
- Mr Rajendran Velayutham, NIOT;

- Mr Al Wallace, MSC;
- Mr Ken Jarrott, BOM;
- Ms Ariel Troisi, SHN; and
- Mr Uwe Send, SIO.

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

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, the regular Training Course on Buoy Programme Implementation and Data Management;

2. Keep under review existing training material (paper and electronic) and advise on updating as well as for the development of new material;

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; and

7. Report to the DBCP Executive Board and the DBCP at its biennial Sessions.

Membership:

The membership is open to all Panel members. The Chairperson, appointed by the Panel, has selected the following team members:

- Dr Sidney Thurston, NOAA / OCO (TT Chairperson);
- DBCP Chairperson;
- DBCP Executive Board members;
- DBCP Vice-chairpersons (or their respective deputies);
- DBCP Technical Co-ordinator;
- 2 Representatives from Western Indian Ocean region;
- Representative from South Africa;
- Representative of the IOC Secretariat; and
- Representative of the WMO Secretariat

ANNEX VI (of Annex III)

Current DBCP budget line items
(as approved at DBCP-XXIII)

The DBCP budget includes the following line items:

1. Contract for the Technical Co-ordinator[1];
2. JCOMMOPS logistical support[2];
3. Travel of DBCP Chairperson[3];
4. Travel for the Technical Co-ordinator[3];
5. Travel of DBCP Representatives[3];
6. Bank charge and support cost[4];
7. Outreach and publication activities[5];
8. JCOMMOPS infrastructure support[6];
9. JCOMMOPS information system migration[7];
10. Provision for termination / transition of the Technical Co-ordinator after 2010;
11. Technical developments and evaluations[8];
12. Capacity-Building[9];
13. Collaborative Arrangements[10];
14. JTA Chairperson's contract[11]; and
15. Contingency.

1: Includes the salary and benefits;
2: 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;
3: Missions on behalf of the Panel;
4: Bank charges and service charges from the WMO and IOC for supporting the DBCP Trust Fund;
5: DBCP and JCOMMOPS brochures and DBCP Publications;
6: Hardware and software, and host IT support for developing, running, and maintaining the JCOMMOPS Information System;
7: Provision for the migration of the JCOMMOPS Information System;
8: For example, the DBCP Iridium Pilot Project;
9: Support for DBCP-related training courses: travel of trainers and / or trainees; training materials;
10: 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
11: This expenditure is balanced by an equivalent contribution of the JTA to the DBCP Trust Fund.

ANNEX VII (of Annex III)

Terms of Reference for the DBCP Trust Fund at WMO

(as adopted at DBCP-XXIV)

1. The purpose of the DBCP Fund is to support the activities of the Data Buoy Co-operation Panel (DBCP);

2. The DBCP Fund is a Trust Fund within the provisions of Articles 9.712, 9.813 and 9.914 of the WMO Financial Regulations (Resolution 37, Cg-XV);

3. The Fund shall be managed according to an annual budget adopted by the DBCP at its regular sessions;

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 DBCP Executive Board, under its Terms of Reference, may authorise by e-mail through the WMO Secretariat the Chairperson, to commit any expenditure necessary for the resolution of these issues and the promotion of the Panel's aims and objectives, as long as these are consistent with the DBCP Operating Principles agreed by the Panel at its previous session;

6. The unit of account shall be the United States dollars. 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 voluntary contributions from WMO or IOC 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 12.215 (Resolution 37, Cg-XV); and

   (v) Miscellaneous income;

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12 9.7: Trust Funds, reserve and special accounts may be established by the Secretary-General and shall be reported to the Executive Council;
13 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;
14 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; and
15 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 items of equipment and software; 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, will be delegated to the Chairperson of the DBCP, together with the Secretary-General of WMO, or his representative. The Chairperson of the DBCP will authorize the Secretary-General of WMO, or his representative to disburse the funds by mean of a letter to the WMO Secretariat;

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; and

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.

ANNEX VIII (of Annex III)

Financial Regulations applicable to the Intergovernmental Oceanographic Commission (IOC)

(Excerpt from the Decisions by 157th 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.

ANNEX IX (of Annex III)

Current key DBCP personnel
(as elected / appointed at DBCP-XXIV)

EUROPE

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ANNEX IV

STRAWMAN PROPOSAL ON THE WAY FORWARD REGARDING WAVE OBSERVATIONS, AND RECOMMENDATIONS FROM THE JCOMM TECHNICAL WORKSHOP ON WAVE MEASUREMENTS

(New York City, New York, USA, 2-3 October 2008)

- Agreed Recommendations and Actions -

Recommendation or Action	Category	By whom
Technical Developments and Related Research		
Ensure continuity of the established buoy networks	L	National / Regional Buoy Operators
Expand directional measurement capabilities	L	National / Regional Buoy Operators
Improve spatial network for wave measurements	L	National / Regional Buoy Operators
Conduct high-quality wave measurement on open ocean reference stations, collocated with other metocean measurement platforms	M	National / Regional Buoy Operators, in coordination with OceanSITES
Extend intercomparison of (existing) various buoy networks, platforms, and instrumentation to develop a consensus for wave observation methods	I	National / Regional Buoy Operators, Wave research community
Assess the differences in buoy platforms and instrumentation as they relate to the “first 5 standard” wave measurements	I	JCOMM, PP Steering Committee after establishment
Ensure data availability for existing wave observations	I	National / Regional Buoy Operators, Wave research community
Expand the use of remote sensed measurements (e.g., wave radar, satellite) in assessment of new wave measuring technologies suitable for use on non wave or particle following buoys	M	National / Regional Buoy Operators, Wave research community

Standards, Requirements and Best Practice		
Develop requirements for spatial / temporal coverage	M	JCOMM, Wave research community
Develop / improve criteria for accuracy (in frequency domain) of wave measurement	M	JCOMM, Wave research community
Identify (spatial) areas of priority for wave measurements	M	JCOMM, Wave research community
Document pros / cons of different wave measurement methods (e.g., wave followers, corrected wave follower, corrected fixed platform, fixed platform) and develop appropriate transfer functions	I	National / Regional Buoy Operators, Wave research community
Establish guidelines of Best Practices for wave measurements from buoys (e.g., on constructing sensors, sampling, power, telemetry needs)	M	JCOMM
Develop global standards and guides based on the existing references such as US IOOS “first-five” approach	M	JCOMM
The Future		
Establish and implement the Pilot Project on Wave Measurements from Drifters (PP-WMD)	I	JCOMM, then PP Steering Committee after establishment
Establish and implement the Wave measurement Evaluation and Test from moored buoys (PP-WET)	I	JCOMM, then PP Steering Committee after establishment
Coordination / Integration of the PPs’ implementation and outcomes with META-T process and WIGOS	M	PP Steering Committees, Secretariat
Identify resources (funds, in-kind supports) for Pilot Projects and following activities	I	PP Steering Committees, Secretariat
Enhance linkage with other communities (e.g., Altimeter, SAR)	L	JCOMM, Wave research community
Enhance linkage with industry in sharing observing facilities and historical observing data	M	Industry, Wave research community

* Categories: I: Immediate action; M: mid-term plan; L: recommendation / action in longer term, and continuous actions.

JCOMM Technical Workshop on Wave Measurements from Buoys
(New York City, New York, USA, 2- 3 October 2008)

Summary of the Workshop and Proposals for Pilot Projects

1. INTRODUCTION

The background to convening the workshop was as follows:

- The JCOMM Expert Team on Wind Waves and Storm Surges (ETWS) wished to extend the very limited network of in situ wave observations from moored buoys to other regions;
- In particular, the ETWS was keen to develop significant numbers of in situ wave observations from the deep oceans, possibly using a co-ordinated network of drifting buoys;
- These wishes stemmed from a desire to improve the:
    - o Opportunities for the validation of satellite wave measurements;
    - o Opportunities for the validation of global wave models; and
    - o Density of wave measurements ahead of hurricanes, and for similar process-related studies;
- Additionally the ETWS was concerned to understand the systematic differences that had been found to exist between two major populations of similar wave measuring buoys, namely the US and Canadian coastal networks;
- The Data Buoy Co-operation Panel (DBCP) was keen to work with the ETWS to make practical progress in tackling the issues;
- The opportunity existed to involve acknowledged experts from the oil and gas industries by holding the meeting in conjunction with the OGP met-ocean meeting in New York in October; and
- This would be timely in allowing a proposal for further work to be submitted to the DBCP at its annual session in mid-October.

2. OUTCOME OF THE MEETING

2.1 Moored Buoys

- Wave buoy data geographical coverage is still very limited, especially as far as any measure of wave directionality is concerned;
- There is no “perfect” or gold standard wave measurement system presently available against which to inter-compare other types of wave measurement. However, the Datawell sensors were viewed in consensus as the best available and should form the basis for comparisons. If measurement technology improves the standard can be update some time in the future;
- Continuity of the established buoy networks and expansion of directional measurements is a priority both for operational and climate assessment requirements;

- Expanding wave observing capabilities to other parts of the worlds could be desirable from an operational point of view for the areas of interest (where waves are a key parameter for marine activities);

- Establishment of guidelines of Best Practices for wave measurements from buoys would be an important step in making the buoy measurements consistent across various networks and instrumentation types;

- There is the real need to inter-compare various buoy networks, platforms, and instrumentation to establish consistency for the “first 5 standard” wave measurements:

    - Development of standardised procedures for the buoy inter-comparison will be required;

    - In principle, a proper wave measuring device should reliably estimate the so called “first 5” for directional wave sensors;

    - Collocate different buoys with a reference standard (the consensus was for a Datawell waverider buoy) for a least a year at one or more reference sites; sites at Duck, NC and SIO (US West Coast) were identified as leading candidates, but the Gulf of Mexico, Oahu, NW Australia and the North Sea were also noted as possibilities; and

    - The concept of moving intercomparison technology was endorsed, i.e., having easily deployed sensors such as the DW which could be moved to individual sites for periods of time to compare with existing measurements there;

- For buoys not designed to follow wave slope / particle motion, a more promising approach in long-term may be to do away with the assumptions and transfer function correction, and instead measure buoy motion and then observe waves directly like from a fixed platform. Research into new measurement technology to measure waves from these platforms, particularly the OceanSites moorings, is a very high priority;

- The Meeting agreed with the WIGOS Concept of Operations (CONOPS) recommendation that all wave observational data and metadata should adhere to WIGOS standards for instruments and methods of observation;

- The Meeting also agreed with the development of Best Practices and Standards documents related to waves and to development of wave metadata within the Meta-T framework;

- There is a need to raise awareness of transfer function problems;

- There is a also a need to raise awareness of sensor options, quality, prospects;

- The DBCP could well be willing to initiate a pilot project to develop procedures and protocols for the continuous testing and evaluation of buoy wave measurements;

- If the pilot project proposal is accepted, the DBCP would likely be willing to set aside up to USD 30K per year for three years to support the project, provided that matching contributions (in-kind or cash) could be identified from other interested parties;

- The DBCP could also promote the recommendations of the New York Wave Workshop which are outside the scope of the test and evaluation Pilot Project, including expansion of the moored buoy network of wave measurement and assessment of emerging technologies; and

- The ETWS Chairperson agreed to draw up a 'strawman' proposal (this document) to be circulated for comment amongst participants, with a view to presenting it to the DBCP in Cape Town, Republic of South Africa.

2.2 Drifting Buoys

- Un-drogued drifting buoys are recognised as being good wave followers with relatively uncomplicated transfer functions;

- Two technologies were identified that might yield high-quality 2-D wave spectra from drifters:

    o Upward looking ADCP to infer 2-D spectra from wave orbital velocities; and

    o Specialised GPS to measure motion of drifter at periods of <100s;

- The ADCP technique was seen as being expensive (~USD 30K), whereas the GPS hardware was inexpensive (~USD 500);

- The GPS technique would require the development of specialised software: some companies had already been active in this field (e.g., JMA / JAXA, Datawell, CCD);

- The DBCP's long experience in transitioning buoy technology from the lab to the operational arena, and in maintaining a global fleet of >1250 drifters built, reporting and archiving to a common standard suggests that they would, in the first instance at least, be a good choice to pursue wave measurements from drifters;

- Moreover, the DBCP evaluates technologies impartially without showing favour to any particular nation, organization or manufacturer;

- The DBCP could well be willing to initiate a pilot project to:

    o Intercompare GPS drifter wave measurements with recognised industry standards through a careful test and evaluation programme; and

    o In the event that good results are obtained, to sponsor the construction and deployment of up to 50 GPS wave drifters so as to develop confidence in the use of this technology;

- If the pilot project proposal is accepted, the DBCP would likely be willing to set aside up to USD 30K per year for 3 years to support the project, provided that matching contributions (in-kind or cash) could be identified from other interested parties; and

- The DBCP Chairperson agreed to draw up a 'strawman' proposal (this document) to be circulated for comment amongst participants, with a view to presenting it to the DBCP in Cape Town, Republic of South Africa.

3. OBJECTIVES OF A PILOT PROJECT FOR THE MEASUREMENT OF WAVES FROM DRIFTING BUOYS

- Evaluate feasibility of wave measurement from drifters;
- Explore in particular use of GPS as the cost-effective means of yielding 2-dimensional wave spectra;
- Prove the technology by measurements and intercomparison with existing trusted wave measurement technologies;
- Subsequently deploy up to 50 wave measurement drifters within the framework of the pilot project; and
- Establish confidence in user community in the validity of wave measurements from drifters.

4. METHODOLOGY

- Establish a Pilot Project Steering Team comprising a wide representation from end-users, wave experts, buoy manufacturers, and buoy operators;
- Draw up a work programme (see draft later in this document) that:
    - Evaluates the potential of GPS for wave measurements from drifters;
    - Verifies the performance of GPS-equipped drifters against industry standards;
    - Leads to the deployment of a fleet of up to 50 prototype drifters; and
    - Analyses and reports on the data.
- Consult with potential end-users (e.g., global wave modellers, satellite operators, forecasters e.g., for extreme events such as hurricanes, etc.) to decide on the deployment area(s);
- Engage with buoy manufacturers to build up to 50 prototype wave measurement drifters to be deployed as part of the pilot project;
- Ensure free access to data via the DBCP servers;
- Engage with other operators and end-users to seek contributions (cash and in-kind); and
- Present results (written reports, conference presentations, scientific publications)

5. OBJECTIVES OF A PILOT PROJECT FOR THE TEST AND EVALUATION OF WAVE MEASUREMENTS FROM MOORED BUOYS

- Develop the basis for an international framework for the continuous testing and evaluation of existing and planned wave buoy measurements;
- Coordinate buoy inter-comparison activities;
- Develop technical documentation of differences due to hull, payload, mooring, sampling frequency and period, processing (e.g., frequency bands and cutoff), precision and transmission;

- Develop training material to educate users about how to deploy and operate wave sensors appropriately;

- Contribute appropriate material to the *JCOMM Standards and Best Practice Guide*;

- Establish confidence in the user community of the validity of wave measurements from the various moored buoy systems; and

- Sponsor the work needed to arrive at the most promising technique.

6. METHODOLOGY

- Establish a Pilot Project Steering Team comprising a wide representation from end-users, wave experts, buoy manufacturers and buoy operators;

- Draw up a work programme (see draft later in this document) that:

    o Establishes standards for the intercomparison of moored buoy wave measurements;

    o Documents existing procedures for moored buoy wave measurements; and

    o Establishes standards and contributes to development of guidelines for Best Practices for Wave Data and Metadata;

- Consult with buoy network operators, manufacturers and potential end users (e.g., global wave modellers, satellite operators and forecasters) potential end-users to undertake coordinated evaluations of buoy wave measurements according to the agreed-on standard;

- Engage with other operators and end-users to seek contributions (cash and in-kind); and

- Present results (written reports, conference presentations and scientific publications).

Draft Terms of Reference for the Steering Team of the DBCP Pilot Project on Wave Measurements from Drifters
(DBCP PP-WMD)

The Pilot Project will: a) evaluate the feasibility of making wave spectral measurements from GPS-equipped drifting buoys; and b) if successful, proceed to the deployment of a network of up to 50 GPS-equipped drifting buoys.

The Pilot Project will also run for an initial three-year period from November 2008 and will report to the DBCP on progress at its annual sessions.

The Pilot Project will seek to evaluate the feasibility of GPS wave technology for drifters in terms of:

1) Data quality in comparison to established industry references;

2) Sensor reliability and survivability;

3) Limitations of sensor validity as a function of sea state;

4) Data throughput in terms of quantity and timeliness;

5) Data management, especially data formatting and insertion on the GTS;

6) Operational shipment and deployment, including rapid response options;

7) Cooperation with developing countries in terms of drifter deployment and technology transfer;

8) Collaboration with manufacturers to promote availability of GPS-equipped wave drifters; and

9) Overall cost effectiveness (manufacturing, transmission, data processing and lifetime).

