DATA BUOY COOPERATION PANEL
TWENTY-THIRD SESSION

Jeju, Republic of Korea, 15-19 October 2007

FINAL REPORT

JCOMM Meeting Report No. 54

WORLD METEOROLOGICAL ORGANIZATION

INTERGOVERNMENTAL OCEANOGRAPHIC COMMISSION (OF UNESCO)

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N O T E

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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;
- National reports;
- Action Group reports;
- 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;
- Technical Document list;
- Evaluation Group report;
- International Tsunameter Partnership report
- Training course outcome.

EXECUTIVE SUMMARY

The twenty-third Session of the Data Buoy Cooperation Panel (DBCP) was held in Jeju, Republic of Korea, from 15 to 19 October 2007, at the kind invitation of the National Oceanographic Research Institute (NORI) of the Ministry of Maritime Affairs and Fisheries.

A technical and scientific workshop focusing on technology developments, operational practices, applications of collected data and national practices was organized during the first 1.5 days of the meeting. Twenty-one presentations were delivered covering each of the theme areas.

The session discussed buoy programme implementation, including activities of the DBCP Action Groups, sustained scientific programmes (GDP, OceanSITES, Argo), progress report of the International Tsunameter Partnership (ITP), data collection and data management, exchange, quality assurance and monitoring issues, best practices and standards, deployment opportunities and strategies, vandalism on data buoys, and the relationship with JCOMM. In addition, DBCP Trust Fund contributions, future commitments, and budget were discussed. 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.

One of the items for discussion was the review and restructure of the modus operandi for the Panel so that its activities become more cost-effective. For example, the size of the meeting, including technical and scientific workshop, will be reduced to fours days, and the Session will be organized in Paris at the Intergovernmental Oceanographic Commission (IOC) of UNESCO or in Geneva at the World Meteorological Organization (WMO) headquarters, respectively every other year (odd years); and will be held at a venue to be decided by the Panel on even years. The Panel agreed with its operating principles and proposed to establish Task Teams to deal with (i) data management, (ii) quality management, (iii) technological developments, (iv) capacity building, and (v) moored buoys.

The Panel updated its implementation strategy. The new version included recent modifications 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), and the Global Ocean Observing System (GOOS), Global Climate Observing System (GCOS) and Global Earth Observation System of Systems (GEOSS). The review also encompassed implementation aspects such as the deployment strategy, and the number of barometer drifters to be deployed worldwide, including in the tropical regions, and in the Southern Ocean (now 300 units), as well as development of appropriate technology to meet the expressed requirements. In particular, the DBCP is willing to explore the development of cost-effective wave observations from drifters and OceanSITES in support of satellite wave products and wave modelling validation. The Panel recommended that all manufacturers adopt tether strain as drogue detector and use consistent technology. Some specific recommendations were also made with regard to deployment instructions.

The Panel agreed with the strategy proposed by the JCOMM Observations Coordination Group (OCG) with regard to the development of a future Observing Programme Support Centre (OPSC). The Panel considered that, provided that additional funding be identified, it would eventually be appropriate that the Technical Coordinator transfer her duties regarding the SOT to the Argo Technical Coordinator, and undertake OceanSITES activities instead. The SOT, OceanSITES, and Argo will be approached to investigate whether this will be agreeable to them.

The DBCP drifter Iridium Pilot Project has formally started in July 2007 for a two-year period. The Pilot Project seeks to evaluate the feasibility of Iridium technology for real-time telecommunication of drifter data globally (at least 50 units worldwide) and under various conditions, particularly in rough seas, to demonstrate performance with submergence, in various temperatures and levels of wind. To date 8 Iridium drifters have been deployed, and about 30 drifters are planned for deployment in various ocean basins before the end of 2007 with participation from 8 DBCP Members.

Based on the success of the training course on data management and buoy programme implementation, Ostend, Belgium, 11-15 June 2007, the DBCP now plans to apply the Panel's experience and resources in the development of training materials for Capacity Building in developing nations on a sustained basis. The Panel therefore agreed to establish a Task Team on Capacity Building.

The Panel made a few recommendations to the Argos Joint Tariff Agreement (JTA), including the usual arrangements for funding the independent JTA chairperson, but also in particular regarding improvement of timeliness of data collected via Argos, and the development of appropriate monitoring tools to improve responsiveness to problems. The Panel recommended that the JTA makes recommendation to the Argos Operations Committee (OPSCOMM) to review the Memorandum Of Understanding (MOU) between NOAA, CNES, and EUMETSAT so as to permit fair competition by other satellite data service providers by opening up free and open use of the global Argos datasets that were currently only distributed to CLS.

The Panel re-elected Mr David Meldrum as its chairperson, Mr Ken Jarrott as its vice-Chairperson for the Southern Hemisphere, and elected Mr Al Wallace as its vice-Chairperson for North America. The position of vice-chairperson for Asia is now vacant. Ms Hester Viola will continue to serve as Technical Coordinator for the DBCP. The Panel welcomed the potential offer from the South African Weather Service for hosting its twenty-fourth session in the Republic of South Africa in October or November 2008.

GENERAL SUMMARY OF THE WORK OF THE SESSION

A. ORGANIZATIONAL COMPONENT

1. ORGANIZATION OF THE SESSION

1.1 OPENING OF THE SCIENTIFIC AND TECHNICAL WORKSHOP

1.1.1 The Scientific and Technical Workshop with DBCP-XXIII was opened in the conference room of Jeju Grand Hotel, Jeju, Republic of Korea, at 09.00 hours on Monday, 15 October 2007.

1.1.2 On behalf of the Panel, Mr David Meldrum, Chairperson of the Panel, welcomed all participants to the session and to the workshop, noting that the large participation was testimony to the importance with which the work of the panel was now regarded, as well as the ever-increasing interest in this work and in the applications of buoy data in both meteorology and oceanography. The chairperson expressed his sincere thanks, on behalf of all participants, the National Oceanographic Research Institute (NORI) of the Ministry of Maritime Affairs and Fisheries, and the local organisers for hosting the session and workshop and for providing such excellent facilities and support and warm hospitality.

1.1.3 On behalf of the Republic of Korea government, Dr Yeong-Jin Yeon, Director General of NORI, welcomed participants to the meeting and to Jeju and expressed his pleasure and great honour to host this workshop and session. He recalled that the twenty first century is the age of ocean. The "Ocean" becomes a significant keyword for mankind in terms of food, logistics, energy resource, as well as environment.

1.1.4 However, he noted that we have done uncontrolled development and use of ocean without full understanding of its value. Recently, the carelessness of human being leads to many kind of marine disasters and accident. To overcome these problems, he stressed that we should do our best to be in harmony between conservation and development of ocean, and conduct more researches on the production and management of useful oceanographic data with perfect accord.

1.1.5 Additionally, Dr Yeon noted that we should exert all possible efforts to find the best way to predict marine disasters, which cause heavy damage, through the exchange of experience and information. All member states of IOC and WMO have taken many activities to understand the characteristics of ocean. In particular, the production of beneficial information using data collected from buoys deployed in almost all ocean of the world have been evaluated as a fruit for the international cooperation of ocean observation.

1.1.6 He reported that the Republic of Korea also recognized the importance of ocean and selected it as one of top ten national policy items. Besides, in order to continually use and develop the ocean, we endeavour to find new cooperation projects with other countries and international organizations and to increase a budget for ocean observation and research every year.