The Steering Team is tasked to guide the Pilot Project in achieving the tasks described above.

Draft Steering Team Membership – please add / delete your name if interested / uninterested

The Steering Team is comprised of the following individuals:

- Mr David Meldrum (Chairperson) (David.Meldrum@sams.ac.uk);
- Mr Val Swail (val.swail@ec.gc.ca);
- Mr Peter Niiler (pniiler@ucsd.edu);
- Dr Jean Bidlot (jean.bidlot@ecmwf.int);
- Ms Hester Viola (viola@jcommops.org);
- Mr Andy Sybrandy (asybrandy@pacificgyre.com);

- Dr Bill Burnett (Bill.Burnett@noaa.gov);
- Mr Bob Jensen (Robert.E.Jensen@usace.army.mil);
- Mr Tony Chedrawy (tony@metocean.com);
- Mr Jeff Wingenroth (jw@technocean.com);
- Mr Eric Terrill (eterrill@ucsd.edu);
- Mr Hans Graber (hans@miami.edu); and
- Mr Harry Pannekeet (sales@datawell.nl).

Secretariat support will be provided by the WMO and IOC. The contact points are as follows:

- Mr Etienne Charpentier, WMO, Geneva, Switzerland (echarpentier@wmo.int); and
- Ms Boram Lee, IOC, France (b.lee@unesco.org).

DBCP PP-WMD – Draft Workplan

Year 1 – analysis of available technologies

1. Establish what potentially low-cost technologies (GPS or otherwise) exist for making wave measurements from drifters, and establish links with the developers of these technologies;

2. Undertake lab and field trials of selected systems; field trials to take place at an established wave measurement facility (e.g., SIO or Duck);

3. Analyse intercomparison data in terms of quality, reliability and performance limitations;

4. Examine options for improving data quality, reliability and performance envelope;

5. Present results to DBCP-XXV; and

6. Decide if the technology is good enough to warrant a more extensive trial in Year 2, or if further development is needed.

Year 2 – proceed to larger deployment if results are encouraging

1. Engage with buoy manufacturers to develop a common specification for prototype drifters;

2. Develop a cost-sharing mechanism for the construction and deployment of up to 50 wave drifters within available resource limitations;

3. Consult with end users to draw up a deployment strategy that might best demonstrate the viability of the technique or otherwise;

4. Commence deployments;

5. Analyse results and present to DBCP-XXVI and other fora; and

6. Decide if modifications are needed to the plan or the technologies for year 3.

Year 3 – continue with development and deployments

1. Invoke any technology changes deemed desirable;

2. Continue with deployments within funding limitations;

3. Analyse and publish results as widely as possible;

4. Decide if a case can be made to continue the pilot project for a further year and investigate follow-on mechanisms; and

5. Report to DBCP-XXVII.

DBCP-ETWS PP-WET

Pilot Project on Wave measurement Evaluation and Test from moored buoys

BACKGROUND

The JCOMM Technical Workshop on Wave Measurements from Buoys (New York City, New York, USA, 2-3 October 2008) recognized and supported the recent work carried out in the development of the US IOOS Operational Wave Observation Plan (September 2007) and its related documents including the March 2007 US Wave Sensor Technologies Workshop. The underlying basis for that plan, which was endorsed by the NY Workshop, made the case that continuous testing and evaluation of wave measurement systems is an essential programme activity, of equal importance to the deployment of new assets. In particular, it was agreed that:

- the success of a directional wave measurement network is dependent in large part on reliable and effective instrumentation (e.g. sensors and platforms);
- a thorough and comprehensive understanding of the performance of existing technologies under real-world conditions is currently lacking; and
- independent performance testing of wave instruments is required.

The New York Workshop also confirmed the following basic principles:

- the basic foundation for all technology evaluations, is to build community consensus on a performance standard and protocol framework;
- multiple locations are required to appropriately evaluate the performance of wave measurement systems given the wide spectrum of wave regimes that are of interest; and
- protocols and resources could be established to conduct “in-place” evaluations of wave measurement systems, which cannot easily be moved to the test sites.

The Meeting further agreed that the most effective way to proceed with a DBCP-based Pilot Project on Wave Measurement Test and Evaluation was to expand and extend the relevant parts of the US experience from the IOOS Wave Plan test and evaluation activities to an international context within JCOMM.

OBJECTIVES

- Develop the basis for an international framework for the continuous testing and evaluation of existing and planned wave buoy measurements;
- Coordinate buoy inter-comparison activities;
- Develop technical documentation of differences due to hull, payload, mooring, sampling frequency and period, processing (e.g., frequency bands and cutoff), precision and transmission;
- Develop training material to educate users about how to deploy and operate wave sensors appropriately;
- Contribute appropriate material to the *JCOMM Standards and Best Practice Guide*; and

- Establish confidence in the user community of the validity of wave measurements from the various moored buoy systems.

METHODOLOGY

- Establish a Pilot Project Steering Team comprising a wide representation from end-users, wave experts, buoy manufacturers and buoy operators;

- Draw up a work programme (see draft later in this document) that:

  - Establishes standards for the intercomparison of moored buoy wave measurements;

  - Documents existing procedures for moored buoy wave measurements; and

  - Establishes standards and contributes to development of guidelines for Best Practices for Wave Data and Metadata;

- Consult with buoy network operators, manufacturers and potential end users (e.g., global wave modellers, satellite operators and forecasters) potential end-users to undertake coordinated evaluations of buoy wave measurements according to the agreed-on standard;

- Engage with other operators and end-users to seek contributions (cash and in-kind); and

- Present results (written reports, conference presentations and scientific publications).

Draft Steering Team Membership – please add / delete your name if interested / uninterested

The Steering Team is comprised of the following individuals:

1. Mr Bob Jensen (Chair) (Robert.E.Jensen@usace.army.mil);

2. Mr David Meldrum (David.Meldrum@sams.ac.uk);

3. Mr Val Swail (val.swail@ec.gc.ca);

4. Dr Jean Bidlot (Jean.Bidlot@ecmwf.int);

5. Ms Hester Viola (viola@jcommops.org);

6. Mr Chung-Chu Teng (Chung-Chu.Teng@noaa.gov);

7. Dr Bill Burnett (Bill.Burnett@noaa.gov);

8. Ms Julie Thomas (jot@splash.ecsd.edu);

9. Mr Hans Graber (hans@miami.edu);

10. Mr Harry Pannekeet (sales@datawell.nl);

11. Mr Bill O'Reilly (bor@coast.ucsd.edu);

12. Mr Jon Turton (jon.turton@metoffice.com);

13. Mr Christian Meinig (Christian.Meinig@noaa.gov);

14. Ms Anne Karin Magnusson (anne.karin.magnusson@met.no);

15. Mr Kevin Ewans (kevin.ewans@shell.com);

16. Mr George Forristall (george@forocean.com);

17. Mr Stan Stroud (stan.stroud@woodside.com.au);

18. Mr Joao A. Lorenzzetti (loren@dsr.inpe.br); and

19. Representative(s) from Korea, Australia, Mediterranean, India:

Secretariat support will be provided by the WMO and IOC. The contact points are as follows:

- Mr Etienne Charpentier, WMO, Geneva, Switzerland (echarpentier@wmo.int); and
- Ms Boram Lee, IOC, France (b.lee@unesco.org).

DRAFT WORKPLAN

The Pilot Project will run for an initial two-year period from November 2008 and will report to the DBCP on progress at its annual sessions. The Steering Team shall be selected and tasked to guide the Pilot Project through the following actions:

Year 1

1. Expand and extend the relevant parts of the US experience from the IOOS Wave Plan test and evaluation activities to an international context within JCOMM;

2. Develop or adapt, as necessary, test and evaluation standards and the methodology for the inter-comparisons for both directional and non-directional data;

3. Establish basic protocols for how the field tests of wave measurement systems will be conducted (note that SIO has already established tools for wave sensor intercomparison);

4. Develop specific protocols for how the first set of system tests will be conducted (e.g., length of time for testing), and analysis software to be used, and how results will be presented;

5. Develop metadata standards for wave measurements and documentation of existing wave measurement metadata in coordination with the Meta-T PP (there already is an ODAS standard for buoy metadata);

6. Liaise with existing marine metadata projects to develop support for the goals of the Pilot Project (e.g., ODAS, IODE and WIS);

7. Develop technical documentation and evaluation of differences due to hull, payload, mooring, sampling frequency and period, processing (e.g., frequency bands and cutoff), precision, transmission in existing global moored buoy networks;

8. Identification and possible development of standard wave quality control guidelines;

9. Contribute, as appropriate, to the *JCOMM Standards and Best Practice Guide*; and

10. Present results to DBCP-XXV and other scientific fora.

Year 2

1. Carry out coordinated intercomparisons of wave measurements from different platforms on an opportunistic basis as proof of concept of the test and evaluation plan;

2. Develop a plan for the implementation of a continuous technology testing and evaluation program;

3. Promote the development of new wave measurement sensors and measurement techniques and their evaluation;

4. Identify approaches to evaluating the performance (e.g., comparisons to a currently accepted technology / approach) of current operational and pre-operational (including nautical and HF radar, ADCP, GPS sensors, and ASIS buoys) in situ and remote sensing technologies;

5. Investigate the possibility of an alternative testing site if an ocean platform, suitable for mounting a pressure array, were to be available through an industry partnership agreement; the evaluation framework would remain the same irrespective of the actual site;

6. Develop training material to educate users about how to deploy and operate wave sensors appropriately;

7. Decide if a case can be made to continue the pilot project for a further year and investigate follow-on mechanisms; and

8. Present results to DBCP-XXVI and other scientific fora.

ANNEX V

REPORT FROM THE EXECUTIVE BOARD MEETING
(Cape Town, Republic of South Africa, 14 October 2008)

1.1 The Executive Board convened at 1930 on 14 October 2008 to discuss a number of issues that had arisen during the day's plenary session. Those present were:

Mr David Meldrum (DBCP Chairperson);

Mr Ken Jarrott (DBCP Vice-chairperson);

Mr Al Wallace (DBCP Vice-chairperson);

Dr Sidney Thurston (Panel Member);

Mr Etienne Charpentier (WMO Secretariat representative);

Ms Boram Lee (IOC Secretariat representative); and

Ms Hester Viola (DBCP Technical Co-ordinator).

A quorum of the EB was therefore present and the EB was consequently able to make recommendations and, if needs be, decisions. The discussions and recommendations are described in the following paragraphs. The Panel is invited to freely discuss the recommendations with a view to agreeing a set of decisions and actions for the next intersessional period and beyond.

1.2 Proposed expenditures on Pilot Projects and the like. A number of suggestions had been made before and during the session, which potentially had cost implications for the Panel. These suggestions were as follows:

a) Continuation of the DBCP Iridium Pilot Project for a third year;

b) A new Argos-3 Pilot Project proposed by CLS;

c) A new JCOMM Pilot Project on Wave Measurements from Moored Buoys (WET);

d) A new DBCP Pilot Project on Wave Measurements from Drifting Buoys (WMD);

e) A proposal to provide continuation funding for OceanSITES technical support;

f) The funding of barometer upgrades to offset the shortfall in provision by the GDP;

g) Capacity-Building; and

h) Printing of the DBCP brochure.

1.3 Iridium Pilot Project. It was felt that there was merit in extending the deployment phase of the Iridium Pilot Project for a further year (until July 2010) by funding a further 40 Iridium upgrades explicitly for deployment in those areas which had so far not been well populated (see agenda item 7.1). Preferred areas of deployment included the central Atlantic and the south Pacific. In the event that no deployment opportunities were identified for these regions by the upgrade route, consideration should be given to the outright purchase of drifters for populating these areas. A larger cohort of drifters would also be beneficial for subsequent analysis in terms of performance and cost-benefit. Such an analysis should focus carefully on the energy budget and failure modes of the drifters with a view to defining best practice for subsequent buoy manufacture

and deployment. It was recognised that buoy lifetimes depended critically on the sampling and transmission strategies that were implemented, and the EB asked the Iridium Pilot Project Steering Team (therefore also the manufacturers) to consider this issue and make a set of recommendations for future deployments.

1.4 Argos-3 Pilot Project. The EB welcomed the generous offer from CLS of 50 Argos-3 capable drifters to the project, 25 of which would be equipped with barometers, and was unanimous in wishing to commit DBCP support, both cash and in-kind. It was realized that planning of the project was at a very early stage, and did not wish to be prescriptive as to how this support might be used, though it recognized that funding further barometer upgrades might prove attractive to the eventual project steering team.

1.5 JCOMM Moored Buoy Pilot Project (WET). The EB recognized the potential of this project to resolve the inconsistencies and uncertainties that surrounded moored buoy wave measurements, and felt that the project should go ahead under joint DBCP / JCOMM-ETWS leadership. The EB also recognized that matched funding could well be available from other interested parties (e.g., JCOMM, USACE and NDBC), and that a relatively minor contribution from the DBCP would be necessary to allow the project to move forward.

1.6 DBCP Waves Drifter Project (WMD). This project had the potential to vastly increase the amount of in situ wave spectral collected from the deep oceans, provided that a suitable low-cost wave measuring technology (e.g., GPS) could be identified and suitably verified. It was recognized that any eventual deployment of a fleet of prototype drifters within the project would be contingent on a successful verification. Once again, cash and in-kind support could be expected from a number of bodies, including buoy manufacturers. It might also be possible to repeat the upgrade scheme (as had been successfully used for procuring additional barometer-equipped drifters, and within the Iridium Pilot Project).

1.7 OceanSITES. This Action Group had been successful in winning funding from NOAA for technical coordination (provided by the DBCP TC) and for IT support. The long-term continuation of this funding was contingent on USD 30,000 matched funding from sources, and OceanSITES was actively exploring other avenues, including possible support from the DBCP Trust Fund. The EB was sympathetic to this request, and offered USD 30,000 of matched funds to bridge a possible gap in 2009, the money to come from the Collaborative Arrangements line item. It further suggested that the Panel should work with OceanSITES to try to bring in additional funds through new contributions or contributors. Such contributions might be linked to promoting freer dissemination of relevant OceanSITES data via the WIS.

1.8 Additional barometer upgrades. The EB felt that the cost of any additional upgrades should come from the operational agencies, and that an appeal to these agencies following the next CBS meeting (which was expected to endorse the requirement for barometers on all drifters) should yield a positive response.

1.9 Capacity-Building. The EB felt that the Panel it had a real contribution to make this area, but that it had failed to capitalize on its early success with the Ostend Training Workshop in Data Buoy Programme Management. With the hosting of the current session in Africa, attended by delegates from a number of African countries, the time was clearly ripe for the planning of an in-region Capacity-Building activity during 2009. The EB therefore recommended that the Panel retain the CB line item in the budget at a significant level.

1.10 The EB welcomed the kind offer of Southern Hemisphere Vice-chairperson (Mr Ken Jarrott) to cover brochure production from Bureau of Meteorology (BOM) funds.

1.11 Finally, taking into account the likely budget for discretionary activities that the Panel would have at its disposal, the EB suggested the following table of budget maxima in USD 1,000 units over three years. After discussion, this was accepted by the Panel.

Activity	**2009**	**2010**	**2011**
Iridium Pilot Project (40 upgrades)	20	0	**0**
Argos-3 Pilot Project	10	10	**0**
Moored buoy pilot (WET)	10	10	**0**
Waves drifter pilot (WMD)	10	?10	**?10**
OceanSITES support	30	0	**0**
Barometer upgrades	0	0	**0**
Capacity-Building	25	25	**25**
Brochure	0	0	**0**
Total	**105**	**55**	**35**

ANNEX VI

INTERIM STATEMENTS OF ACCOUNT

TABLE 1: IOC STATEMENT OF ACCOUNT FOR THE PERIOD OF 1 JANUARY 2008 ~ 31 JULY 2008

193-GLO-2001

INTERGOVERNMENTAL OCEANOGRAPHIC COMMISSION

DBCP/SOOP Technical Coordinator: Salary, Missions and Other Costs

(Statement of Account from 1 January 2008 to 31 July 2008)

(Expressed in US Dollars)

Cash Balance Brought Forward as at 1 January 2008			279,491.79
Funds Received from:			-
Deduct:			
Disbursements			
Salary of Ms Hester Viola:	1/2008 - 7/2008		55,497.30
Missions :	Ms Hester Viola		
	Paris - December 2007	1,966.71	
	USA - March 2008	4,253.40	
	UK - March 2008	2,502.20	
	Austria - April 2008	1,980.27	
	Paris - April 2008	1,098.30	
	Poland - May 2008	2,329.62	
	Iceland - May 2008	2,523.37	16,653.87
Sub-contract :	Logistical Support		16,877.01
Cash balance as at 31 July 2008			190,523.61

Note: The IOC Statement for the period 1 January 2007 to 31 December 2007 can be found in the DBCP Annual Report for 2007.

TABLE 2: WMO INTERIM STATEMENT OF ACCOUNT FOR THE PERIOD 1 JANUARY 2008 TO 31 AUGUST 2008

DATA BUOY CO-OPERATION PANEL

Interim Statement of income and expenditure
For the period 1 January to 31 July 2008
Amounts in United States dollars

1. Balance brought forward , 1 Jan 2008					151,769
2. Income:					
2.1 Contributions received					130,539
3. Total available funds during reporting period					282,308
4. Expenditure		Actual	Obligations	Total	
4.1 Direct project costs					
4.1.1 Travel - Jon Turton		1,417	-	1,417	
4.1.2 Travel - J. Rolland		(1,336)	-	(1,336)	
4.1.3 Mandatory Publications		-	973	973	
4.1.4 DBCP contribution to JMCOMMOPS Inf. System Dev		3,930	-	3,930	
4.1.5 Upgrade, activation & airtime for 27 drifters DBCP proj		14,751	-	14,751	
4.1.6 Total direct costs		18,762	973	19,735	
4.2 Indirect project costs					
4.2.1 Support costs at 3%		563	29	592	
4.2.2 Bank charges		58	-	58	
4.2.3 Exchange differences		(13,983)		(13,983)	
4.2.4 Total indirect costs		(13,362)	29	(13,333)	
4.3 Total project expenditure					6,402
5. Balance of fund at 31July 2008					**275,906**

Contributions received	**for 2007**	**for 2008**	**Total**
Canada	20,784	24,263	45,047
CLS Argos	-	20,000	20,000
France -CNRM Meteo France	-	63,092	63,092
New Zealnd	2,400	-	2,400
Total	2,400	83,092	130,539

Certified correct:

Luckson Ngwira
Chief, Finance Division
11-Aug-08

Notes:
4.1.1: Mr Jon Turton providing training at the DBCP Capacity-Building Workshop, Ostend, Belgium, June 2007; 4.1.2: Mr Jean Rolland representing the DBCP at the OPSC evaluation meeting, Paris, France, 11 April 2008; and 4.1.3: Publication of the DBCP-XXIII Final Report.

The WMO Statement for the period 1 January 2007 to 31 December 2007 can be found in the DBCP Annual report for 2007.

ANNEX VII

TABLE OF NATIONAL CONTRIBUTIONS FOR 2009

Country	JCOMMOPS	DBCP	SOT	JTA	Comment
Australia	USD 16,200				
Canada	CAD 25,000				CAD 25,000
CLS				USD 15,000	USD 15,000 for the JTA Chairperson
E-SURFMAR		EUR 40,000			Belgium, Croatia, Cyprus, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Netherlands, Norway, Portugal, Spain, Sweden and the United Kingdom
Germany			USD 5,000		Contribution for SOOPIP
India		USD 3,000			
New Zealand	USD 2,400				NZ to confirm that their contribution is for JCOMMOPS as a whole
South Africa		USD 4,500			
United States		USD 80,000	USD 25,000		Contribution made to the IOC

ANNEX VIII

BUDGET FOR THE NEXT YEAR

(finalized interim accounts based on WMO and IOC statements in Annex VI, and planned income / expenditures for the remainder of the year, 2008 and 2009)

TABLE 1

DBCP TRUST FUND Summary

TERIM BUDGET 2008 BASED ON WMO and IOC ACCOUNTING FOR 2006-2008 IN USD as at 31 July 2008 [Amended at DBCP24 on 15 October 2008]

	Actual			Actual			Actual income & expenditure Jan-July			Budget			Budget		
	2006		**Balance**	**2007**		**Balance**	**2008**		**Balance**	**2009**		**Balance**	**2010**		**Balance**
Item	**Receipts**	**Obligations**	**at 31 Dec.**	**Receipts**	**Obligations**	**at 31 Dec.**	**Receipts**	**Obligations**	**at 31 Dec.**	**Receipts**	**Obligations**	**at 31 Dec.**	**Receipts**	**Obligations**	**at 31 Dec.**
DBCP															
Carried over	206,640			237,643			429,464			470,930			401,380		
Contributions	126,188			411,233			135,039			229,950			229,950		
Adjustment	9,015			6,907			13,983								
Expenditure															
Technical Coordination		55,152			86,934			55,437			100,000			100,000	
Consultancy		12,090			15,854						15,000			15,000	
Travel		28,151			40,921			13,521			43,000			43,000	
Bank Charges/Support Cost		1,399			3,724			650			12,500			12,500	
IOC					60,000										
Marine Programme															
JCOMMOPS		7,408						20,807			22,000			52,000	
Outreach and Publications								973			2,000			2,000	
Supp Meetings/Workshops															
New Technical Evaluation								14,751			50,000			30,000	
Capacity Building					17,089			1,417			25,000			25,000	
Contingency					50,000			50,000			50,000			50,000	
Collaborative Arrangements											30,000			20,000	
Total DBCP	**341,843**	**104,200**		**655,783**	**274,522**		**578,486**	**157,556**		**700,880**	**349,500**		**631,330**	**349,500**	
Unliquidated obligations		11,847			1,797										
Balance of DBCP Trust Fund			**225,796**			**379,464**			**420,930**			**351,380**			**281,830**
Contingency						***50,000***			***50,000***			***50,000***			***50,000***
Carried over			**237,643**			**429,464**			**470,930**			**401,380**			**331,830**

↙↙↙↙↙↙↙↙↙ Rough estimation Rough estimation

TABLE 1

Balance/Carry over based on CURRENT level of expenditure

TABLE 2

INTERIM Statement for the 2008 DBCP Trust Fund: Income and Expenditure in USD
(based on WMO Finance Information as at 31 July 2008 and IOC Finance Information as at 31 July 2008)
Amended for 2009 Expected Expenditure at DBCP24 on 15 October 2008 9(yellow)

	Final account		Final account		2008				Estimated budget		Estimated budget	
	Jan-Dec 2006		Jan-Dec 2007		Expenditure Jan-July		Estimated budget		Jan-Dec 2009		Jan-Dec 2010	
DBCP	WMO	IOC	WMO	IOC	WMO	IOC	WMO	IOC	WMO	IOC	WMO	IOC
Receipts												
Brought Forward	22,161	184,479	113,350	124,293	151,769	277,695	151,769	277,695	280,406	190,524	280,406	190,524
Contributions (listed below)	126,188	0	141,233	270,000	135,039	0	100,750	105,000	124,950	105,000	124,950	105,000
Adjustment	9,015		6,907		*13,983*							
Total Receipts	**157,364**	**184,479**	**261,490**	**394,293**	**300,791**	**277,695**	**252,519**	**382,695**	**405,356**	**295,524**	**405,356**	**295,524**
Expenditure/Oblig'ns												
Consultancy (JTA Chair)	12,090		15,854				17,500		15,000		15,000	
Tech Coordination		55,152		86,934		55,437		98,000		100,000		100,000
JCOMMOPS logistic supp		890				16,877		15,000		15,000		15,000
IOC			60,000						0		0	
Marine Programme												
Travel/Missions												
Tech Coordinator		4,144		27,850		14,857	10,000	10,000	20,000		20,000	
DBCP Chairman	21,988		13,071				21,000		21,000		21,000	
DBCP Representatives	2,019				-1,336		2,000		2,000		2,000	
Bank Charges/SuppCost/Other	1,399		3,707	17	650		2,500	10,000	2,500	10,000	2,500	10,000
Projects & Activities												
Outreach and Publications					973		2,000		2,000		2,000	
JCOMMOPS Data Devt	6,518				3,930		7,000		7,000		7,000	
JCOMMOPS IS migration											30,000	
Supp. DBCP Mtgs/WSs												
New Technical Evaluation					14,751		30,000		50,000		30,000	
Capacity Building			17,089		1,417		25,000		25,000		25,000	
Contingency			30,000	20,000			30,000	20,000	30,000	20,000	30,000	20,000
Collaborative Arrangement							20,000		30,000		20,000	
Total Expenditure	**44,014**	**60,186**	**139,721**	**134,801**	**20,385**	**87,171**	**167,000**	**153,000**	**204,500**	**145,000**	**204,500**	**145,000**
Unliquidated Obligations		*11,847*		1,797								
Balance of Fund	**113,350**	**112,446**	**121,769**	**257,695**	**280,406**	**190,524**	**85,519**	**229,695**	**200,856**	**150,524**	**200,856**	**150,524**
Contingency carry over			**30,000**	**20,000**			**30,000**	**20,000**	**30,000**	**20,000**	**30,000**	**20,000**
Carried over	**113,350**	**124,293**	**151,769**	**277,695**	**280,406**	**190,524**	**115,519**	**249,695**	**230,856**	**170,524**	**230,856**	**170,524**
Contributions												
Argos Inc												
Australia #	16,200		32,400						16,200		16,200	
Canada $	20,000				45,047		22,750		22,750		22,750	
CLS			15,000		20,000		17,500		17,500		17,500	
E-SURFMAR *	62,393		53,333		63,092		53,600		53,600		53,600	
France(incl E-SURFMAR)*												
Germany * #	11,000		5,000						5,000		5,000	
Greece												
Iceland												
India #	3,000		6,000						3,000		3,000	
Ireland												
Japan												
Netherlands												
New Zealand * $	4,800				2,400		2,400		2,400		2,400	
Norway												
South Africa	4,500		4,500		4,500		4,500		4,500		4,500	
United Kingdom	4,295											
United States of America		0	25,000	210,000				105,000		105,000		105,000
WMO		0		60,000								
Total	**126,188**	**0**	**141,233**	**270,000**	**135,039**	**0**	**100,750**	**105,000**	**124,950**	**105,000**	**124,950**	**105,000**
	*=including		#=including		$=including			E		E		E
E=Estimate	2007 contribution		2008 contribution		2007 contribution							

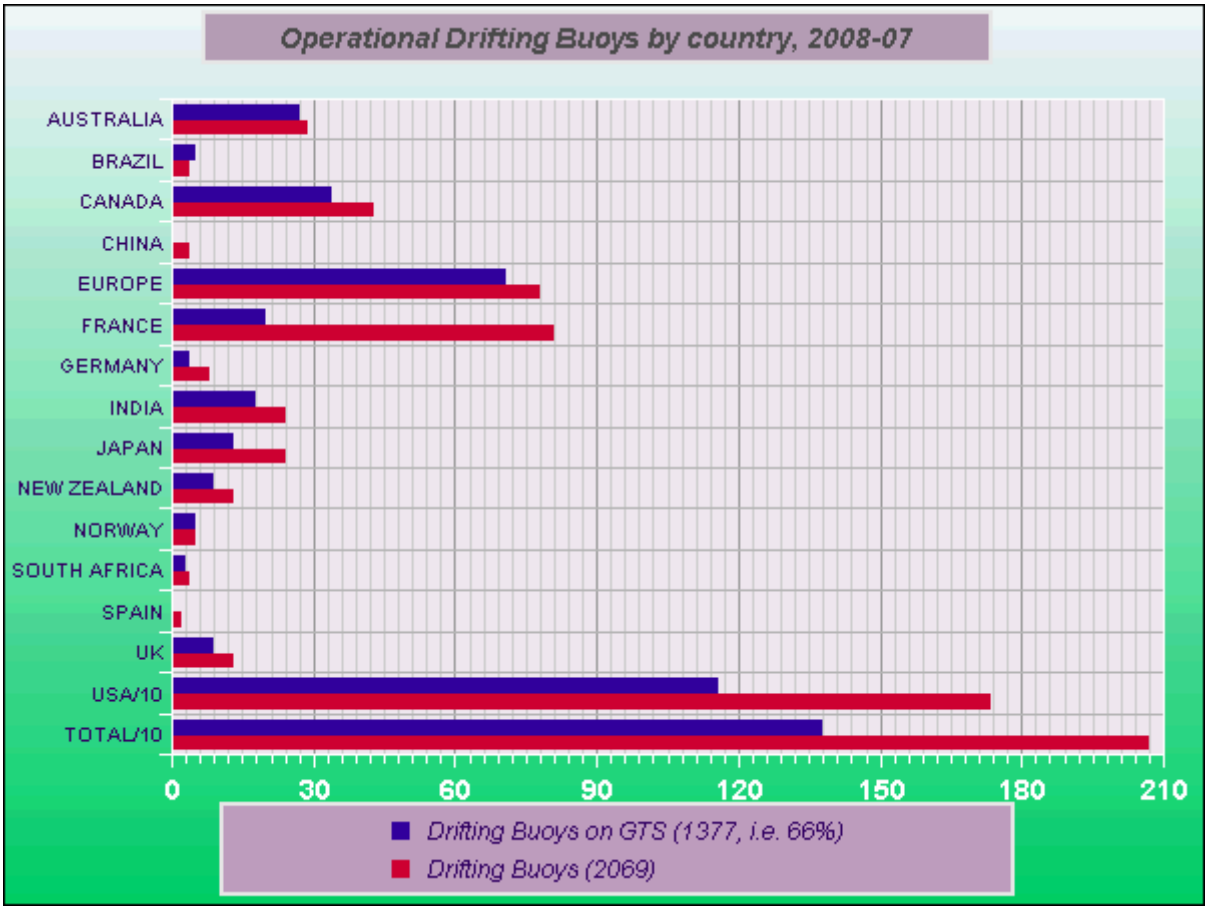
Notes:
"DBCP Representatives": Mr Jean Rolland travelling on behalf of DBCP Chairperson for the OPSC evaluation meeting, Paris, France, 11 April 2008.

ANNEX IX

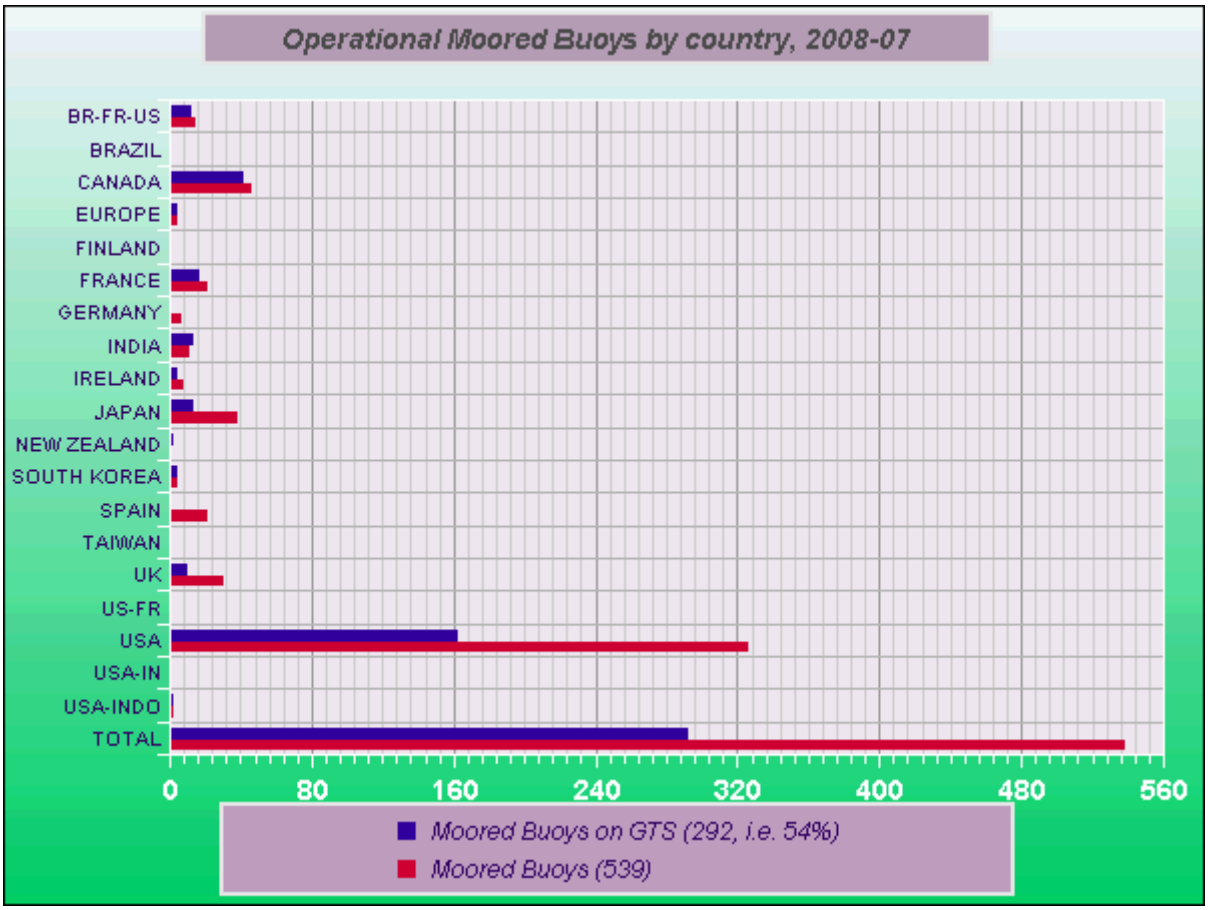
STATUS REPORTS AND MAPS

(as of August 2008)

1. PRESENT STATUS OF BUOY PLATFORMS



Graph 1: Drifting Buoys (mostly reporting via Argos)
and those on the GTS by country for July 2008.