1.1.7 Dr Yeon explained that he fully hoped that this meeting in Jeju would serve as a valuable opportunity for all participants to strengthen their cooperation and solidarity as well as to discuss relevant issues under the oceanographic field, in particular, ocean observation using buoys. He wished for a successful meeting and expressed hope that the participants will leave Korea with many wonderful memories in Jeju, which is one of the world heritages designated, by the United Nations Educational, Scientific, and Cultural Organization (UNESCO). He closed his remarks by wishing everyone here the best for continued happiness and success and welcomed again everyone to the Republic of Korea.

1.1.8 On behalf of the Secretary-General of WMO, Mr Michel Jarraud, and the Executive Secretary IOC, Dr Patricio Bernal, the Secretariat representative also welcomed participants to the workshop and DBCP session, and in doing so expressed the sincere thanks of both organizations to NORI and to Dr Yeong-Jin Yeon and his staff for their excellent support for the meetings, for the panel and for the work of WMO and IOC in general. 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).

1.1.9 The list of participants in the workshop is given in an appendix to the workshop proceedings.

1.2 OPENING OF THE SESSION

1.2.1 The twenty-third session of the DBCP itself was opened by the Panel Chairperson, Mr David Meldrum, at 13.00 hours on Tuesday, 16 October 2007, in the conference room of the of Jeju Grand Hotel. The Chairperson welcomed participants again to the session and once more thanked the NORI for hosting it and providing excellent facilities.

1.2.2 The list of participants in the session is given in ***Annex II.***

1.3 ADOPTION OF THE AGENDA

1.3.1 The Panel adopted its agenda for the session, which is given in ***Annex I.***

1.4 WORKING ARRANGEMENTS

1.4.1 Under this agenda item, the Panel decided on its working hours and other arrangements for the conduct of the session.

B. IMPLEMENTATION COMPONENT

2. IMPLEMENTATION REPORTS

2.1 TECHNICAL COORDINATOR

2.1.1 The Technical Coordinator (TC), Ms Hester Viola, reported on her activities during the period 1 September 2006 to 31 August 2007. During this period, she was based in Toulouse, France, and employed by IOC of UNESCO. As agreed by the Panel at its 14th session, about one-third part of her time was spent on the Ship Observations Team (SOT). About 5% of her time was spent on JCOMM and JCOMM *in situ* Observing Platform Support Centre (JCOMMOPS) issues and about 5% working with the Argo TC. The remainder is spent on DBCP matters.

2.1.2 During the period, her time (relating to DBCP) was spent in the follow ways:

(i.) User assistance
(ii.) Producing reports and maps as required
(iii.) JCOMMOPS - information system operations & maintenance, i.e. (a) loading and updating platform metadata, (b) maintaining web mapping applications, (c) maintaining and updating websites, and (d) maintaining mailing lists and contact details
(iv.) Participated in DBCP Executive board decision making
(v.) Produced monthly maps (including new standardized maps), and other data processing
(vi.) Loaded monthly Buoy Monitoring statistics into the JCOMMOPS database

(vii.) Preparing for DBCP-23 (status report and preparatory documents; action lists and work plans from 2006, and follow up; documenting anti-vandalism measures; collecting SOBP commitments for the period 1 September 2007 to 31 August 2008; contributing to the DBCP future objectives discussion; TC travel plan; hosting DBCP Session documents at JCOMMOPS)
(viii.) Maintained mailing lists
(ix.) Maintained and updated websites (DBCP, JCOMMOPS & SOT/SOOP sites), including (a) review of website usability across JCOMMOPS (minimal progress so far), (b) deployment opportunities page, (c) benefits of GTS (web and letter), (d) buoy Manufacturer Contacts updated, and (d) Action Group map updated etc ;
(x.) Worked on Metadata within JCOMMOPS database
(xi.) DBCP Iridium Pilot Project Technical Coordination (web site and mailing list; pilot project status; upgrade scheme; deployment notification; provision of information about the project)
(xii.) Attended monthly meetings with CLS (e.g. Brazilian Navy contact point and usernames for the Argos Web; issues with data in the GTS sub system which was affecting the metadata in the JCOMMOPS database; demonstration of Argos Web by CLS staff)
(xiii.) Participation in the DBCP Executive Board decision making.

2.1.3 She reported on the following highlights:

- She worked with the Argo TC to ensure that all DBCP and SOT maps were consistent with Argo maps
- A number of status maps are now available from JCOMMOPS, in particular the new dynamic map of all JCOMM observing systems; those are available from the JCOMMOPS web site and distributed to the mailing list on a monthly basis
- "Open Geospatial Consortium Web Map Services (WMS)" is enabled and permits viewing platform status into mapping (GIS) packages
- She Created a monthly Keyhole Mark-up Language (KML) file of Data Buoys to permit visualisation in Google Earth
- She provided input on behalf of JCOMM for the WMO Rolling Review of Requirements (RRR) regarding *in situ* ocean instrument performances
- A New Web Server was installed at JCOMMOPS
- The DBCP brochure update is in progress

2.1.4 During the period, she participated in a number of events and meetings, including in particular:

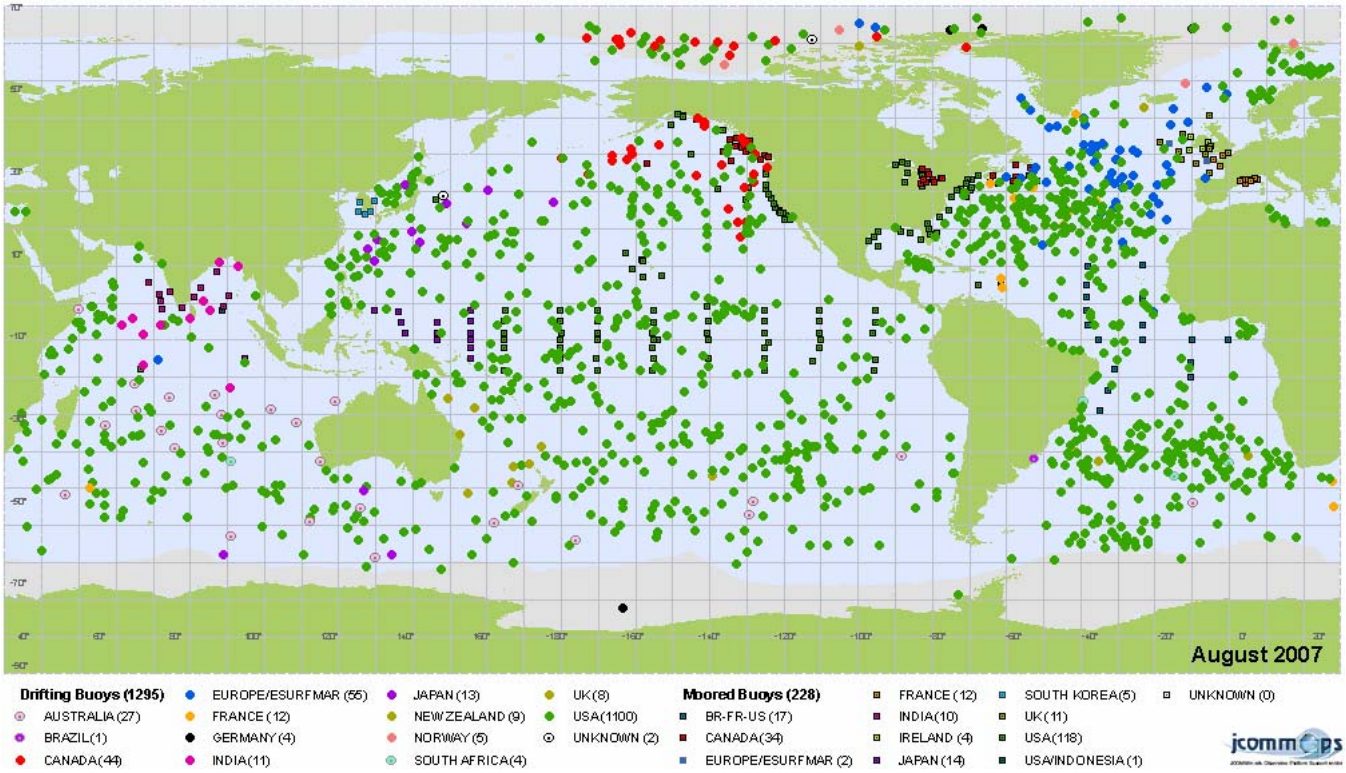
- USA, October-November 2006:
  - Seattle, Washington: Visited Pacific Marine Environmental Laboratory & Applied physics Laboratory& School of Ocean Sciences, University of Washington.
  - Washington DC: NOAA Office of Climate Observation, NOAA Office of Oceanic and Atmospheric Research & CLS America
  - Miami, Florida: Atlantic Oceanographic and Meteorological Laboratory and Global Drifter Centre
  - Stennis Space Center, Mississippi: Navoceano & NOAA National Data Buoy Center
- Brest, France, 13-14 December 2006; Visit of Météo-France, SHOM, IFREMER and IRD:
  - Spoke with Météo-France and SHOM staff about instrumentation and quality control.
  - Spoke with IRD staff specifically about the SOOP programme.