Graph 2: Moored Buoys reporting via Argos and those on the GTS by Country for July 2008.

N.B New Zealand 'Mooring' is a stationary drifting buoy.

1. Amongst the drifting and moored buoys reporting on the GTS in BUOY (and SHIP) message formats; the following variables were measured in July 2008. There has been a steady growth in the number of buoys reporting Air Pressure in the last year.

Variable	Any	Air P	P Tend.	SST	Air T	Hum.	Wind	Waves	Sub/T
Drifting Buoys	1377	603	546	1233	39	1	7	12	4
Moorings	292	200	161	256	254	151	251	186	83

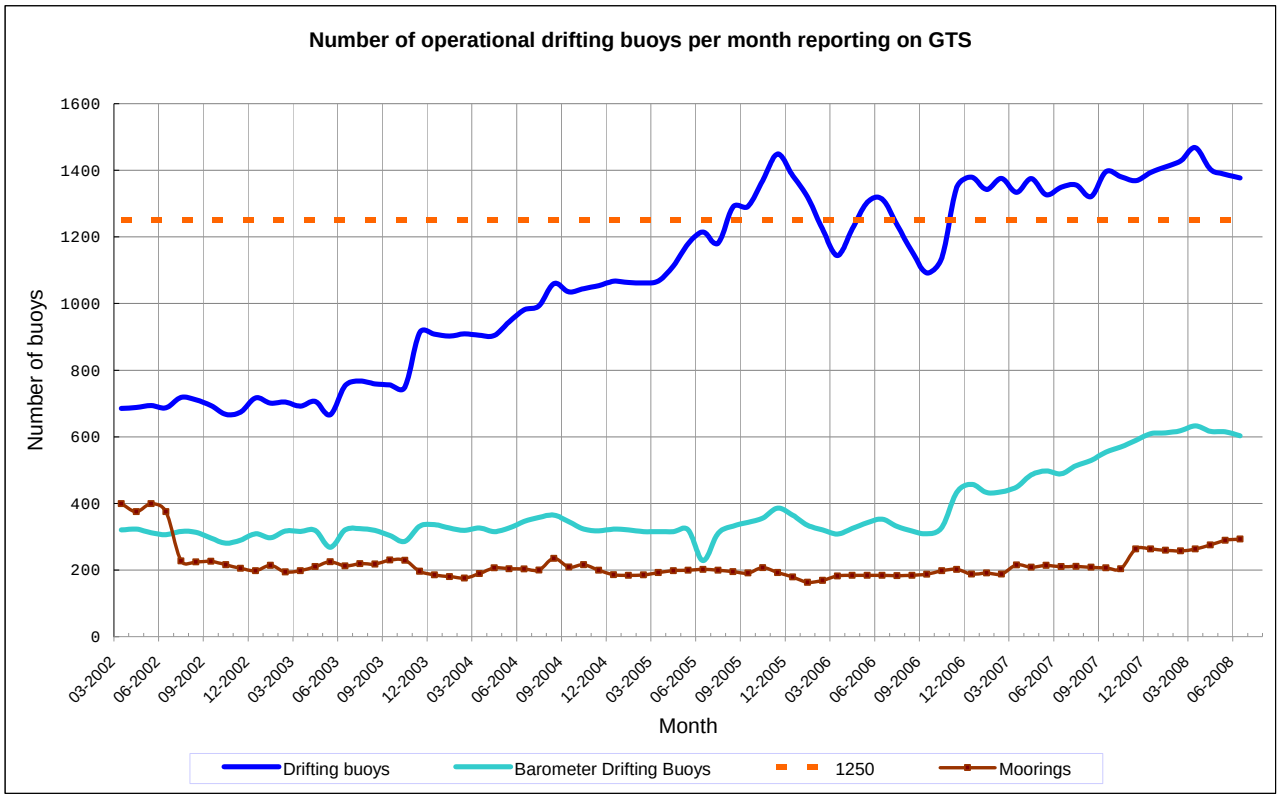
Table 1: Drifting and Moored buoys – variables being reported on the GTS

Year	Operational drifting buoys at JCOMMOPS	On GTS	% on GTS
July 1991	718	264	36.8%
July 1992	1162	474	40.8%
August 1993	1269	548	43.2%
September 1994	1246	587	47.1%
September 1995	1429	631	44.2 %
September 1996	1180	638	54.1%
September 1997	1159	581	50.1%
August 1998	1230	543	44.1%
July 1999	1270	728	57.3%
July 2000	1385	807	58.3%
July 2001	1338	763	57%
July 2002	919	459	49.9%
August 2003	1436	752	52.3%
July 2004	1727	950	55%
June 2005	2396	1157	48%
August 2006	2218	1237	55%
August 2007	2026	1295	64%
July 2008	2069	1377	66%

Table 2: Evolution of GTS Buoy data percentage

2. Météo-France provided the Data Availability Index Maps on a monthly basis. The maps were useful to identify the data sparse ocean area for each kind of geo-physical variable and therefore to assist the various data buoy programmes in adjusting deployment strategies.

3. The graph below shows the number of operational drifting buoys over the last 6 years.



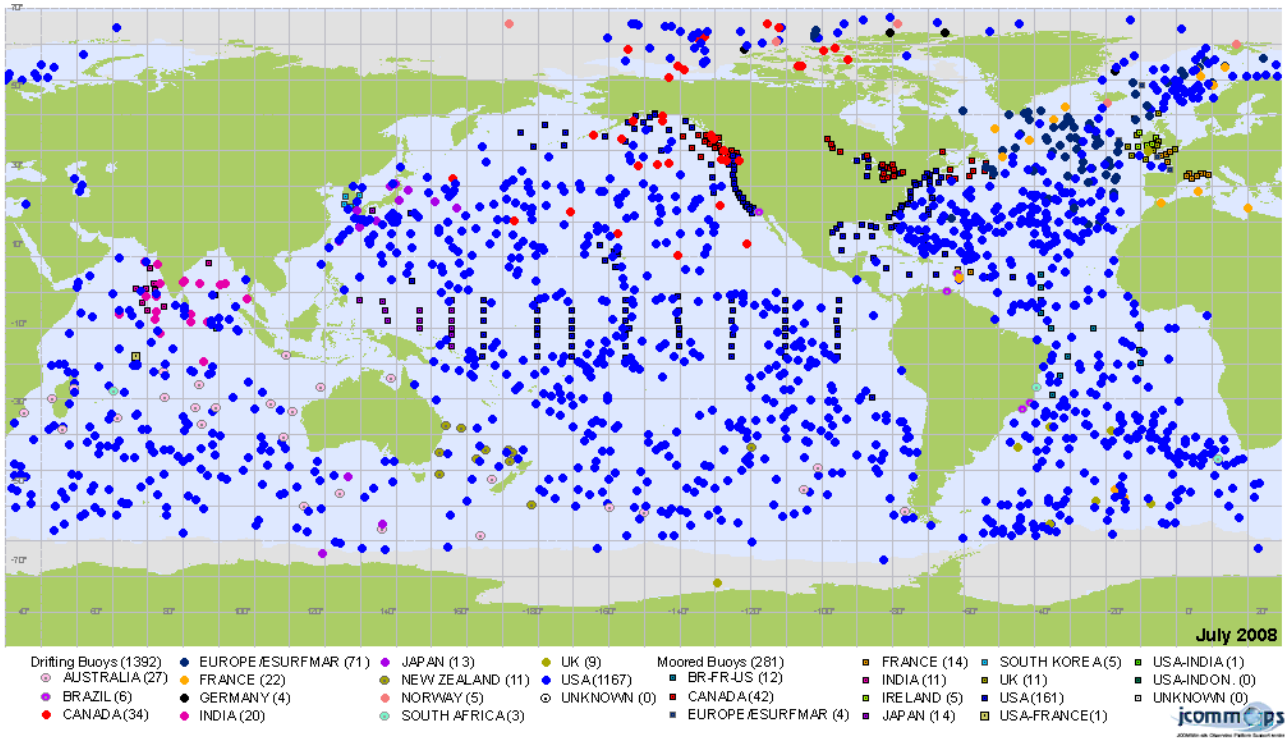
Graph 3: Monthly evolution of the number of operational drifting buoys reporting on GTS from March 2002 to July 2008 and those reporting air pressures. Operational Moored buoys are also included. (Data derived by statistics computed from GTS in situ marine data provided by Météo-France).

4. This graph shows the continued growth in the number operationally reporting air pressure measurements, though in the last three months that has levelled off a little. A significant growth occurred in the first half of the intersessional period, then a drop in April – May 2008. The inclusion of barometers on buoys has been well supported. The total number of buoys globally has become more stable in the last year than previously, presumably as buoy operators become more used to how many buoys need to be deployed to stay in 'maintenance mode' for the network.

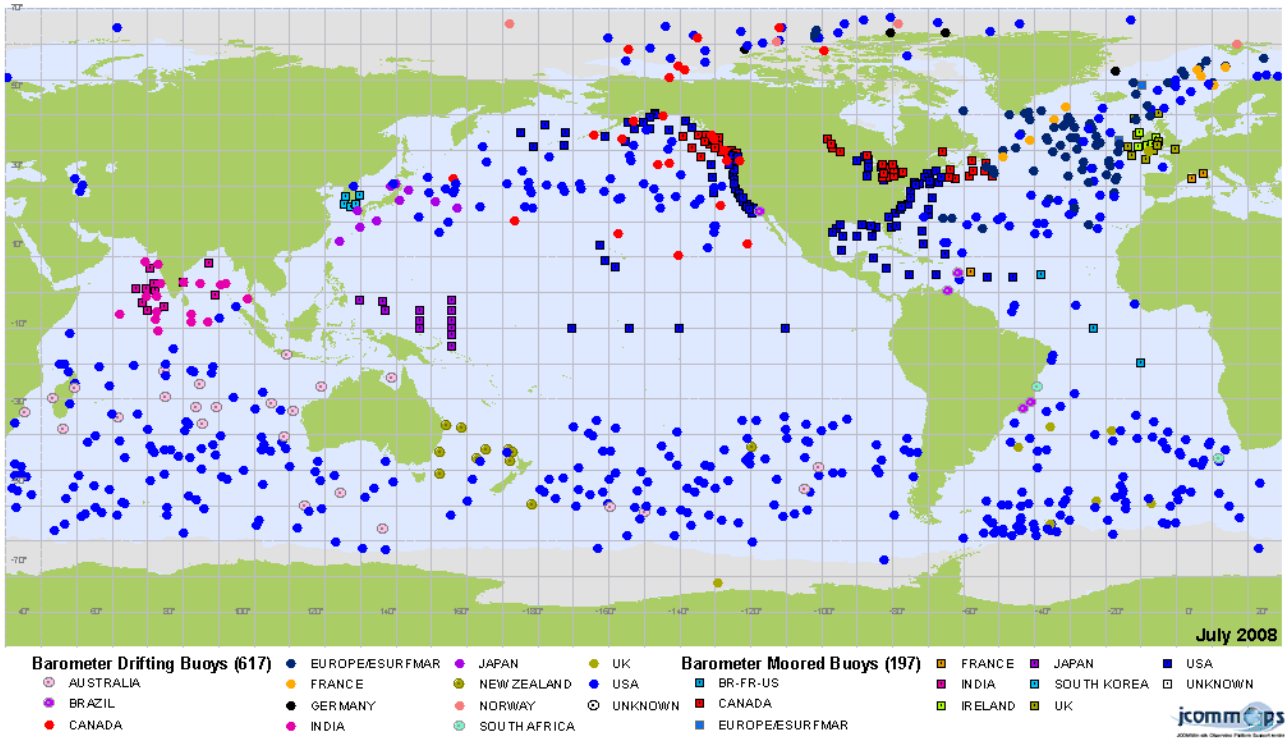
5. The Panel seems to be well prepared to maintain its network above 1250 buoys, but still, efforts are needed in sharing deployment opportunities (within DBCP and with other programmes), as well as assessment of buoy lifetimes and where buoys need to be placed, to ensure an even coverage across the globe.

6. The Global Drifter Center, supported by NOAA, continues to offer the Barometer upgrade opportunity for standard SVP drifters for ~ USD 1000 per unit (see the following URL for details: http://www.jcommops.org/dbcp/svpb_upgrade.html). The goal of having a barometer on all buoys should be critically assessed by the Panel to see if that is achievable.

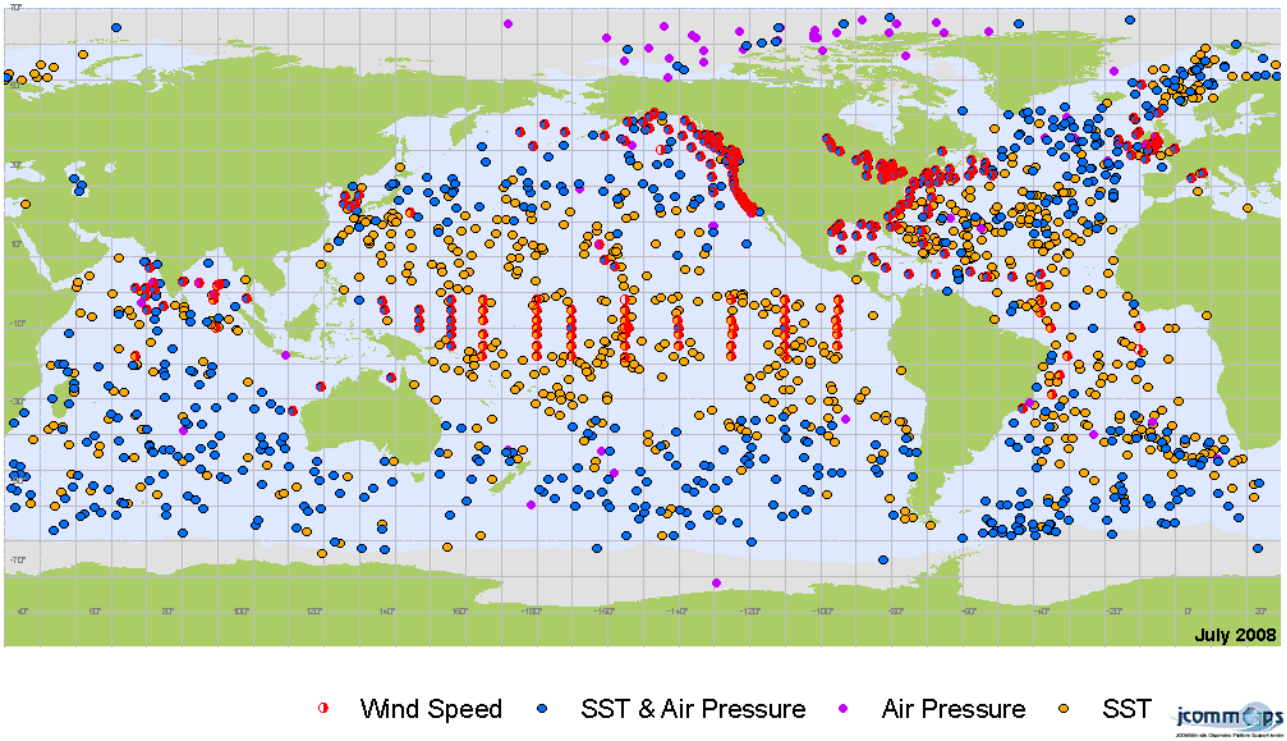
7. The map below shows that now the spread across the globe is fairly even and that the efforts of the Panel (the Global Drifter Program in particular) have paid off.



Map 1: DBCP monthly status by country for July 2008.
(Data Buoys reporting on the GTS via Météo-France)



Map 2: DBCP Barometer Buoy monthly status by country for July 2008.
(Data Buoys reporting Pressure measurements on the GTS via Météo-France)



Map 3: Drifting and moored buoys reporting SST, Air Pressure and Wind in July 2008. (Data Buoys reporting on the GTS via Météo-France)

Other maps and status information available from JCOMMOPS:

Dynamic maps:

- Maintained monthly dynamic map: http://w4.jcommops.org/WebSite/DBCP;
- Maintained daily dynamic map (drifter trajectories): http://w4.jcommops.org/WebSite/DBCP_RT; and
- Maintained dynamic map of all JCOMM observing systems http://w4.jcommops.org/WebSite/JCOMM.

Static maps:

DBCP:

- Files viewable can be located at: http://www.jcommops.org/FTPRoot/DBCP/Maps/;
- *Buoys by Country:* http://wo.jcommops.org/cgi-bin/WebObjects/JCOMMOPS.woa/wa/map?type=DBM_CNTRY;
- *Barometer Drifting Buoys by Country:* http://wo.jcommops.org/cgi-bin/WebObjects/JCOMMOPS.woa/wa/map?type=DBPM_CNTRY;
- *SST, Barometer and Wind Buoys:* http://wo.jcommops.org/cgi-bin/WebObjects/JCOMMOPS.woa/wa/map?type=DBM_SPW;

- *GTS Delays:* http://www.jcommops.org/FTPRoot/DBCP/Maps/delay_analysis/DBCP_delays.pdf; and

- *Iridium Buoys (52 Active Buoys):* http://wo.jcommops.org/cgi-bin/WebObjects/JCOMMOPS.woa/wa/map?type=DB_IRIDIUM;

  -also see http://www.jcommops.org/dbcp/iridium-pp/.

JCOMM:

- Files viewable can be located at: http://www.jcommops.org/FTPRoot/JCOMM/Maps/;

- *All in situ marine observations:* http://wo.jcommops.org/cgi-bin/WebObjects/JCOMMOPS.woa/wa/map?type=GTSM_FMT;

- *Sub-surface salinity and temperature profiles (now included in a single map):* http://wo.jcommops.org/cgi-bin/WebObjects/JCOMMOPS.woa/wa/map?type=GTSM_SZ;

- *All Floats, Drifting and Moored Buoys:* http://wo.jcommops.org/cgi-bin/WebObjects/JCOMMOPS.woa/wa/map?type=BUOYS; and

- *All Floats, Drifting and Moored Buoys - Polar areas:* http://wo.jcommops.org/cgi-bin/WebObjects/JCOMMOPS.woa/wa/map?type=BUOYS_POLES.

ANNEX X

ACTION GROUP SUMMARIES

1. EUCOS SURFACE MARINE PROGRAMME OF THE NETWORK OF EUROPEAN METEOROLOGICAL SERVICES (E-SURFMAR)

Area of interest: 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).

Targeted horizontal resolution: 250 km x 250 km, 150 drifting buoys, 4 moorings

Variables measured: Drifting buoys: Air pressure, wind, air temperature and SST
Moorings: air pressure, wind, air temperature, SST, waves (directional spectra), relative humidity and SSS

Manager, E-SURFMAR: Mr Pierre Blouch, Météo-France

Chairperson, Data Buoy Technical Advisory Group (DB-TAG):

Mr Jon Turton, UK Met Office

Data Buoy Manager: Mr Jean Rolland, Météo-France

Website: http://esurfmar.meteo.fr

Meetings: DB-TAG meets once a year (May)

Status (September 2008): 78 buoys were deployed between September 2007 and August 2008, including **eight** upgrades of SVP drifters. 43 out of the SVP-B were fitted with Iridium transmitters. 4 E-SURFMAR moored buoys are operated by UK, Ireland, France and Spain (i.e., three K-pattern buoys and one SeaWatch buoy, respectively).

The EUMETNET Composite Observing System (EUCOS) surface marine (E-SURFMAR) Programme is an optional programme involving 17 out of the 24 EUMETNET Members: (Belgium, Croatia, Cyprus, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, The Netherlands, Norway, Portugal, Spain, Sweden and the United Kingdom), 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 to manage these activities. The DBM is supported and advised by the E-SURFMAR Data Buoy Technical Advisory Group (DBTAG), which has superseded the European Group on Ocean Stations (EGOS) as an Action Group of the DBCP. The fifth annual DB-TAG meeting was held in Reykjavik, Iceland, 20-21 May 2008.

The activities of the European Group on Ocean Stations (EGOS) were transferred to the EUCOS Surface Marine Programme (E-SURFMAR) in January 2005. E-SURFMAR then became an Action Group of DBCP, to replace EGOS.

2. GLOBAL DRIFTER PROGRAMME (GDP)

Area of interest:	The global ocean
Targeted horizontal resolution:	5 degree x 5 degree (1250 units)
Variables measured:	Basic: surface velocity, SST; other: surface pressure, wind, salinity and sub-surface temperature profiles
Directors:	Mr Rick Lumpkin, NOAA / AOML, USA Mr Peter Niiler, SIO, USA
Data Assembly Center Manager:	Ms Mayra Pazos, NOAA / AOML, USA
Operations Manager:	Mr Shaun Dolk, NOAA / AOML, USA
Website:	http://www.aoml.noaa.gov/phod/dac/gdp.html
Meetings:	As the need arises
Status (August 2008):	As of 25 August 2008, the global array of GDP drifters was at 1159, with 962 (83%) drogued to measure mixed layer currents.

The Global Drifter Program (GDP) is the principle component of the Global Surface Drifting Buoy Array, a branch of NOAA's Global Ocean Observing System (GOOS) and a scientific project of the DBCP. Its objectives are to: 1.) Maintain a global 5 x 5 degree array of 1250 ARGOS-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 inter-annual) climate predictions as well as climate research and monitoring.

The GDP was established in 1996 as the follow-up to the Surface Velocity Programme (SVP) of TOGA and WOCE and became an Action Group of the Panel in 1997. The NOAA Atlantic Oceanographic and Meteorological Laboratory (AOML) in Miami, Florida, USA, host the Drifter Operation Center (DOC).

The DOC supports the upgrading of SVPs to SVPBs by any country, which desires to do so, and it is working closely with those countries in coordinating the shipping and deployment of those upgraded drifters.

The DOC also encourages other drifter programs to contribute their data to the Data Assembly Centre (DAC) if the SVP WOCE type drifter collects those data with drogues set at 15 meters.

3. INTERNATIONAL ARCTIC BUOY PROGRAMME (IABP)

Area of Interest:	Central Arctic Ocean and its marginal seas, excepting Exclusive Economic Zones, where agreements of the Coastal States have not been obtained
Variables measured:	Basic variables: atmospheric pressure and air temperature Other variables: atmospheric pressure tendency, wind speed and direction, snow, and sea-ice properties, as well as sub-surface oceanographic characteristics
Targeted horizontal resolution:	250 km x 250 km
Chairperson:	Mr Tim Goos, Meteorological Services Canada (MSC)
Coordinator:	Mr Ignatius Rigor, University of Washington, USA
Website:	http://iabp.apl.washington.edu/
Meetings:	Annual meetings in spring/early summer of the Northern Hemisphere
Status (September 2008):	The daily buoy status report for 26 August 2008 shows 89 buoys on the basin. This is similar to last year at this time there are more buoys on less ice than in previous years. The number of buoys is higher in 2007 and 2008 than in 2006 and years previous as result of and / or in support of International Polar Year activity. There continues to be several ice thickness and oceanographic buoys in the array. The Number of buoys on the Eurasian side of the pole on ice and / or in water remains low.

IABP was formally established on 18 September 1991, and officially became an Action Group of the Panel at the seventh session of the DBCP (Toulouse, France, October 1991).

The Programme is targeting a horizontal resolution of 250 x 250 km. The recommended measured data include SLP, AT, ice motion, snow depth, ice thickness, ice temperature, ocean temperatures and salinity.

Today, the IABP is composed of 28 different research and operational institutions from 8 different countries (Canada, China, France, Germany, Japan, Norway, UK and USA), and 2 international organizations (the World Climate Research Programme, and the European Meteorological Network).

4. INTERNATIONAL BUOY PROGRAMME FOR THE INDIAN OCEAN (IBPIO)

Area of Interest:	Indian Ocean North of 55°S and between 25°E and 120°E
Targeted horizontal resolution:	500 km x 500 km
Variables measured:	Drifting buoys: Air pressure, wind, air temperature and SST Moorings: air pressure, wind, air temperature, SST, waves, relative humidity and SSS
Chairperson:	Mr Graeme Ball, BOM, Australia
Vice-chairperson:	Vacant
Coordinator:	Mr Jean Rolland, Météo-France
Website:	http://www.shom.fr/meteo/ibpio
Meetings:	Annual meetings in conjunction with DBCP meetings
Status (September 2008):	184 drifting buoys were deployed between September 2007 and August 2008. All were SVP-style Lagrangian drifters, of which about 2/3 measured air pressure (SVP-B). Seven buoys measured wind (SVP-BW). See report under TIP for the moored buoy networks.

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.

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, etc.).

There are presently ten organisations formally participating in the IBPIO:

- Australian Bureau of Meteorology (BOM);
- Eduardo Mondlane University (EMU) Mozambique;
- Drifter Operation Center of NOAA / AOML (DOC), USA;
- Kenya Meteorological Department (KMD);
- Météo-France;
- National Institute of Oceanography (CSIR / NIO), India;
- National Institute of Ocean Technology (DoD / NIOT), India;
- Navoceano, USA;
- South African Weather Service (SAWS); and
- Tropical Moored Buoy Implementation Panel (TIP).

5. WCRP-SCAR INTERNATIONAL PROGRAMME FOR ANTARCTIC BUOYS (IPAB)

Area of interest:	South of 55°S and that region of the Southern Ocean and Antarctic marginal seas within the maximum seasonal sea-ice extent
Targeted horizontal resolution:	500 km x 500 km
Variables measured:	Basic variables: Buoy position, atmospheric pressure and SST Other variables: air temperature, ice and / or snow temperature, atmospheric pressure tendency, wind, snow and sea-ice properties and oceanographic variables
Chairperson:	Mr Shuki Ushio, NIPR, Japan
Coordinator:	Mr Christian Haas, AWI, Germany
Website:	http://www.ipab.aq/
Meetings:	Biennial meetings

The IPAB was established in 1994 became an Action Group of the Panel in October 1994.

6. INTERNATIONAL SOUTH ATLANTIC BUOY PROGRAMME (ISABP)

Area of Interest:	South Atlantic Ocean north of 55S plus Tropical Atlantic Ocean.
Targeted horizontal resolution:	5° x 5°
Variables measured:	Air pressure, SST, sea-surface velocity
Chairperson:	Ariel Troisi, SHN, Argentina
Coordinator:	Misses Mayra Pazos, AOML-NOAA, USA and Lithakazi Mkatshwa, SAWB, South Africa
Website:	http://www.jcommops.org/dbcp/isabp/index.html
Meetings:	Meetings every each year, normally in May-July
Status (September 2008):	In the last two years, the ISABP has attained a monthly average of almost 260 active drifters, a quarter of them with atmospheric pressure sensors

The ISABP, established in October 1994, became an Action Group of the Panel in November 1994 (DBCP-X). The following organizations are currently participating in the ISABP:

Argentina	Servicio Meteorológico Nacional (SMN) Servicio de Hidrografia Naval (SHN)
Brazil	Diretoria de Hidrografia e Navegacao (DHN) National Meteorological Institute (NMI) National Space Research Institute (INPE)
Canada	Integrated Science Data Management (ISDM)
France / USA	CLS / Service Argos
Namibia	The Meteorological Service
South Africa	South African Weather Service (SAWS) Marine and Coastal Management (MCM)
Ukraine	Marine Hydrophysical Institute of National Academy of Science (MHI)
United Kingdom	The Met Office
USA	NOAA Atlantic Oceanographic and Meteorological Laboratory (AOML) NOAA National Data Buoy Center (NDBC) Naval Meteorology and Oceanography (COMNAVMETOCCOM)
International Organizations	Caribbean Meteorological Organization (CMO)

7. DBCP-PICES NORTH PACIFIC DATA BUOY ADVISORY PANEL (NPDBAP)

Area of Interest: North Pacific Ocean and marginal seas generally north of 30°N

Targeted horizontal resolution: 5° x 5°

Variables measured: Air Pressure, SST, sea-surface velocity

Co-chairpersons: NE Pacific: Al Wallace, MSC, Canada
NW Pacific: To be proposed by PICES

Coordinator: Mr Shaun Dolk, NOAA / AOML

Website: http://npdbap.noaa.gov/

Meetings: Yearly meetings usually held in conjunction with DBCP meetings.

Status (September 2008): In the months between September 2007 and August 2008, there were a total of 59 buoys deployed north of 30°N and between 110°E to 110°W. Of these 59 deployments in the North Pacific, 13 of these buoys were SVP drifters (22%) and the remaining 46 buoys were SVPB drifters (78%). Two of the SVPB drifters were equipped with iridium as part of the DBCP pilot project. The Panel continues to search for an Asian Co-chairperson.

The NPDBAP, established in 2002, became an Action Group of the Panel. The following members are presently participating in the ISABP:

Canada	Environment Canada Marine Environmental Data Service (MEDS)
Japan	Japan Meteorological Agency
Republic of Korea	National Oceanic Research Institute (NORI)
USA	Drifter Operation Center of NOAA / AOML (DOC) NOAA National Data Buoy Center (NDBC)

8. TROPICAL MOORED BUOYS IMPLEMENTATION PANEL (TIP)

Area of interest: 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.

Targeted horizontal resolution: Tropical Pacific Ocean: 76 moorings ; Tropical Atlantic Ocean: 18 moorings ; Tropical Indian Ocean: 47 moorings

Variables measured: 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 on all surface moorings; Salinity profiles down to 120m on some surface moorings; Current velocity on some moorings.

Chairperson: Mr Mike McPhaden, PMEL, USA

Coordinator: Mr Paul Freitag, PMEL, USA

Website: http://www.pmel.noaa.gov/tao/proj_over/tip/newpanel.html

TAO / TRITON: The Tropical Atmosphere Ocean / Triangle Trans-Ocean Buoy Network (TAO / TRITON) moored buoy array is a central component of the ENSO Observing System, deployed specifically for research and forecasting of El Niño and La Niña. The Array consists of 55 ATLAS moorings maintained by the National Data Buoy Center (NDBC) and the Pacific Marine Environmental Laboratory (PMEL), 12 TRITON moorings maintained by the Japan Agency for Marine-Earth Science and Technology (JAMSTEC), and five sub-surface Acoustic Doppler Current Profiler (ADCP) moorings (four maintained by NDBC and one by JAMSTEC). In addition to these core moorings, there are several moorings deployed as enhancements, including three TRITON moorings in the far western tropical Pacific along 130 E and 137 E, and test sites maintained by NDBC for mooring refresh development.

PIRATA: The Prediction and Research Moored Array in the Tropical Atlantic (PIRATA) moored array has completed its pilot phase (reflected in a redefinition of the acronym, Bourles, et al., 2008) and continued in a 17 surface mooring and one sub-surface ADCP mooring configuration in 2008. Mooring preparation, data processing and evaluation are provided by the United States. Ship time for mooring maintenance is provided by Brazil, France and the US. Cruises are staffed by the US, French and Brazilian technicians.

RAMA: The CLIVAR / GOOS Indian Ocean Panel (IOP) developed a plan in 2004 for a new observational network designed to address outstanding scientific questions related to Indian Ocean variability and the monsoons. The moored buoy component of the network (given the name Research Moored Array for African-Asian-Australian Monsoon Analysis and Prediction, or RAMA, in 2007) consists of a basin scale network of 46 deep ocean moorings that, like TAO / TRITON and PIRATA, provide essential data to complement other existing satellite and in situ observations in the region. By the end of FY, 2008 moorings will have been deployed at 20 of the 46 sites (implementation 44% complete). The array includes 12 ATLAS (US), three Deep Ocean (India), two TRITON (Japan), and three sub-surface ADCP (one each, US, Japan and China).

The Tropical Moored Buoys Implementation Panel (TIP) became an Action Group of the Data Buoy Co-operation Panel (DBCP) during 1999 (under then the name of TAO Implementation Panel, which was decommissioned in 2001).