  - Met with representatives of the Pan-European infrastructure for Ocean & Marine Data Management (SeaDataNET) project about its aims and discussed how to implement a unique identifier for XBT observations/Lines
- London UK, March 2007; System of Industry Metocean data for the Offshore and Research Communities (SIMORC), International Association of Oil and Gas Producers (OGP).
  - Presented at a workshop, marking the official launch of the SIMORC service, which aims to improve the exchange and availability of ocean data and products to Oil and Gas producers.
- Geneva, Switzerland 13-22 April 2007; WMO headquarters
  - Ship Observations Team (SOT) and related meetings, JCOMM Observations Coordination Group meeting. Discussion on the future of JCOMMOPS
- Darmstadt, Germany, 23-27 April 2007; EUMETSAT
  - Attendance and presentation to the CBS Expert Team on Data Representation and Codes (ET/DRC) meeting as the representative for JCOMM to put forward the plans of JCOMM.
- Ostend, Belgium, 11-15 June 2007; International Oceanographic Data and Information Exchange (IODE) Project Office, DBCP Training Course on Buoy Programme Implementation and Data Management.
  - Prepared for and attended the course, presenting content on Quality Control and the Argos Web.
- Paris, 20-22 June 2007; IOC headquarters
  - Attended IOC Assembly meeting, meeting with member state representatives and IOC colleagues

2.1.5 The status of buoys reporting on the GTS in August 2007 was as follows:

Variable	Any	Air P	Tend.	SST	Air T	Hum.	Wind	Waves	Sub/T
Drifting Buoys	**1295**	**474**	**424**	**1139**	**46**	**1**	**11**	**9**	**12**
Moorings	**227**	**73**	**45**	**127**	**120**	**73**	**111**	**64**	**65** (TAO, PIRATA, TRITON)

2.1.6 The DBCP Status by Country in August 2007 is shown on the map below:



2.1.7 There has been a lot of fluctuation in the total number of operational buoys and accepted observations, on the GTS, in the last two years. The Panel noted with interest that there has been a significant growth in the number of buoys reporting Air Pressure in the last year, owing to additional commitments from Panel Members and following the JCOMM Observations Programme Area (OPA) strategic work plan. See ***Annex IX*** for details on status of buoy programmes.

2.1.8 In summary, the Technical Coordinator was settling into the role and was working as part of JCOMMOPS. The Panel agreed to add the following action items in the Technical Coordinator's work plan for the next intersessional period:

- Continue working on last year's plans/actions which are still open, including in particular
  - Work on buoy metadata collection, maintenance and loading processes
  - Delays - Look at the timeliness of data and possible improvements
  - Quality control monitoring for the global network
  - Support and provide technical assistance with GTS distribution of buoy data
  - Website reliability and usability

- Assist Panel Members and seek additional commitments for barometer buoys – especially in Southern Ocean which, for the Global Drifter Programme (GDP) at least, relates a lot to the availability of additional deployment opportunities

- Enhanced buoy deployment planning especially in cooperation with the Partnership for the Observation of the Global Ocean (POGO) Cruise database

- Participating in Argos 3 training in November 2007 to assist users better; and assist CLS in the validation of the Argos GTS System including BUFR code implementation.

- Play an active role in the DBCP Iridium Project developments by preparing a notification web form for all Iridium PP buoys or customization of existing Buoy Metadata Entry forms, and for producing maps and reports specifically for the Pilot Project.

- Participation in the WMO Expert Team on Data Representation and Codes and work with the JCOMM members to finalize the requirements and coordinate input for new/revised BUFR templates

2.1.9 The Panel proposed a few other actions for the Technical Coordinator to be discussed in more detail under other agenda item during the Session (e.g. delays, metadata, quality control, information exchange, and brochure).

2.1.10 The Panel noted that despite the availability of some deployment opportunities (e.g. Austral summer re-supply ships) in the Southern Ocean, the new target of the Southern Ocean Buoy Programme (SOBP) for eventually maintaining an array of 300 barometer buoys in the programme area of interest will require more deployment opportunities and efforts by Panel Members. More barometer upgrades are required in the meantime and Panel Members are invited to participate actively in the barometer upgrade programme (**action, Members**).

2.1.11 The Panel encouraged the Technical Coordinator to promote an enhanced participation of African countries in the DBCP (**action, TC**) and noted that this had already been made through the participation of the Technical Coordinator as a trainer at the DBCP training Course in Ostend last June (see agenda item 4.3). The International Buoy Programme for the Indian Ocean (IBPIO) Chairperson explained that Mozambique had just joined the IBPIO because of the training course.

2.1.12 The Panel noted the good support and cooperation provided by CLS to the Technical Coordinator, and thanked CLS for its continued cooperation.

2.1.13 The full report of the Technical Coordinator is to be included in the Panel's Annual Report planned to be published in early 2008, in CD-ROM only. The Panel thanked Ms Viola for her work undertaken during the past intersessional period.

2.2 ACTION GROUPS AND RELATED PROGRAMMES

2.2.1 Action Groups

2.2.1.1 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 Jean Rolland, 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 Dr Ignatius Rigor, Coordinator of the IABP);

(vi) the WCRP-SCAR International Programme for Antarctic Buoys (IPAB) (written report provided by Christian Haas, IPAB Coordinator and presented by the Secretariat on behalf of Dr Shuki Ushio);

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

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

(ix) the Global Drifter Programme (GDP) (verbal presentation by Dr Peter Niiler, GDP representative).

2.2.1.2 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.