9. THE OCEAN SUSTAINED INTERDISCIPLINARY TIMESERIES ENVIRONMENT OBSERVATION SYSTEM (OceanSITES)

Area of interest:	The global ocean
Targeted horizontal resolution:	89 reference stations
Variables measured:	Conductivity, salinity, water temperature, air relative humidity, air temperature, air pressure, wind, precipitations, radiation, water pressure, depth, currents, fluxes, dissolved oxygen, fluorescence, pCO2
Co-chairpersons, Steering Team:	Mr Bob Weller, WHOI, USA Mr Uwe Send, SIO, USA
Technical Co-ordinator:	Ms Hester Viola (Project Office)
GDACs:	IFREMER (France) and NOAA / NDBC (USA)
Website:	http://www.oceansites.org/
Status (September 2008):	Noteworthy developments are the demise of NSF funded moorings at Hawaii and Bermuda, the ongoing implementation / operation of KEO and PAPA sites and their gradual support by NOAA, the EuroSITES program having entered its fully active phase, and the NSF OOI program still being a potential contributor but in uncertain waters. In addition, the Indian Ocean is seeing a huge amount of activity, both by Indian agencies and NOAA / PMEL. A complete and new system status update will be available within the year.

The Ocean Sustained Interdisciplinary Time series Environment observation System (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. It became an Action Group of the Data Buoy Co-operation Panel (DBCP) during 2005.

ANNEX XI

DBCP IRIDIUM PILOT PROJECT UPDATE

(October 2008)

1. DBCP IRIDIUM PILOT PROJECT MEETING MINUTES

13 October 2008, Cape Town, Republic of South Africa.

1.1. Introduction

1.1.1 The Iridium Pilot Project participants met during the DBCP session to discuss the status so far and future plans for the project. The Meeting discussed the status of buoys deployed during the year and the coverage of the 50+ buoys which were active in August and September. They also discussed the possibility of extending the project for a further two years in order to deploy buoys in areas (and conditions) not yet covered and considered the evaluations and data analysis that would be undertaken (during 2010-2011) if the project could be extended beyond June 2009.

1.1.2 Annex 1 lists the new aims and Terms of Reference for the project, based on the DBCP approving the extension of the pilot project until June 2011.

1.2. Attendees

Dr David Meldrum, Chairperson, DBCP
Ms Hester Viola, JCOMMOPS
Mr Jean Rolland, Météo-France
Mr Chris Marshall, Environment Canada
Mr Graeme Ball, BOM
Mr Ken Jarrott, BOM
Dr Derrick Snowden, NOAA
Mr Eric Locklear, NOAA
Mr Jon Turton, UK Met Office
Mr Etienne Charpentier, WMO

Manufacturers and Communications providers

Ms Emily MacPherson, MetOcean
Mr Jeff Wingenroth, Technocean
Mr Andy Sybrandy, Pacific Gyre
Mr Gary Williams, Clearwater
Mr Bill Woodward, CLS America
Mr Sergey Motyzhev (Marlin Yug)
Mr Christian Ortega, CLS Argos

1.3. Initial Aims of the Pilot Project

1.3.1. Originally, the goal of the Pilot Project, beginning in July 2007, was to evaluate and demonstrate the operational use of Iridium satellite data telecommunication technology for the real-time collection of drifter data. In addition, the Pilot Project aimed to evaluate whether this can be realized in a cost effective way, on a global basis, and under various ocean conditions. This implied a need to deploy drifters in data sparse and remote ocean areas.

1.3.2. Specific aims were to test:

10) Operation of a global system using Iridium (at least 50 units deployed worldwide) with even spread and in varying ocean conditions;

11) Network reliability and survivability;

12) Data throughput in terms of quantity and timeliness;

13) Data management, especially data formatting and insertion on the GTS;

14) Operational shipment and deployment;

15) Collaboration with manufacturers to promote free availability of Iridium modems and drifters; and

16) Demonstrating overall cost effectiveness (manufacturing, transmission, data processing and lifetime).

1.4. Progress

1.4.1. The deployments made so far were discussed, and a summary of the buoys deployed was presented. Since the beginning of the project, 83 buoys have been deployed by Météo-France, E-SURFMAR, United Kingdom (SAMS, UK Met Office), USA (AOML / NOAA, Pacific Gyre), Australia (BOM), Environment Canada, India (INCOIS) and in the Black Sea (Marlin Yug). At that time, 53 buoys were transmitting successfully onto the GTS via Météo-France, but the geographic dispersion was not optimal.

1.4.2. For more details see the project website at: www.jcommops.org/dbcp/iridium-pp. The Technical Co-ordinator thanked the project participants for e-mailing one another (on iridium-pp@jcommops.org) to notify deployment information and buoy metadata. The TC also expressed thanks to Météo-France (SHOM) for distributing data onto the GTS to-date. Météo-France has kindly disseminated data from all buoys on the GTS, and can continue for as long as necessary.

1.4.3. CLS reported that it had implemented an Iridium processing centre and set-up an operational link between the Iridium and the Argos processing systems. As a result, drifters transmitting through Iridium can now benefit from the entire Argos processing capabilities including the GTS processing. This system was tested with the support of Météo-France and delays were a few minutes longer than the existing Pilot Project processing system at Météo-France, but are still acceptable.

1.4.4. CLS reported that two Indian Iridium drifters currently transmit operationally onto the GTS via the Iridium processing centre at CLS. Whilst Canada and India will definitely use the CLS Iridium processing centre, all project participants were requested to consider using the CLS facility for future deployments. Buoy operators opting to use Iridium via CLS who wish to request GTS distribution of the data should follow the process below:

a) Send CLS (Yann Bernard) (iridium-buoy@cls.fr) an e-mail with: IMEI(s), data format(s), WMO ID(s); and

b) After Mr Bernard provides a confirmation e-mail (that all is okay and ready) one can ask to their Iridium provider to add the CLS e-mail address to the list of e-mail addresses (plus dbcpiridium@gmail.com) for the IMEI(s) concerned.

1.4.5. CLS will be able to accept data formats outside of the one recommended by the pilot project in future, as required by buoy operators or manufacturers. As agreed, the data processing is free of charge for the duration of the IPP, i.e., until end July 2009 unless extended by decision of the DBCP.

1.4.6. Météo-France explained that the data format (currently at version 3.2) will need to be revised (to version 3.3) in order to include a higher maximum voltage for batteries. Mr Jean Rolland will

document the new format and make it available to project participants and for publication on the website.

1.4.7. The Chairperson stressed that he hoped that manufacturers would be able to capture and include the number of failed message attempts in messages, to assess the robustness of the Iridium system, particularly in remote areas and rough seas.

1.4.8. Météo-France is committed to continue analysis of data and performance of the drifters. The Meeting participants were appreciative of this offer. The Meeting then discussed the possibility of extending the project for a further two years in order to deploy buoys in areas (and conditions) not yet covered and considered the evaluations and data analysis that still needed to be undertaken. It was agreed that the future goals of the project should be reassessed in the light of its achievements so far.

Progress against the initial aims of the project is as follows:

Goal:	**Status:**
1) a) To have at least 50 buoys deployed worldwide	**Achieved**
1) b) Achieve even distribution and varying conditions, i.e., in all ocean basins to show that the instruments will work in harsh sea environments, high winds, and under a wide range of temperatures	**Ongoing:** Deployments needed in the Southern Ocean, Central and Southern Pacific Ocean, Central Atlantic Ocean and Mediterranean
2) Network reliability and survivability	**Achieved**
3) Data throughput in terms of quantity and timeliness	**Achieved:** One observation every hour, 8+ GPS positions; Data is available with ~12 minutes of observation **Ongoing:** Analysis of GPS versus Iridium Position is needed
4) Data management, especially data formatting and insertion on the GTS	**Achieved:** Standard message format. Météo-France has been putting data onto the GTS; The operationally supported Iridiium Processing center at CLS is up and running
5) Operational shipment and deployment	**Achieved**
6) Collaboration with manufacturers to promote free availability of Iridium modems and drifters	**Achieved:** The Iridium Upgrade scheme offered for this pilot project has been very successful and has allowed many buoy operators to test the technology so far. Pacific Gyre donated three buoys; MetOcean offered low cost communications for the duration of the project as negotiated
7) Demonstrating overall cost effectiveness (manufacturing, transmission, data processing and lifetime)	**Ongoing:** Lifetimes need to be analysed to find methods of extending buoy longevity. This would include a careful examination of ways to minimize the energy penalty resulting from the use of GPS. Costs of data processing (via CLS) are not yet clear, though they will remain free of charge until at least July 2009.

1.5 Future Plans

1.5.1. Based on these achievements, and this assessment against the initial goals of the project, in future the project will need to focus specifically on :

- A more even distribution across the globe and in varying ocean conditions (Aim 1b above) perhaps by engaging with additional participants;
- the requirement for GPS positioning versus Iridium positioning (Aim 3 above); and
- longevity and analysis of costs, particularly in relation to use of GPS. (Aim 7 above).

1.5.2. The Terms of Reference for the project will be updated and a new set of aims compiled, including plans for analysis to be undertaken in 2009-2010, when there is a more even distribution of drifters across the whole ocean.

1.5.3. Deployment plans 2008-2009

Country	On hand	Ordered	Planned	Ocean Area/s
Europe (E-SURFMAR)	70	80	80	Atlantic
Canada	2		5	North Pacific
France	5		5	Atlantic and Indian
UK Met Office	7 (2 lithium)		5-6	Southern Atlantic
UK SAMS			10	Ice drifters
India	3		10	Indian, Bay of Bengal
South Africa	-		5	
USA AOML	(7)		undecided	
USA Navoceano	0		-	
New Zealand	-		-	
Australia	0		undecided	

1.5.4. Actions

- Review of data format to enable increased voltage and notify project participants **(Météo-France)**; publish on the website **(DBCP TC)**;
- Encourage Navoceano and IABP to purchase Iridium test buoys, in order to enhance distribution of buoys across all oceans. (Chairperson, DBCP TC);
- Create online notification form for Iridium deployments (JCOMMOPS);
- Work with Global Drifter Program and SOOP operators to deploy buoys in the southern Pacific (DBCP TC); and
- Any participating organization planning to set up an Iridium processing and GTS dissemination system for buoys should refer to DBCP Technical Document 2

(in particular Section 7) to be sure of the real-time QC that should be performed by the data processing centre. (Project Participants).

2. DBCP IRIDIUM PILOT PROJECT REVISED AIMS AND ANALYSIS REQUIRED DURING 2009-2010

The project will be extended into 2010 to continue deployments and then into 2011 to perform evaluation of the drifter data and analyse results against the goals of the project. Listed below are:

a) revised goals for the project during the two years up until June 2011;

b) deployment strategy for filling the gaps present in the deployment network; and

c) evaluations which could be undertaken in the next two years to report to the DBCP in 2011.

2.1. Revised goals

The Iridium Upgrade scheme will continue in 2009, to include another 50 buoys. Under this scheme, project participants have the opportunity to upgrade drifters to Iridium Satellite communications for no additional cost (the agreed USD 500 upgrade fee will be financed by the project).

All buoys using the upgrade scheme in future will need to have GPS onboard.

The project will aim to:

- Attain an even distribution across the globe and in varying ocean conditions, which may require additional participants;
- Extend the longevity of buoys and, in particular, seek ways to optimize the use of GPS;
- Further quantify the reliability of Iridium versus GPS positioning;
- Analyse the true costs of operating Iridium buoys; and
- Extend cooperation with developing countries in terms of drifter deployment and Iridium technology transfer.

2.2. Deployment Plans

Deployments required in order to achieve the revised project goals are at least another 20 drifters in the following areas, plus re-seeding of areas already covered.

Desired Area	Number	Possible deploying agencies (TBC)
Southern Pacific	4 SVPB	• New Zealand • Scripps/Pacific SOOP Ships
Central Atlantic	6 SVPB	• GDP (with Brazilian ships)

		• UKMO/British Antarctic Survey
Southern Indian	2 SVPB	• Australia • South African Weather Service
Central Pacific	4 SVPB	• USA NDBC. TAO & DART Cruise
Mediterranean	1 SVPB	• MOON
Northern Pacific / Arctic	3 SVPB	• IABP US / Canada Ice Breakers

2.3. Evaluations

Evaluations will be undertaken and metrics compiled in conjunction with the DBCP Task Team on Quality Management and Technology Developments.

- **Timeliness:** Global evaluations of data timeliness, including comparisons with data timeliness of GTS delivery through the Argos System at (i.e., is it possible to remove or reduce the 10 minute gap seen between CLS Toulouse and Météo-France, Toulouse?) **(Météo-France and CLS)**;

- **Lifetimes:** study of longevity of all buoys after two years and subsequent improvements that could be made in manufacturing and transmission schemes. **(Project participants esp. Manufacturers)**;

- **Telecommunications:** Evaluation of the failed transmissions encountered and the number of retries required before a message is successfully delivered **(SAMS)**. Success of data transmission **(Project participants)**;

- **Positioning:** Review of the usefulness of Iridium locations compared to GPS fixes, e.g., to quantify the level of uncertainty of the smoothed Iridium locations **(Météo-France)**; and

- **Costs:** Perform a cost benefit analysis for Iridium drifters considering modem costs, transmission costs (including losses, timeliness, errors and costs during storage), expected lifetime and energy requirements, GPS, manufacturing, data processing **(Project participants, assisted by NOAA)**.

Annex 1 (of Annex XI)

DBCP Drifter Iridium Pilot revised Terms of Reference - October 2008

Terms of Reference for the Steering Team of the
DBCP Drifter Iridium Pilot Project

(DBCP Iridium PP)

The Pilot Project will demonstrate and evaluate the operational use of Iridium Satellite data telecommunication technology for the real-time collection of drifter data.

The Pilot Project has run for an initial two-year period up until June 2009 and will be extended until end of June 2011. A progress report is presented to the DBCP at its annual sessions.

The Pilot Project will extend from its initial aims to evaluate the feasibility of Iridium technology for drifters in terms of:

1) Operating an evenly distributed global observing system (maintaining at least 50 active units, deployed worldwide);

2) Network reliability and longevity;

3) Data throughput in terms of quantity of data and locations;

4) Data management, especially data formatting and insertion on the GTS;

5) Overall cost effectiveness (manufacturing, transmission, data processing, storage and lifetimes); and

6) Deployment of buoys by new participants and use of Iridium drifters by developing nations.

The Steering Team is tasked with guide the Pilot Project in achieving the tasks described above.

Steering Team Membership:

The Steering Team is comprised of the following individuals:

- Mr David Meldrum, SAMS, UK, Chairperson, Iridium PP Steering Team (David.Meldrum@sams.ac.uk);
- Ms Hester Viola, Technical Co-ordinator, DBCP, France (viola@jcommops.org);
- Mr Jon Turton, Met Office, UK (jon.turton@metoffice.gov.uk);
- Dr Jean Rolland, Météo-France (jean.rolland@meteo.fr);
- Dr Bill Burnett, NOAA / NDBC, USA (Bill.Burnett@noaa.gov);
- Mr Steve Piotrowicz, NOAA (steve.piotrowicz@noaa.gov);
- Mr Sergey Mothyzev, Marlin Yug, Ukraine (motyzhev@marlin-yug.com);

- Mr Bill Woodward, CLS America, USA (bwoodward @clsamerica.com);
- Mr Ngoc Hoang, NAL Research Corporation, USA (nth@nalresearch.com); and
- Mr M. Ravichandran, INCOIS, India (ravi@incois.gov.in).

Secretariat support is being provided by the WMO and IOC. The contact points are as follows:

- Mr Etienne Charpentier, WMO, Geneva, Switzerland (echarpentier@wmo.int); and
- Ms Boram Lee, IOC, France (b.lee@unesco.org).

ANNEX XII

TERMS OF REFERENCE OF THE ARGOS-3 EVALUATION PILOT PROJECT

Purpose:

The purpose of creating an Argos-3 DBCP Data Buoy Evaluation Pilot Project is to: i) independently and objectively evaluate Argos-3 for use by the global data buoy community; ii) foster Argos-3 integration by buoy manufacturers; and iii) provide Argos-3 equipped drifting buoys to the community for evaluation.

Benefits to the operational community:

A positive evaluation of the use of Argos-3 in drifting buoys will result in the following expected benefits to the operational buoy community:

- Reduction in the buoy program cost due to longer buoy lifetimes;
- Greater operational flexibility with the possibility to remotely control and tune buoy performance and mission – i.e. ON/OFF, change of acquisition sampling, transmission power etc.; and
- Possibility to transfer larger amounts of data when needed – i.e. salinity buoys, buoys with thermistor strings … with no impact on the original operational mission which is the timely transmission of Barometer and SST data.

CLS will:

- Establish a Global Performance Monitoring network to evaluate Argos-3 system performance throughout the world;
- Provide 50 Argos-3 PMT's for integration into pre-production drifting buoys;
- Assist manufacturers in the implementation of the PMT's in their drifters;
- Purchase 10 buoys from each of the "DBCP" manufacturers: Clearwater, Marlin-Yug, Metocean, Pacific Gyre, Technocean for a total of 50 SVBP buoys. (25 barometer upgrades paid by CLS and 25 upgrades paid by the DBCP). Should any of these manufacturers be unable or unwilling to integrate the PMT into their drifter product or should they be unable to deliver the buoys in the time required then CLS would likely purchase more buoys from the other manufacturers;
- Provide the 50 drifters at no cost to interested participants selected by the steering team to be used for the pilot project evaluation; and
- Assist and support manufacturers and participants in their evaluation process.

Pilot Project Participants will:

- Deploy the drifters in the geographic location of their choice as soon as possible after their delivery;
- Pay the Argos service fees for the buoys based on Argos-2 / one-way JTA pricing;
- Evaluate the performance of the drifter according to the criteria defined by the Steering Team; and

- Report to CLS and to the steering team on their use of the buoys and specifically on their evaluation of the performance and benefits of the buoys equipped with the Argos-3 PMT.

The Steering Team will:

- Define the appropriate strategies and evaluate buoys performance worldwide;
- Identify users interested in deploying the pre-production buoys to evaluate Argos-3;
- Identify and coordinate buoy deployments;
- Coordinate the barometer upgrades for the 25 SVP drifters paid for by the DBCP;
- Define the evaluation criteria, methods and procedures;
- Coordinate and harmonize the multiple evaluations by the participants;
- Define any modifications and / or new functions required by the DBCP community based on the evaluations and coordinate their implementation with manufacturers and CLS;
- Provide a written document which details the evaluation results of Argos-3 and provides specific feedback to be relayed to CNES to help them in their development of the Argos-4 payload; and
- Provide a community-wide forum to present and disseminate the evaluation results and conclusions.

Steering Team Membership:

The Steering Team is comprised of the following individuals:

- Mr Luca Centurioni (SIO, US, Chairperson);
- Dr Derek Snowden (OCO, US);
- Mr Bruce Bradshaw (EC, CA);
- Mr Johan Stander (SAWS, SA);
- Mr Ravichandran (INCOIS, India, TBC);
- Ms Julie Fletcher (NZ Weather Services, NZ, TBC);
- Mr David Meldrum (SAMS, UK, Chairperson);
- Mr Gary Williams (Clearwater);
- Mr Andy Sydbrandy (Pacific Gyre);
- Mr Jeff Wingenroth (Technocean);
- Mr Sergey Moytezhek (Marlin-Yug);

- X (MetOcean);
- Mr Bill Woodward (CLS America); and
- Mr Christian Ortega (CLS, FR).

JCOMMOPS support:

- Ms Hester Viola.

Secretariat support is being provided by the WMO and IOC. The contact points are as follows:

- Mr Etienne Charpentier, WMO, Geneva, Switzerland (echarpentier@wmo.int); and
- Ms Boram Lee, IOC, France (b.lee@unesco.org).

Tentative List of Pilot Project Participants

Organization	Country	PI	# Buoys	Type	Manufacturer	Port	Deploy date	Comments
SIO	US	Luca Centurioni	15					
AOML	US		15					
SAMS	UK	David Meldrum	2					
INCOIS	In	Ravichandran	2					
SAWS	SA	Johan Stander	2					
BOM	Au	Graeme Brough	2					
Met Office	NZ	Julie Fletcher	2					
Kordi	Ko		2					
2nd University	CN		2					
JMA / JAMSTEC	JP		2					

ANNEX XIII

ACTION LIST / WORKPLAN

DBCP WORKPLAN FOR THE NEXT INTERSESSIONAL PERIOD (2009)

-1- ACTIONS ARISING FROM THIS PANEL SESSION

(ongoing actions arising from this Panel Session are listed under parts 2 and 3)

Ref.	Action	By	Deadline
2.6	Submit papers via e-mail or CD-ROM to the Workshop Chairperson, in electronic form (MS Office compatible format only)	Authors workshop	30 Nov. 2008
2.7	Act as the Workshop Co-chairpersons for 2009	Dr Bill Burnett and Jean Rolland	DBCP-XXV
5.9	Address the issue of updating the JCOMMOPS TOR (to add OceanSITES) in view to make appropriate recommendation to JCOMM-III	OCG	Early 2009
5.10	Assist the NDBC in the design of a new BUFR template for the moored buoy data	TC	Oct. 2009
5.10	Forward to the Chairperson of the Task Team the nomination of Dr Bruce Bradshaw for participating as DBCP representative in the JCOMM Data Management Programme Area Task Team on Table driven Codes	Secretariat	ASAP
6.13	Address the repetitive transmission issue and to develop a recommendation statement accordingly	TT IBPD	Oct. 2009
6.16	Address the identified issues and to report at the next Panel Session	TT IBPD	Oct. 2009
7.1.9.5	Define precise criteria for measuring success	Iridium PP	Oct. 2009
7.1.9.6	Update the terms and conditions for the Iridium upgrade	Chairperson	ASAP
7.2.5.3	Address the Argos format issue and make recommendations	Argos-3 PP	Oct. 2009
7.3.6	Investigate implications of PP-WMD proposing new fields to be included in BUFR template	TC	Oct. 2009
7.3.7	Compile and clearly state as part of Pilot Project documentation existing requirements for wave observations as documented by the ETWS and JCOMM	PP WMD and PP WET	ASAP
8.4(ii)	Make the Final Reports from the last workshop on the impact of observational systems on NWP (Geneva, Switzerland, 2008) available to Panel members	Secretariat	ASAP
8.4(iv)	Investigate small increase of RMS(Obs-FG) for Indian Ocean data	TT IBPD	Oct. 2009

Ref.	Action	By	Deadline
8.4(iv)	Reduce the delays regarding the Indian Ocean and to inform the Panel on how well the region will be served by Argos-3	CLS	Oct. 2009
9.5	Address ITP-DBCP relationship issues and report at the next Panel session	Mr Ken Jarrott	Oct. 2009
10.1.3	Re-design the DBCP website	JCOMMOPS	Oct. 2009
10.2.4	Look at this issue of combined deployment opportunities as a matter of priority, in liaison with the Argo Technical Co-ordinator, and platform operators	TC	Oct. 2009
10.3.4	Write to write to the NFPs, provide them with the list of blocks allocated to each country, and ask them to release unused WMO numbers if possible	Secretariat	Early 2009
10.4.4	Make proposals for a anti-vandalism strategy	Mr Ken Jarrott	Oct. 2009
10.5.3	Work with Panel members and with ET / DRC to define requirements for metadata as part of the BUFR template for buoy data, and to propose new template	TC	Mid-2009
10.6.6, 12.5	Coordinate with appropriate experts and to develop a new document summarizing requirements for the reporting of high-temporal resolution SST data	TC	ASAP
10.6.7	Work with JAMSTEC to ensure CO_2 data is put onto the GTS	TC	Oct. 2009
10.7.3	Investigate participating in the Association of Hydro-Meteorological Equipment Industry (HMEI - http://www.hydrometeoindustry.org/) as a way to be represented at JCOMM meetings	Manufacturers	Oct. 2009
11.1.15	Investigate improving present DBCP deployment planning mechanisms to benefit both DBCP and Argo programs	TC	Oct. 2009
11.2.5	Liaise between themselves and to work out a better strategy for providing a coherent system for archiving the buoy data	RNODC / DB and SOC / DB	Oct. 2009
11.3.3	Write to NESDIS regarding the issue of accessing the NOAA Satellite data via the Svalbard receiving station	Chairperson	ASAP
11.3.4	Closely monitor CLS actions regarding improving data timeliness in the Indian Ocean and report at the next Panel session	TC	Oct. 2009
11.4.3	Study this issue of using Iridium positions for oceanographic purposes, and investigate whether technical solutions could be proposed to address the oceanographic requirements	PP Iridium	Oct. 2009
12.1.2	Seek information from Panel members on data buoy-related instrument Best Practices, calibration procedures, and standards for inclusion in the *JCOMM Catalogue of Best Practices and Standards*	TC	End 2008
12.1.5	Participate in the development of the DMPA document that explains how marine data can be distributed in both real-time and delayed-mode from a data buoy perspective	TC and Dr Bill Burnett	Oct. 2009

Ref.	Action	By	Deadline
12.1.15	Take into account requirements for met-ocean forecasts and services, and the gap analysis from the *JCOMM Statement of Guidance for Ocean Applications* to produce a future revised version of the JCOMM OPA Strategic Workplan	OCG and OCG-III	ASAP
12.2.3	Provide reports on the development / improvement of the IOC Operating Plan in the annual session	Secretariat	Oct. 2009
12.3.5	Provide input to the JCOMM OCG Chairperson for the WMO Operating Plan, as appropriate	DBCP Chairperson and Secretariat	End 2008
12.5.3	Coordinate provision of a proposal for Community White Papers, via the conference OceanObs'09 website (www.oceanobs09.net) in due course and assist in identifying authors	Chairperson	15 Nov. 2008
12..5.4	Relay the OOPC recommendation to CBS (i.e., addressing similar NWP needs regarding high-resolution SST data) as appropriate	Secretariat	ASAP
12.5.5	Investigate developing an easy-to-calculate global statistic that reports the status of the array, also taking into account drifter distribution targets	TT IBPD	Oct. 2009
12.5.6	Organize in due course a face-to-face meeting with a few GHRSST key players	Chairperson	ASAP
12.6.7.1	Check the WIGOS Pilot Project for JCOMM Implementation Plan and see how they could contribute to the Pilot Project	Panel members	Mid-2009
12.6.7.2	Lead the DBCP efforts regarding instrument Best Practices in close liaison with the JCOMM Focal Point on CIMO matters (Dr Teng) and the Technical Co-ordinator, as well as with the TT IBPD and Panel members	Dr Bill Burnett	Mid-2009
12.6.8.1	Participate in the WIGOS Pilot Project for JCOMM and address related data management aspects including interoperability with the WIS, and quality management	RNODC / DB and SOC / DB	ASAP
12.6.8.2	Investigate whether it would be appropriate and desirable that their national organizations contributes to the Pilot Project as specialized and / or Regional Instrument Centres or assist candidate instrument centres as appropriate	Members	Mid-2009
12.6.8.3	Review the Chapter 4, Part II of the *WMO Guide on Instruments and Methods of Observation* and make proposals through the Pilot Project Steering Group for its updating as required	Members	Mid-2009
12.7.7.1	Set a plan for the 2009 expenditure and update the interim financial report with the most accurate and actual information	EB	31 Dec. 2008
12.7.7.2	Work together to distribute the final statement for 2008 to the Panel members as soon as the IOC and WMO final Statement of Accounts for the year 2008 are finalized	Secretariat and Mr Frank Grooters	1 Mar. 2009
13.1.2	Inform the Chairperson about required changes	Members	31 Dec. 2008

Ref.	Action	By	Deadline
13.4.6	Provide the Chairperson with comments regarding DBCP operating principles by the end of the year	Members	31 Dec. 2008
13.5.3	Write to the JCOMM Co-chairpersons to highlight DBCP concerns and the need for an adequate career structure and satisfactory status for the TCs	Chairperson	ASAP
13.7.1	Propose a prioritization of her tasks based on her understanding of the Panel's requirements, and to submit it for review and approval to the Chairperson through the Executive Board	TC	ASAP
13.8.9	Seek advice from Panel members and the Executive Board and then write to WMO and IOC Members / Member States in order to seek additional contributions to the Trust Fund	Secretariat	Oct. 2009
13.11.1	Advise on the appropriate level in due course regarding UNESCO requirements for the deposit of advance salary and severance payments as a precondition for the continuation of the TC's employment through IOC	Secretariat	Oct. 2009
16.1	Publish DBCP Annual Report for 2008	Secretariat	Early-2009
16.2	Submit their National Reports to the Secretariat	Members	31 Dec. 2009

-2- IMPLEMENTATION & TECHNICAL WORKPLAN

(ongoing actions from this and past Panel Sessions; actions arising from this Panel Session are indicated in bold)

No.	Task	Ref	Carried out by	Supported / Assisted by	Reported to
1	Identify sources of buoy data not currently reported on the GTS and determine reason for non-availability (particularly for the Arctic Buoys IABP)	TC TOR and DBCP-XXIII 3.3.8	TC, CLS	Members Secretariats	Chairperson and Panel for information
2	Maintain summary of requirements for buoy data to meet expressed needs of the international meteorological and oceanographic communities	DBCP TOR	TC	Members Secretariats	Chairperson for presentation to the Panel
3	Maintain a catalogue of existing ongoing ocean data buoy programmes	DBCP TOR	TC	Members Secretariats	Chairperson and Panel for information
4	Continue review of satellite data telecommunications systems – particularly supporting the DBCP Iridium Pilot Project	DBCP-XXIII 8.4.2.4	Chairperson, TC	Members	Panel
5	Share experiences regarding usage of various satellite communications systems for buoy data and participate in the DBCP Iridium Pilot Project	DBCP-XXIII 8.4.2.2	Members	Chairperson, TC	Chairperson
6	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	DBCP-XXIII 8.4.1.10	Participants in Iridium PP	TC	JCOMMOPS
7	Put in place real-time tools for monitoring GTS data flows and data timeliness in order to improve its responsiveness to possible problems, this should include an analysis of the long term trends in delays through the system at each stage	DBCP-XXIII 8.6.2.19	TC, CLS		Panel
8	Monitor Argos GTS sub-system and arrange for modifications as necessary.	DBCP-XXI	TC	CLS	Panel and users
9	Investigate and implement appropriate solution to decrease delays within the Argos system	DBCP-XXIII 2.2.1.3 (xiii)	TC and CLS		Panel

No.	Task	Ref	Carried out by	Supported / Assisted by	Reported to
		8.6.2.18			
10	Coordinate operations of DBCP QC guidelines	TC TOR	TC	Members Operational services	Panel
11	Follow-up and possibly assist in implementing requirements expressed by the buoy users within the Argos system	DBCP TOR JTA	CLS	TC	Panel, meeting on JTA
12	Support, as required, existing DBCP Action Groups, and provide assistance on request to other internationally coordinated buoy programme developments	TC TOR	TC Secretariats	Chairperson	Panel
13	Coordinate with IOP implementing strategy for the Indian Ocean Observing System as far as data buoys are concerned	DBCP-XX	IBPIO	Chair TC Secretariats	Panel
14	Encourage other centres to act as PMOC and existing centres to invest more resources in the implementation of QC guidelines	DBCP-XXIII 8.1.2	Members	TC	Panel
15	Provide information on deployment opportunities – annual reports, Action Group annual planning, ship schedules, national plans, national contact points etc.	DBCP-XXII, XXIII 7.2.4, 8.6.1.1 8.6.1.13	Members, Task Team on Capacity-Building	TC	JCOMMOPS, Panel
16	Check the DBCP list of National Focal Points for logistical facilities and report discrepancies, changes, or additions to the WMO Secretariat	DBCP-XXII 8.6.1.1 DBCP-XXIII 9.3.2	Members	WMO Secretariat	WMO Secretariat
17	Produce a table of national commitments in the Southern Ocean and seek additional commitments for barometer upgrades and deployment opportunities in the Southern Ocean to achieve a level of 300 buoys south of 40S	DBCP-XVI & DBCP-XXIII 4.2.4	TC	Members	Panel
18	Routinely provide the list of moorings reporting in SHIP or BUOY format	DBCP-XXI	Members	TC	Panel

No.	Task	Ref	Carried out by	Supported / Assisted by	Reported to
19	Enhance buoy safety through improved design (refer recommendations) and keep the Panel informed about related changes	DBCP-XVII	Manufacturers, Members	Members, TC	Panel
20	Develop and keep up to date standardized training materials in parallel with the organization of training programmes	DBCP-XXIII 4.3.6	TT / CB	Secretariat	Ongoing
21	Provide info / materials for DBCP / JCOMMOPS websites (news, brochure)	DBCP-XXII 7.2.3	Interested Members	TC	Panel
22	Provide feedback on required updates and ways to restructure JCOMMOPS web sites – especially contact details	DBCP-XXII 7.2.1, DBCP-XXIII 7.2.2, 8.5.1.13, 8.6.1.10	Members	TC	Panel
23	To link, as much as possible, to the JCOMM (http://www.jcomm.info) websites for JCOMM-related information and re-design the DBCP website	DBCP-XXIII 8.5.1.14	TC, Secretariats		Panel
24	Provide assistance to JCOMMOPS in redevelopment of the DBCP website	DBCP-XXIII 8.5.1.14	TC	Members	Panel
25	Maintain close links with SOT members so that support on deployment opportunities can be obtained from the SOOP and VOS Panels of SOT	DBCP-IX	Chairperson	TC	Panel
26	**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;** Both to comply with buoy metadata collection scheme	DBCP-XXI DBCP-XXIII8.6.4.5 **DBCP-XXIV** **10.5.6** **6.14**	**Buoy operators, Manufacturers**	**TC**	**Panel**
27	Address the issue of usability of the JCOMMOPS metadata collection system and to provide Panel members with the list of metadata required	Metadata workshop	TC		Panel members