2.2.1.3 Some comments and discussion followed the above presentations:

(i) Availability of deployment opportunities remained as an issue for most of the Action Groups. Achieving uniform spatial distribution also remained to be done for some of them (e.g. IBPIO, NPDBAP). The Panel noted increased deployments in certain regions (e.g. IABP & IPAB in the occasion of the IPY), whereas the loss of the air deployment opportunities provided in previous years by the US Naval Oceanographic Office (Navoceano) has substantially impacted most of the Action Groups, in particular, the IABP (e.g. White Trident exercise). The Panel agreed to investigate the availability of new deployment opportunities by air (e.g. ice patrol, coast guards, and hurricane hunters) or by ship (**action, Members & TC**). It was particularly suggested that interested Panel Members contact Dr Peter Black of the US National Hurricane Center (**action, Members**);

(ii) The Panel was pleased to note the substantial development of the PIRATA array since 2005 with the SouthWest extension (2005), NorthEast extension (2006), and SouthEast extension (2006, one year only), with good data return;

(iii) The development of the RAMA array was noted in the Indian Ocean for Monsoon Analysis and prediction. The Indian Ocean array was 32% completed in 2007; plans are to achieve 43% completion in 2008;

(iv) Vandalism remained an issue for some of the Action Groups (e.g. TIP, IBPIO). The Panel noted that TIP has been developing vandalism resistant designs for the TAO array moorings;

(v) The Navy requested the moored buoys to be deployed near the African Coasts in the Atlantic Ocean;

(vi) The substantial development of the buoy network in the North Atlantic was noted, thanks to increased E-SURFMAR commitments: E-SURFMAR aims to continue increasing the number of drifting buoys operating in its area of interest (North Atlantic and Mediterranean) to as many as 150 by 2012 (subject to budget approval by its contributing members). In the reference period 1st September to 31st August 2007 95 drifting buoys were deployed, with 95 drifters operating at end August. Continuous efforts was made for barometer upgrades, that all of these operating buoys were SVPB drifters including 40 barometer upgrades provided through the Global Drifter Programme and 3 SVPBW as a contribution of Environment Canada. Most buoys used the Argos system to report their data. The evaluation of the Iridium communication system began as a contribution to the DBCP drifter Pilot Project;

(vii) The total number of drifting buoys reporting air pressure globally currently reached a level of about 500 operational units;

(viii) Many DBCP Members have been contributing to the IPY through the Action Groups such as IABP, IPAB, and E-SURFMAR;

(ix) E-SURFMAR was developing wave directional spectral measurements from all of its moorings for satellite validation purposes;

(x) The noticed seasonal variation of RMS (obs. – FG) needs to be investigated as the model "noise" might be seasonally variable, and the observational errors might not be as large as thought;

(xi) The QC tools developed by Météo-France were found to be very useful and routinely being used by Panel Members, including the black list (e.g. AOML systematically removes from GTS distribution the buoys that appear in the black list); The Panel expressed its appreciation to Pierre Blouch for developing the tools and making them available to the Panel Members;

(xii) The IBPIO deployed 161 drifters in 2006/2007 of which 119 were fitted with barometers. In 2007/2008, it plans to deploy 150 drifters including more than 90 barometer buoys. As a direct outcome of the DBCP Capacity Building training course in Ostend, June 2007 (agenda item 4.3), Mozambique has officially joined the IBPIO;

(xiii) GTS delays have been remained as a serious issue for a number of years. For example, less than 50% of the Indian Ocean buoy data were being received within 100 minutes. The Panel asked the TC and CLS to investigate and if possible to implement a solution before the next Panel Session (**action**, See agenda item 8);

(xiv) DBCP-PICES NPDBAP had new Technical Coordinator (Shaun Dolk to replace Craig Engler); 140 drifting buoys are reporting from the programme area of interest (30N to 65N in the North Pacific Ocean) but gaps were remained in the Barent Sea and Northern part of the Gulf of Alaska.

(xv) The Panel noted with concern passive participation of the Asian countries in the NPDBAP, following the Panel's decision in the previous Session, the Secretariats wrote in February 2007 to Japan, Republic of Korea, China, and Russian Federation to raise their attention to the DBCP-PICES NPDBAP, its underlying requirements, and the need to achieve better coverage in the areas of interest. Active participation from the Asian countries in the programme was therefore urged, as well as the nomination of a co-chairperson representing Asia to the NPDBAP. Neither the Secretariats nor the NPDBAP Co-chairperson, Mr Al Wallace, had received any reply from those countries. Nevertheless, the Panel reiterated its invitation to Asian countries interested to participate in the NPDBAP to contact the NPDBAP co-chairperson for North America, Mr Al Wallace (**action, interested Members**). The Panel agreed that the NPDBAP should make a formal presentation of the programme to the North Pacific Marine Science Organization (PICES) in order to inform them about the available data sets and the programme activities (**action, NPDBAP**). It was noted that the IOC representative to the 16th PICES meeting (October 2007) conveyed this message to the PICES on behalf of the DBCP;

(xvi) 120 ice buoys were reporting from the Arctic Ocean in October 2007; 200 buoys are planned for deployment next year, many of them being committed as a contribution to the IPY (e.g. DAMOCLES meteorological buoy array, Polar Ocean Profiling System (POPS) and Ice Tethered Platforms, SVP drifters). The Panel noted that a substantial percentage of IABP buoys were not reporting in real-time onto the GTS. It recommended that the IABP address the issue as soon as possible with the goal of having all buoys reporting on the GTS (**action, IABP**).

(xvii) A reference to documents describing the conditions under which the deployment of scientific equipment from ships, in particular in Antarctic waters south of 60S, can be placed on the DBCP/JCOMMOPS web sites (**action, G. Ball and TC**).

(xviii) 171 drifters were operational in October 2007 in the ISABP area of interest, including 75 barometer drifters. Some data communication problems persist in the ISABP area. Ghana and Angola have joined the ISABP as a follow up to the DBCP Training Course in Ostend. Plans are to improve sampling in the South-West and South-East Atlantic Ocean, Drake Passage, the Gulf of Guinea, and the Angola Basin, continue Capacity Building (CB) efforts and attract attention of more African countries.

(xix) The development of OceanSITES has been relatively slow during the last intersessional period, due to the lack of manpower. However, plans for new sites and further integration were under way, including 1) 4 sites planned under the US/NSF Ocean Research Interactive Observatory Networks (ORION) programme, with ambitious infrastructure (e.g. 55S power discus buoy). Funding and final decision on each site's development were yet

to be decided. 2) integration of 11 existing time series stations under the European integrated network of open ocean multidisciplinary observatories (EuroSITES) framework, in terms of technology, operation, and data management. Enhanced interaction with the International Ocean Carbon Coordination Project (IOCCP) was being pursued regarding ocean carbon measurements.

(xx) OceanSITES data management were continuously under development. Specific data format was established but still being tested with some sites. Some of the sites are reporting in real-time (e.g. TAO/PIRATA, ANIMATE) and others in delayed mode (e.g. MOVE, hydrography BATS and HOT). The Panel noted that Coriolis needed a Global Data Access Centre (GDAC) partner in the USA in order for the OceanSITES Data Management to become more effective.

(xxi) Project office and management support was critically needed for the OceanSITES not only for monitoring purposes but also for chasing after the data suppliers. Discussions have been underway in the context of the future Observing Programme Support (see agenda item 5.2). In parallel, the Panel invited Dr Uwe Send to investigate whether the EuroSITES could participate in the overall OceanSITES management (**action, U. Send**).

(xxii) The Panel noted that the OceanSITES was very heterogeneous, and that the programme had to strive for more interoperable and comparable observatories to be able to provide consistent data as a system.

(xxiii) The Panel encouraged the cooperation of OceanSITES and the tsunameter network at the national level (**action, Panel Members**). It also encouraged OceanSITES to continue developing wave measurement technique, in communication with the wave community including the JCOMM Expert Team on Waves and Storm Surges (ETWS) **(recommendation)**.

(xxiv) JCOMM and IOC/WMO playing a role for OceanSITES advocacy to GEO (**action, Secretariat**);

(xxv) It was noted that the GDP could be regarded as a sustained scientific programme also serving operational needs. Hurricane drifters were also showing good results. Salinity drifters deployed in the Bay of Biscay were providing reliable salinity data. Spooled chain drifters were being developed.