No.	Task	Ref	Carried out by	Supported / Assisted by	Reported to
		and DBCP-XXIII 8.6.4.2			
28	Continue to actively participate in the Meta-T Pilot Project	DBCP-XXIII 8.6.4.7	TC		Panel
29	Liaise with the META-T in order to take the requirements for Category1 Metadata into account when defining requirements for the BUFR templates for buoy data	DBCP-XXIII 8.6.4.9	Task Team on Data Management	TC	Panel
30	Provide input on buoy models for JCOMMOPS database	DBCP-XXI	Manufacturers	TC	Panel
31	Review Best Practices prior to drifter purchase for safety, and GTS data processing purposes	DBCP-XXI	Members	Evaluation group, TC	Panel
32	Provide Service Argos with list of most used buoy models and formats they operate	DBCP-XXI	Manufacturers	TC	Service Argos
33	Participate in Argos-3 test programme	DBCP-XXII 8.3.17	TC, Panel members, Manufacturers	CLS	Panel / next Panel session
34	React on the presented characteristics of Argos-4	DBCP-XXII 8.3.23	Argos users	CLS	Michel Faup / end of 2006
35	Provide information to Panel members or on its website, about where inventories of buoys are held, to aid in deployment planning	DBCP-XXIII 8.6.1.10	GDP		Panel / next Panel session
36	Implement JCOMMOPS work-plan – particularly with respect to deployment opportunities	DBCP-XXII 8.5.3 and DBCP-XXIII 8.5.1.8 and 8.5.1.9	TC / DBCP, TC / Argo	CLS	Panel / next Panel session

No.	Task	Ref	Carried out by	Supported / Assisted by	Reported to
37	Design deployment packages for safe deployments from 20 m height from 25 knots ships	DBCP-XXII 8.6.5.2	Manufacturers	Evaluation Group	Panel / next Panel session
38	Liaise with the IOCCP and prepare a report of pCO2 measurement from drifters	DBCP-XXIII 8.6.5.4	Task Team on Technology developments	IOCCP	Panel / next session
39	Assist in the proper distribution of information on data buoy vandalism to the fishing fleets	DBCP-XXIII 8.6.3.7	CLS	JTA	Next Panel session
40	**Address user requirements and particular observing systems deficiencies as expressed in the *JCOMM Statement of Guidance for Ocean Applications***	**DBCP-XXIV 12.1.13**	**Panel Members**		**Panel**
41	**Contribute to feeding the JCOMM database extreme wave events when such events are observed by data buoys and are recorded by Panel members**	**DBCP-XXIV 12.1.14**	**Panel Members**	**Chairpersons of the ETWS, ETMC, NDBC**	**Panel**
42	**Follow the Best Practices and Standards eventually proposed under WIGOS, and in particular, to provide the buoy platform / instrument metadata to JCOMMOPS, META-T servers, and the ODASMS as appropriate**	**DBCP-XXIV 12.6.8.4**	**Panel members**	**TC, Secretariat**	**Panel**

-3- ADMINISTRATIVE WORKPLAN

(ongoing actions from this and past panel sessions; actions arising from this Panel Session are indicated in bold)

No.	Task		Carried out by	Supported / Assisted by	Reported to
1	Maintain a list of national contact points for the DBCP and within other relevant bodies with potential for involvement in DBCP activities	DBCP TOR	Secretariats	Panel members	Chairperson and Panel for information
2	Continue the arrangements (including finance) to secure the services of a Technical Co-ordinator.	DBCP-XXII 10.3	Chairperson	Secretariats	Secretariats
3	Review programme and establish working priorities of the Technical Co-ordinator	DBCP-XXII 10.4	Panel, Chairperson		Panel
4	To organize scientific and technical workshop at next Panel session (identify second Co-chairperson from the host country if needed)	DBCP-XXIII 6.8	Workshop Chairperson and a Co-chairperson from the host country	Secretariats	Panel
5	Compile a CD-ROM of scientific and technical workshop at the last Panel session	DBCP-XXIII 6.7	Presenters at workshop, Workshop's Co-chairpersons	Secretariats	Panel
6	Consolidate and publish the Panel's session report (web only) and Annual Report (CD-ROM and web)	DBCP-XXIII 4.1.4 and Annex III	Chairperson, Secretariat	TC	Executive Councils of WMO and IOC
7	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	DBCP-XXIII 4.2.5 & 4.3.10	Chairperson	Members	Panel
8	Explore options for allowing Panel contributors to participate in a wider funding activity that might eventually translate to direct contribution to a JCOMMOPS Trust Fund	DBCP-XXI	Chairperson	JCOMM OCG Secretariat	Panel
9	Send invoices to Participants	DBCP-XXIII 10.3	Secretariats		Panel
10	Pay their contributions upon receipt of invoices	DBCP-XXIII 10.3	Members		WMO and IOC Secretariat / upon

No.	Task		Carried out by	Supported / Assisted by	Reported to
					invoice
11	Submit National Reports and Action Group reports via electronic form	DBCP-XXIII 2.2.1.2, 2.4, 4.1.4, Annex III	Members, AG		Secretariats
12	Prepare and distribute revised budget estimates for the following year, and final financial statement for the previous year	DBCP-XXIII 10.1, 10.3	Finance Advisor	Secretariats, Chairperson	Panel
13	Prepare interim statement of the budget for the next DBCP session	DBCP-XXII 10.1.10	Finance Advisor	Secretariats	Panel
14	Inform the Chairperson of his / her wish or otherwise to continue to work as the TC / DBCP	DBCP-XXIII 10.3.1	TC		Panel session
15	Make recommendations to JTA	DBCP-XXII 11.1	Chairperson		JTA
16	Actively communicate with national coordination for GEO to fully inform on the Panel's activities and capabilities in this regard	DBCP-XXII	Members		Panel
17	Organize capacity-building activities (training workshops, training materials, identifying lecturers) – to set up a Task Team on Capacity-Building	DBCP-XXII and XXIII- 23 4.3	Panel	Secretariats	Panel
18	Continue actions with other International Organizations for preventing vandalism	DBCP-XXII 8.6.3.1	Secretariats		Panel
19	Consider distributing information on vandalism nationally, also consider translations into national languages	DBCP-XXIII 8.6.3.2	Members	Secretariat	Panel
20	Compile information on vandalism-proof designs	DBCP-XXII 8.6.3.3	Members	TC	Panel
21	Request CLS and JTA to consider assisting with distribution of materials about data buoy vandalism to its fishing fleet customers	DBCP-XXIII 8.8.3.7	CLS	Secretariats	Panel
22	Encourage cooperation with OceanSITES and the Tsunameter network at a national level	DBCP-XXIII 2.2.1.3 (xxiii) and 2.2.2.7	Members	Secretariats	Ongoing
23	The IODE and JCOMM buoy data archiving centres should liaise and work	DBCP-XXIII	RNODC / DB		Ongoing

No.	Task		Carried out by	Supported / Assisted by	Reported to
	out the best strategy for providing a coherent archive, in light of the fact that the two centres are now completely separate, but provide similar functions	7.1.5	and SOC		
24	Oversee the expenditure for the next year based on plans presented to the Panel	DBCP-XXIIII 10.1.7	Executive Board		Panel
25	Distribute the finalised account for the previous year by the beginning of the year (January)	DBCP-XXIII 10.1.8	F. Grooters, Secretariats	Executive Board	Panel
26	Ensure the most efficient management of the DBCP Trust Fund between IOC and WMO	DBCP-XXIII 10.3.6	Secretariats		Panel

ANNEX XIV

ACRONYM LIST

ABE-LOS	IOC Advisory Body on the Law of the Sea
ACCESS	African Centre for Climate and Earth System Science (ACCESS)
ADOS	Autonomous Drifting Ocean Station
AG	DBCP Action Groups
AIC	Argo Information Center
ALD	UNESCO Appointment of Limited Duration
AOML	NOAA Atlantic Oceanographic and Meteorological Laboratory (USA)
AP	Air Pressure
Argo	Argo Profiling Float Pilot Project
ASCLME	Agulhas and Somali Current Large Marine Ecosystem
AST	Argo Steering Team
BOM	Bureau of Meteorology (Australia)
BUFR	Binary Universal Form for Representation of meteorological data
CB	Capacity-Building
CBS	Commission for Basic Systems (WMO)
CCl	Commission for Climatology (CCl)
Cg	Congress (WMO)
CIMO	Commission on Instruments and Methods of Observation (WMO)
CLIVAR	Climate Variability and Predictability (WCRP)
CLS	Collecte Localisation Satellites (France)
DAR	Data Discovery, Access and Retrieval service (WMO WIS)
DART	Deep-ocean Assessment and Reporting of Tsunami (buoy)
DB	Data Buoy
DBCP	Data Buoy Co-operation Panel (WMO-IOC)
DB-TAG	E-SURFMAR Data Buoy Technical Advisory Group
DCPC	Data Collection and Production Centres (WMO WIS)
DCS	Data Collection System
DMCG	Data Management Coordination Group (JCOMM)
DMPA	Data Management Programme Area (DMPA)
EB	DBCP Executive Board
EBD	Equivalent Buoy Density
EC	Executive Council
ECMWF	European Centre for Medium-Range Weather Forecasts
EEZ	Exclusive Economic Zone
ER	Expected Result
E-SURFMAR	Surface Marine programme of the Network of European Meteorological Services, EUMETNET
ET/AWS	CBS / IOS Expert Team on Requirements for Data from Automatic Weather Stations (WMO)
ETCCDI	joint CLIVAR / CCl / JCOMM Expert Team on Climate Detection and Indices
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)
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
FAD	Fish Aggregation Device
FAO	Food and Agriculture Organization

FG	First Guess Field
GCC	Global Collecting Centre (of MCSS)
GCOS	Global Climate Observing System
GDAC	Global Data Assembly / Acquisition Centre
GDP	Global Drifter Programme
GEO	Group on Earth Observations
GEOSS	Global Earth Observation System of Systems
GHRSST	GODAE High-Resolution SST Pilot Project
GIS	Geographical Information System
GISC	Global Information System Centres (WMO WIS)
GLOSS	Global Sea-level Observing System (JCOMM)
GODAE	Global Ocean Data Assimilation Experiment (GOOS)
GOOS	Global Ocean Observing System (IOC, WMO, UNEP, ICSU)
GOS	Global Observing System (WMO)
GPS	Global Positioning System
GSSC	GOOS Scientific Steering Committee
GTS	Global Telecommunication System (WWW)
HMEI	Association of Hydro-Meteorological Equipment Industry
IABP	International Arctic Buoy Programme
IBPIO	International Buoy Programme for the Indian Ocean
ICG/IOTWS	Intergovernmental Coordination Group for the Indian Ocean Tsunami Warning and Mitigation System (IOC)
ICOADS	International Comprehensive Ocean-Atmosphere Data Set (USA)
ICSU	International Council for Science
ICT-IOS	CBS Implementation / Coordination Team on the Integrated Observing System
ICTT-QMF	Inter Commission Task Team on Quality Management Framework
ID	Identification Number
IGDDS	Integrated Global Data Dissemination Service (satellite)
I-GOOS	The intergovernmental IOC-WMO-UNEP Committee for GOOS
IMB	Ice Mass Balance
IMEI	International Mobile Equipment Identity
IMO	International Maritime Organization
IOC	Intergovernmental Oceanographic Commission (of UNESCO)
IOCCP	International Ocean Carbon Coordination Project
IODE	International Oceanographic Data and Information Exchange (IOC)
IPAB	WCRP-SCAR International Programme for Antarctic Buoys
IPY	International Polar Year (2007-2008)
ISABP	International South Atlantic Buoy Programme
ISDM	Integrated Science Data Management (formerly MEDS)
ISO	International Organization for Standardization
IT	Information Technology
ITP	International Tsunameter Partnership
JAMSTEC	Japan Agency for Marine-Earth Science and Technology
JCOMM	Joint WMO-IOC Technical Commission for Oceanography and Marine Meteorology
JCOMM-III	Third Session of JCOMM (Marrakech, Morocco, 4-11 November 2009)
JCOMMOPS	JCOMM in situ Observing Platform Support Centre
JTA	Joint Tariff Agreement (Argos)
LOI	Letters of Intent
LUT	Local User Terminal (Argos)
MAN	JCOMM Management Committee
MCSS	Marine Climatological Summaries Scheme
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)
MOFS	Met-Ocean Forecasts and Services
MOU	Memorandum of Understanding

MSC	Meteorological Services of Canada
NAVOCEANO	Naval Oceanographic Office (USA)
NC	National Centres (WMO WIS)
NCEP	NOAA National Center for Environmental Prediction (USA)
NDBC	NOAA National Data Buoy Center (USA)
NESDIS	NOAA National Environmental Satellite Data and Information Service (USA)
NFP	National Focal Point
NIOT	National Institute of Ocean Technology (India)
NMDIS	National Marine Data and Information Service (China)
NMHS	National Meteorological and Hydrological Service
NOAA	National Oceanic and Atmospheric Administration (USA)
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
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
ODINAFRICA	Ocean Data and Information Network for Africa (IODE)
ODP	Ocean Data Portal (IODE)
OGP	Oil and Gas Producers
OOPC	Ocean Observations Panel for Climate (GCOS-GOOS-WCRP)
OPA	Observations Programme Area (JCOMM)
OPSC	Observing Programme Support Centre
OPSCOM	Argos Operations Committee
OSMC	NOAA Observing System Monitoring Center (USA)
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
POGO	Partnership for Observation of the Global Oceans
PP-WMD	Pilot Project on Wave Measurement from Drifters
PP-WET	JCOMM Pilot Project on Wave measurement Evaluation and Test from moored buoys
PTT	Platform Transmitter Terminal (Argos)
QA	Quality Assurance
QC	Quality Control
QMF	WMO Quality Management Framework
QMS	Quality Management Systems
RAMA	Indian Ocean Research Moored Array for African-Asian-Australian Monsoon Analysis and Prediction
RMS	Root Mean Square
RNODC	Responsible Oceanographic Data Centre (IODE)
RNODC/DB	RNODC for Drifting Buoys
RRR	Rolling Review of Requirements
SADC	South African Development Community
SAMS	Scottish Association for Marine Science
SAT	Site Acceptance Test

SAWS	South African Weather Service
SBD	Short Burst Data
SCG	Services Coordination Group (JCOMM)
SeaDataNET	Pan-European infrastructure for Ocean & Marine Data Management
SIA	Seasonal to Inter-annual Forecast
SIO	Scripps Institution of Oceanography (University of California, USA)
SLP	Sea Level Pressure
SOBP	Southern Ocean Buoy Programme
SOC	Specialized Oceanographic Centre (JCOMM)
SoG	Statements of Guidance
SOOP	Ship-Of-Opportunity Programme
SOOPIP	SOOP Implementation Panel (JCOMM)
SOT	Ship Observations Team (JCOMM)
SPA	JCOMM Services Programme Area
SST	Sea-Surface Temperature
STIP	Stored Tiros Information Processing
SVP	Surface Velocity Programme (of TOGA and WOCE, replaced by GDP) drifter
SVP-B	SVP barometer drifter
SVP-BS	SVP drifter with salinity
SVP-BTC	SVP drifter with temperatures in depth
SVP-BW	SVP Abarometer 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
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-IBPD	DBCP Task Team on Instrument Best Practices & Drifter Technology Developments (merged the TT-QM & TT-TD)
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)
UN	United Nations
UNESCO	UN Educational, Scientific and Cultural Organization
UNFCCC	United Nations Framework Convention on Climate Change
URL	Uniform Resource Locator
USA	United States of America
USD	United States Dollar
VAR	Value Added Reseller
VOS	Voluntary Observing Ship (JCOMM)
WCRP	World Climate Research Programme
WIGOS	WMO Integrated Global Observing Systems
WIS	WMO Information System
WMO	World Meteorological Organization (UN)
WOCE	World Ocean Circulation Experiment
WWW	World Weather Watch (WMO)
XBT	Expendable BathyThermograph