(xxvi) Recalling Mayra Pazos' presentation at the Scientific and Technical workshop, the Panel recommended using strain gauge sensors for drogue detection and for increasing the buoy lifetime (**recommendation**).

(xxvii) The GDP raised an issue regarding the OOPC requirements for high temporal resolution data. It was discussed and recorded under agenda item 8.6.5;

(xxviii) The Panel noted the GDP's plan to deploy 1000 drifters during 2008, including in the area of the Gulf of Guinea in cooperation with US Navy. The Panel noted that USA was providing about 90% of the drifters deployed in the GDP but that this was slightly compensated by the increasing number of barometer upgrades purchased by other Members. Dr Peter Niiler explained that buoy upgrade with barometers would require the commitment of international partners participating in the GDP. The Panel agreed that such commitments were particularly critical in the Southern Ocean and encouraged Members' consideration (**action, Members**). The Panel also noted that increasing the drifter lifetime could make the situation more acceptable to the USA.

(xxix) Sharing infrastructure was remained as a major issue and priority recommendation to all Action Groups and related programmes (e.g. ship time, upgrade of drifters and moorings). The Panel encouraged inter-agency and inter-programme cooperation in this regard.

2.2.2 Progress report of the International Tsunameter Partnership

2.2.2.1 The Panel received a report by Mr Ken Jarrott on the tsunami warning systems and the issues arising from the discussions of the International Tsunameter Partnership (ITP). The full report is reproduced in the accompanying CD-ROM.

2.2.2.2 The International Tsunameter Partnership was established under the auspices of the IOC International Cooperation Group for the Indian Ocean Tsunami Warning and Mitigation System (IGC/IOTWS). Its purpose was to support the establishment, effectiveness and on-going viability and enhancement of tsunami detection and warning systems using deep ocean monitoring stations (tsunameters).

2.2.2.3 The ITP has met twice in 2007, with good representation at both meetings from national operators, suppliers, and developers of tsunameters. The meetings had very strong representation from Indian Ocean and neighbouring Asian countries, and from the USA. This reflects the very intense efforts currently underway in the Indian Ocean and Pacific Ocean to develop and expand tsunami observation networks.

2.2.2.4 To date the ITP has:

(i) issued a Tsunameter Equipment Performance Standards and Guidelines document, reflecting the perceived needs of warning centres, and the current state of practical instruments;

(ii) provided in-principle endorsement of message content elements for tsunameter sea level data transmissions and metadata information categories, as a basis for wider consultation and the detailed development of GTS transmission standards;

(iii) commenced the compilation of best practice materials for tsunameter test and acceptance processes;

(iv) commenced work to assess the long-term challenge of sustaining deep ocean tsunami observation networks (particularly but not exclusively in the Indian Ocean).

2.2.2.5 The Panel noted that the Indian Ocean faced a dramatic expansion in national tsunameter deployments through to end 2008. By end 2008, over 40 tsunameters were planned to be deployed in the Indian Ocean and nearby seas, drawing on at least five different tsunameter products. At least seven stations in this area were currently reported to be operational within “local” (national) warning systems, but their data was not available to neighbour countries’ warning centres. The tempo of new station rollouts required urgent attention to instrument performance assessments, to achieving real-time continuous data dissemination, and to global data management practices (including metadata).

2.2.2.6 The Panel agreed that many of the present activities of the ITP related directly to the role that the DBCP has exercised since its inception, and to its current expertise base and communal data tools. In this context, 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. Strong desire was expressed for the ITP-DBCP relationship to be better formalized, to improve and understand these synergies **(recommendation)**.

2.2.2.7 The Panel thanked Mr Ken Jarrott for his report and for acting as a liaison with the ITP. The Panel once again recognized that the ITP goals and activities are largely related to those of the DBCP, which have been exercised since its inception, and to its current expertise base and communal data tools. The Panel agreed that communication with the ITP should continue and that the links between the DBCP and the ITP should be strengthened. The Panel encouraged its Members to maintain their commitment in this regard (**action, Members**).

2.2.3 New Action Groups

2.2.3.1 No proposals for new action groups were received by the Panel.

2.2.3.2 The Panel considered whether the ITP might in due course become an Action Group of the Panel. Mr Ken Jarrott commented that there was considerable discussion at the recent ITP meetings on this issue and noted that participating in the DBCP might be an accelerator to implement the Tsunami Warning Systems, considering the experience of DBCP and the status of the DBCP as a joint WMO-IOC programme that would emphasize the ITP link to the IOC. The Panel noted that, from an "observing platform" perspective, as well as all related practical implementation and data distribution aspects, the ITP was addressing very similar issues with the DBCP that both groups should avoid duplicated efforts and build synergies in the long term (e.g. deployment opportunities). Meanwhile, the Panel recognized that that there is a split of responsibilities at the national level, therefore informal discussions had to take place before any formal proposal for cooperative activities between the DBCP and the ITP. The Panel agreed that a transition strategy could be addressed later on.

2.3 DBCP EVALUATION GROUP

2.3.1 The Chairperson of the Evaluation Group, Mr Bill Burnett, reported on the activities of the Group and referred to the DBCP preparatory document 2.3, submitted in September 2007. The Evaluation Group also had an informal meeting on Sunday, 14 September 2007 in Jeju, Republic of Korea. The full report of the Evaluation Group is reproduced in the accompanying CD-ROM

2.3.2 The Panel also received input from Météo-France, AOML, Met Service New Zealand, Technocean, Marlin-Yug and METOCEAN, including the presentation during its Scientific and Technical workshop by Ms Mayra Pazos on AOML's drifter comparison. The Panel invited its Members to review the AOML's exercise for their intercomparison (**action, Members**).

2.3.3 The activities by the group included:

(i) Evaluation of Iridium Short Burst Data (SBD) as an alternative to Argos. These evaluations would appear in the report of the Iridium Pilot Project (see agenda item 8.4.1);
(ii) Evaluation of the Iridium transmission technology and positioning issues (GPS, Iridium),
(iii) Evaluation of ice drifters reporting air pressure,
(iv) Further development and evaluation of SVP-BS (salinity) and SVP-BTC (temperatures in depth),
(v) Modification to the sensor system for drogue on/off detection (strain gauge),
(vi) Deployment and evaluation of Southern Ocean Buoy Programme drifter data,
(vii) Lifetime study (average lifetime of about 20 months for SVPBs).
(viii) Further investigation of the spiky pressure data from buoys in the Southern Ocean (sea-state might be the cause; work still required to improve the de-spiking algorithm).
(ix) Study of specific problems that have occurred for specific buoys
(x) Integration of GPS
(xi) Developments for the making of observations at the round hour

2.3.4 The Panel also noted technical developments by manufacturers, including i) Marlin-Yug's continuing improvement of the 80m temperature chains for higher reliability and longer lifetimes, and ii) Technocean's progress with GPS technology integration, which will have future impacts on Argos and Iridium buoy applications.

2.3.5 The Panel noted with appreciation that the Iridium Pilot Project continued to make strides. Both Météo-France and the Scottish Association for Marine Science (SAMS) are equipping Iridium modems and GPS receivers.

2.3.6 The Panel thanked Dr Bill Burnett for his report, and the Members of the Evaluation Group, the DBCP Members who have been supporting its work (E-SURFMAR, France, New Zealand, USA, UK, Ukraine), and the manufacturers for their cooperation.

2.3.7 The Panel reviewed the history of the fruitful cooperation with the US Naval Oceanographic Office (Navoceano) regarding the provision of air deployment opportunities and expressed concerns regarding the termination of such support activities since early 2007. The Panel invited USA to contact Navoceano in order to identify someone who could to take over the role of the previous DBCP vice-chairperson for North America, Ms Elizabeth Horton, in terms of providing coordination for the provision of air deployment opportunities in support of DBCP activities (**action, USA**).

2.4 NATIONAL REPORTS

2.4.1 The Panel received written and verbal reports on current and planned buoy programmes from Australia, Brazil, Canada, France, Germany, Japan, Kenya, New Zealand, Republic of Korea, South Africa, Sweden, Thailand, and USA. As usual, these written reports, as well as others submitted to the Secretariat before 30 November 2007, would be published in the Panel's Annual Report.

3. SUSTAINED SCIENTIFIC PROGRAMMES

3.1 GLOBAL DRIFTER PROGRAMME (GDP)

3.1.1 Dr Peter Niiler reported on the scientific objectives and latest scientific results of the GDP on behalf of Dr Rick Lumpkin, Chairperson, GDP. He recalled that the great majority of scientific papers written and based on GDP data have been related to sea surface velocity. The Panel noted that the overall Global Ocean Observing System (GOOS) is evaluated for SST measurements by NOAA's National Climate Data Center (NCDC) and for near-surface current measurements by the Global Drifter Program. SST measurements are quantified by Equivalent Buoy Density (EBD), which down rates ship measurements compared to moored and drifting buoy measurements to reflect the relative accuracy levels. Near-surface currents are measured by moored current meters and by drogued drifters, a subset of the overall drifter array due to drogue loss. Over the most recent quarter, approximately 60% of all 5°x5° open-ocean squares were sampled at least once. Spatially, coverage is best in the subtropical North and South Atlantic, with lowest coverage in the South Pacific and northwestern Pacific.

3.1.2 In addition to composing a sustained part of the Global Ocean Observing System, drifters are a critical part of a number of ongoing research efforts. Dr Lumpkin highlighted two recent studies, (i) hurricane drifters, and (ii) CLIMODE drifter deployments.

3.1.3 The goals of NOAA's hurricane array of drifters is to provide real time data on the Global Telecommunication System (GTS) for improved weather forecasting by operational centres such as NOAA's Environmental Modelling Center (EMC); to study wind-driven mixing and its impacts on upper ocean heat content; to validate and calibrate satellite-based products (SST, wind, upper ocean heat content); and to evaluate coupled ocean-atmosphere models (e.g., Hurricane Weather Research and Forecast model system (HWRF)) for improved hurricane intensity forecasting. For 2007, an array of 60 Autonomous Drifting Ocean Station (ADOS, a Minimet drifter with a thermistor chain) and Minimet drifters were staged for deployment in the paths of multiple Atlantic hurricanes. Air deployments will be conducted from C-130Js of the 53rd Weather Reconnaissance Squadron "Hurricane Hunters", coordinated by personnel at NOAA's Atlantic Oceanographic and Meteorological Laboratory (AOML).

3.1.4 On August 19, 2007, an array of 4 Minimet and 8 ADOS drifter was deployed in the path of hurricane Dean, a Category 4 storm approaching the Yucatan Peninsula and forecast to strengthen to Category 5 before landfall. All drifters survived deployment and successfully

transmitted their data on the GTS. The subsurface temperature measurements from the 8 ADOS drifters allow us to see how Dean mixed the upper ocean during its passage, creating a relatively homogeneous mixed layer of maximum depth 120m. These measurements allow rigorous tests of the parameterization of subgridscale processes in coupled models seeking to improve hurricane intensity forecasts.

3.1.5 CLIMODE drifter deployments. In February through March 2007, a dense array of 60 drifters was deployed in the Gulf Stream from the R/V Knorr, as part of the CLIVAR Mode Water Dynamics Experiment (CLIMODE, drifter PI R. Lumpkin). Drifters were deployed in pairs and trios. The subsequent spreading and rotation of these clusters allows estimates to be made of mixing, stirring and vorticity in the region, with implications for eddy-driven modulation of the formation rate of subtropical mode water.

3.2 OCEANSITES

3.2.1 Dr Uwe Send, co-chairperson of the OceanSITES, reported on the scientific achievement and future plans of OceanSITES including future cooperation wit the DBCP. He noted that most of the sites in the system were still driven by disciplinary science, funded by research projects addressing either meteorology, physical oceanography, transport, biogeochemistry, or benthic observations. As such, virtually all the science carried out employs data from single sites or the subsets of sites belonging to individual projects.

3.2.2 Dr. Send presented an exemplary study by using multidisciplinary data from a single timeseries mooring (Koertzinger et al, 2007). It employed 2 years of timeseries data from the PAP site in the NE Atlantic, encompassing temperature, mixed-layer depth, pCO_2, nutrient, chlorophyll, and downward particle flux observations. Using the temporal changes over a season in the mixed-layer inventories of DIC (dissolved inorganic carbon, derived from the pCO_2) and nutrients, the net community production (NCP) is estimated during the mixed-layer deepening and after the onset of restratification. The budgets and events were consistent with the chlorophyll inventory and particle flux timeseries. New estimates of the NCP and of chlorophyll inventories resulted, and highlighted the importance of re-entraining respired deeper CO_2 during the mixed-layer deepening phase, which offsets/reduces about 1/3 of the NCP and carbon sequestration.

3.2.3 Progress on the NOAA funded Consortium on the Oceans Role in Climate (CORC) project was then reported; it aimed to monitor boundary current transports in real-time. It would employ a combination of end-point moorings, bottom-mounted PIES (inverted echosounders plus pressure sensors), and gliders, communicating acoustically with each other, plus automated surface drifter releases, Expendable BathyThermograph (XBT) lines, and data assimilation. The acoustic modems have been implemented in the gliders and PIES. A test PIES was deployed off San Diego, and acoustic communication to ranges of 6km was accomplished. By the end of 2007, a glider and a mooring would be added for testing the complete acoustic system.

3.2.4 As an example of more network-type analyses, rather than using single sites, geostrophic transport estimates between several moorings in the OceanSITES system were shown. This is from a study by Lankhorst et al 2007, using the ANIMATE/MERSEA sites Central Irminger Sea (CIS), Porcupine Abyssal Plain (PAP), and ESTOC, plus ARGO floats around the moorings. Mean profiles of flow on sections covering the Azores Current, the North Atlantic Current, and the Irminger Current were shown, plus timeseries revealing variability of the transports. The estimated transport accuracy was 1.3Sv using only moorings, and 2.4Sv using only floats. Combining them slightly increased the overall accuracy.

3.2.5 Dr. Send noted the main lesson/message from such activities was that more network approaches/analyses are needed, and for that the data collected at the sites in the system, and the procedures and QC methods should be more similar and comparable, to allow merging of the data.

3.2.6 Dr Send again emphasized the critical need for a project office and management support, to further develop the programme and provide appropriate visibility for the Programme,

and assist in the data sharing and data exchange through the communication with data suppliers. Further discussion on possible support by future JCOMMOPS was made under agenda item 5.2.

3.3 ARGO STEERING TEAM

3.3.1 Dr Kuh Kim, Seoul National University of Korea and a member of Argo Steering Team, reported on the scientific objectives and latest scientific results of the Argo Pilot Project.

3.3.2 The Panel congratulated the Argo achieving 2860 global floats by September 2007, i.e. 95% of the 3000 float goal, which is needed to maintain a 3º x 3º array. This was enabled by identifying and fixing early float, which made Argo float lifetime longer (with the current goal of 4-5 year). 805 floats were planned to be deployed in 2007 that the array should reach its full capacity of 3,000 floats sometime in late 2007.

3.3.3 The Panel paid attention to the use of Argo floats for other measurements such as dissolved oxygen, acoustic wind and rainfall, velocity shear, fluorescence, and optical plankton counting. Floats equipped with additional sensors could make such observations; however, processes strain the float energy budgets and potentially reduce the float reliability and longevity. Therefore, the Argo Steering Team (AST) has agreed that no new sensors would be incorporated into the core Argo array unless the negative impacts on float reliability and life can be fully mitigated.

3.3.4 Dr. Kim reported that Argo data – temperature and salinity profile and associated subsurface velocities – has been increasingly used by operational agencies to develop and make available products, analyses, and forecasts based on the assimilation of data into models (e.g. Mercator, ECMWF, FOAM, JCOPE, MFS). Usefulness of Argo data was generally accepted and positively impacted the ocean models (e.g. FOAM). Researchers are increasingly using Argo data.

3.3.5 Continuous efforts have been made to identify causes of erroneous reports from the floats; in February 2007, around 200 SOLO_FSI floats had pressure errors resulting from the improper binning of data, mostly in the Atlantic region, which produced a cold bias in the data in this region. Some of the erroneous data were recoverable, while other data must be estimated. Scientists were in the process of fixing the data from these floats and releasing it to the GDACs. Several strategies were discussed at the Argo Steering Team meeting in March 2007 to prevent this type of incident from happening again in the future.

3.3.6 Dr. Kim reported that the transition from a pilot program to a sustained observing system remained as a major challenge, to maintain and assess 3000 float array. The Panel noted that Argo sought help from JCOMM to make this transition as smoothly as possible. Regarding the programme support, not only the float deployment but also the Argo infrastructure needed funding, that has been so far provided by only small number of countries such as Australia, Canada, France, UK, and USA. China, Germany and India have begun contributing to the Argo Information Center from 2007. The Panel also noted that Argo's outreach and capacity building activities could somehow be linked to DBCP's activities in this regard.

3.3.7 The Panel thanked Dr Kuh Kim for the excellent overview he provided for the project. The Panel noted that the goal of achieving the sustained completion of the Argo network of 3000 operational floats required the deployment of about 800 floats per year. Dr Kim explained that this was a realistic estimate and that the number of 3000 operational floats could probably be slightly exceeded in the technology remains at the same level of reliability or is improved.

3.3.8 The Panel noted that some of the IABP participants have been deploying Argo type floats from the Arctic region but that they had found difficulties in taking steps for making the data available on the GTS in real-time. The Panel noted that the primary responsibility for inserting the data on the GTS lied with the Principal Investigators and noted that JCOMMOPS could help in this regard. The Panel therefore asked the Technical Coordinator to relay the issue to the Argo TC in

order for JCOMMOPS to liaise with the IABP Coordinator, Dr Ignatius Rigor, and provide appropriate assistance to the IABP Principal Investigators. (**action, TC**).

4. REVIEW OF THE DBCP IMPLEMENTATION STRATEGY

4.1 Future initiatives and activities of the DBCP

4.1.1 The Panel considered a proposal regarding a new structure for the DBCP and its meeting schedule that had been prepared by its chair and the joint secretariat. In essence, the proposal attempted to describe a more efficient *modus operandi* for the Panel that would allow its intersessional business to be delegated to task teams. The teams would be overseen by the Executive Board that had been created at DBCP-XXII to facilitate intersessional decision-making within bounds clearly defined by the Panel. The new proposal took account of the following constraints, the Panel had recognised most of which at previous sessions:

- The mature status of DBCP (and Argos JTA), and the attendant risks of stagnation and loss of status;
- The emergence of fresh challenges in areas such as capacity building, technology development, and the new organisational and support structures being developed within JCOMM and GEOSS;
- The need for the DBCP to be proactive throughout the intersessional period;
- The increasing pressure on every participant's time and budget;
- The need to streamline the documentation produced by the Panel, both to increase its impact and to lessen the considerable load on the joint secretariat.

4.1.2 A key element of the proposal, aimed at reducing travel costs for meetings, the annual total of which exceeded the Panel's regular budget for the employment of the Technical Coordinator and other activities, was to shorten Panel sessions, and only to hold plenary sessions in alternate years, the intermediate year sessions being replaced by Executive Board meetings. This was akin to the model that had been successfully adopted by the Ship Observations Team (SOT). Furthermore, it was suggested that future meetings should as a rule be held at WMO or IOC to lessen the stress on secretariat resources, although the Panel would remain open to invitations from other hosts, as had been its successful tradition in the past.

4.1.3 In the discussion that followed, general support was accorded to the task-team concept, in recognition that this allowed those Panel members who were able to devote significant time to Panel activities to work in an efficient and focussed manner, while allowing the Panel as a whole to continue to offer advice and exert control over task team directions. It was also agreed that the Panel should appoint task team chairs, and that it should fall to the task team chairs to recruit team members as they saw fit. Work needed to be done to define the terms of reference of these teams and to revise those of the Executive Board, and the Panel welcomed the guidance offered by Mr Al Wallace and Mr Chris O'Connors in this regard during this Panel Session. Finally, the Panel agreed on the Terms of reference and membership of the Executive Board; they provided in ***Annex IV***. Draft Terms of Reference and Membership of the Task Teams, to be reviewed by the Executive Board during the next Intersessional period for adoption at the next Panel Session, are provided in ***Annex IV***.

4.1.4 As regards a consolidated annual publication structure, the scheme outlined in the proposal was accepted without dissent.

4.1.5 Despite overall approval for the philosophies voiced in the proposal and for most of its provisions, the Panel was doubtful that it could move to biennial sessions in the short term: task teams would require meeting annually, as would action groups and the Executive Board. A clear view emerged that annual Panel sessions formed a natural framework for such meetings, and although it was recognised that the structure, length, and agenda of the sessions might usefully be changed, the frequency as yet could not. It however, was, accepted that future sessions in

principle would be held alternately in WMO or IOC in odd years and at a venue to be decided by the Panel in even years, based on other offers that might come its way. See ***Annex V*** for the timetable proposed for annual Sessions.

4.1.6 The Panel agreed that focus had to be maintained on scientific and technical issues and that the scientific and technical workshop was a very valuable tool for that. It was an excellent open forum for people to raise issues and propose new ideas, and, on the occasions when the Panel might meet away from WMO or IOC, was an effective way for presenters from the host organisation or country to interact productively with Panel members. The Panel therefore agreed that the scientific and technical workshops should continue to be organized in the future.

4.1.7 The DBCP operating principles, to be reviewed at each Panel Session, are attached as ***Annex III***.

4.2 Implementation strategy

4.2.1 It was always intended that the Implementation Plan should be a dynamic document that reflected the evolution of the DBCP's aims and aspirations within the rapidly changing environment of oceanography and marine meteorology.

4.2.2 A draft-updated version of the DBCP Implementation Strategy prepared by the Chairperson in conjunction with the Secretariat was presented to the Panel for review and comments. The new version included recent modifications 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), and the Global Ocean Observing System (GOOS), Global Climate Observing System (GCOS) and Global Earth Observation System of Systems (GEOSS). The review also encompassed implementation aspects such as the deployment strategy, and the number of barometer drifters to be deployed worldwide, including in the tropical regions, and in the Southern Ocean, as well as development of appropriate technology to meet the requirements expressed for wave observations.

4.2.3 The new edition takes note of recent DBCP discussions regarding its future mission and purpose, given that many of the original problems affecting data buoy observations had been tackled by the Panel and overcome. Accordingly, new initiatives for the Panel such as pilot projects, task teams, user workshops, training courses and other outreach activities now feature in the Panel's strategy, alongside other major updates, more accurately reflect our current position and aspirations.

4.2.4 The Technical Coordinator reported on plans for deployments during the next intersessional period in the Southern Ocean Buoy Programme which is part of the DBCP Implementation Strategy. She recalled that the aim was initially to have 80 operational drifting buoys with barometers distributed across the Seas south of 40°S. In August 2007, the number of operational buoys was about 100 (out of ~170 buoys). Commitments for 2007/2008 are for 125 units depending on the number of buoys deployed by the GDP. The Panel recalled the new proposed commitment of 300 units in the Southern Ocean in total as part of the JCOMM OPA strategic workplan and noted that the implementation of this will rely heavily on improved deployment opportunities. However, the Panel agreed with the proposed new target and asked its Members to seek additional commitments in terms of barometer buoys, barometer upgrades, or deployment opportunities (**action, Panel Members**).

4.2.5 The Panel was invited to convey any suggestions to Mr Meldrum before 30 November 2007 so that an updated version of the strategy is published on the Panel's website **(Action).**

4.3 CAPACITY BUILDING

4.3.1 The Panel recalled that at its previous Session, it had decided to exploit the Panel's experience and resources in the development of training materials and the active participation in Capacity Building in developing nations. The Panel reviewed the Capacity Building activities undertaken during the last intersessional period.

4.3.2 The Panel was pleased to hear about the success of the training course on Buoy Programme Implementation and Data Management that was convened at the IOC Project Office for IODE, Ostend, Belgium, from 11 to 15 June 2007. Funding for the trainers had been provided by the DBCP Trust Fund and funding for the trainees provided by the IOC Ocean Data and Information Network for Africa (ODINAFRICA) and the Project Office for IODE. The majority of trainees were drawn from the African continent, and care was taken to select applicants who showed the best potential to develop data buoy initiatives in the region.

4.3.3 The Panel expressed its satisfaction at the programme of the training course; the trainees participated in an exercise to deploy a drifting buoy in Ostend harbour, and explored the whole range of data processing and quality control steps, leading to the eventual release of data from the buoy on to the GTS. To maximize the impact and benefit of the course, practical work and assignments were given to participants at each stage. As a final exercise, the trainers and trainees worked together to create a standard checklist for buoy programme operators, with the aim of documenting best practice in the deployment of drifting buoys (see the accompanying CD-ROM). Overall, the course was pursued with great enthusiasm by both trainers and trainees. The Summary of the outcome of the training course is given in the accompanying CD-ROM.

4.3.4 The Panel agreed that this first attempt for the training course turned out to be a success not only in sharing knowledge of buoy implementation and data management, but also in drawing attention of developing countries to the global cooperation. The Panel thanked all parties for their commitments and especially the trainers for their time and efforts, and the IOC Project Office for IODE and ODINAFRICA for their financial support.

4.3.5 The Panel discussed the follow-up actions to the training course and possible new development in this regard. It was confidently expected that this and subsequent courses would help strengthen partnerships with regional institutions, resulting both in improved resourced sharing (such as deployment ship-time) and in a wider appreciation, implementation and use of buoy programmes. The Panel particularly emphasized that such CB efforts should be supported on a sustained basis. In this context, the Panel agreed to establish a Task Team on Capacity Building to lead and actively participate in the CB activities on behalf of the Panel **(action, Panel)**. The summary of relevant discussions and proposed Terms of Reference is presented under agenda item 4.1.

4.3.6 The Panel considered that standardized training materials should be developed and kept updated in parallel with the organization of training programmes, as a matter of priority **(recommendation, TT/CB)**. Technical and in-kind support (such as donating drifting buoys) should also be considered in order to build upon the training results in a concrete way.

4.3.7 The Panel noted a request from the trainees for more information on mooring buoy programmes – deployment, maintenance, and data management. It agreed that this request should be addressed in the curriculum of future courses **(recommendation, TT/CB and future trainers**). The Panel commented that it would be more effective to provide for examples instead of generic information since there are various types of moorings and applications for buoy data, each with specific requirements.

4.3.8 The Panel also emphasized that not only creating synergies from relevant initiatives within JCOMM but also within the overall Met/Ocean community, was essential in the area of Capacity Building. In this context, it recalled the initiatives of the regional and global Actions Groups such as ISABP and IBPIO, as well as relevant national programmes/frameworks such as Partnerships with NOAA for GEOSS Applications (PANGEA). Particular attention was given to the CB initiative by the US Navy and the Global Fleet Stations (GFS): a Navy ship sailing around

Western Africa and throughout the open waters in the Gulf of Guinea would perform a variety of activities that support monitoring of fishing, pollution, port security, engine repair (for African navy or coast guard ships), oceanographic research, and related support to maritime security through monitoring and protection. During this cruise, in coordination with NOAA/AOML, 70 SVP drifters, 10 ARGO floats and 2 cases of XBT's would be deployed. In addition to the deployment of these instruments, a training session was also planned in February 2008, in cooperation with Argo programme and University of Ghana (as a local host), for African participants in order to demonstrate proper deployment techniques and explain data acquisition methods. A list of participants has not yet been finalized and new participants were welcome. The Panel welcomed this initiative and congratulated the NOAA/AOML and US Navy, in particular, in view of improving spatial coverage in the Gulf of Guinea. Ms Stella (Kenya) noted that such an initiative for East African countries would also be desired, together with appropriate financial supports for participants.

4.3.9 The Panel agreed that it was useful and important to conduct its future CB activities in conjunction with other relevant programmes and initiatives such as the above-mentioned US Navy cruise, PANGEA, and Action Group initiatives **(recommendation)**...

4.3.10 The Panel requested the Chairperson to update the DBCP implementation strategy to reflect the Panel's activities and plans in this regard (**action, Chairperson**).

5. JCOMM ACTIVITIES RELEVANT TO THE DBCP

5.1 REPORT ON JCOMM ACTIVITIES

5.1.1 The Panel noted with interest a report on activities, either under or associated with JCOMM, which had taken place since DBCP-XXII and which were of direct interest to the Panel.

5.1.2 Several meetings had taken place during the intersessional period, involving JCOMM Panels and programmes as well as other relevant bodies, including in particular the following ones of direct interest to the Panel's activities:

(i) 3rd meeting of the JCOMM Services Coordination Group (SCG-III), Exeter, United Kingdom, 7-10 November 2006. DBCP Chairperson attended the meeting and represented the JCOMM Observations Coordination Group;

(ii) 2nd meeting of the Expert Team on Wind Waves and Storm Surges (ETWS-II), Geneva, Switzerland, 20-24 March 2007. Following the discussion made at the 22nd DBCP session, a Task Team was established within ETWS to produce an updated Surface Wave Observation Requirement document, for wave forecast modelling and related activities. To complement the currently documented requirement (http://www.jcomm-services.org/ETWS-Observation-Requirements.html), the need to flag additional observations requirements, such as wide swath wave height data and coastal observations, was noted. See further details under item 4 of this document;

(iii) 2nd meeting of the Expert Team on Marine Climatology (ETMC), Geneva, Switzerland, 26-27 March 2007. A major topic of discussion at ETMC-II was the modernization of the Marine Climatological Summaries Scheme (MCSS), with the goals of improving: (1.) the flow of delayed-mode Voluntary Observing Ship (VOS) data; and (2.) the production of climatological summaries. Two new task teams are being defined to manage those functions, currently defined jointly under MCSS and with reinvention of the latter function likely also to be strongly related to the development of climate indices, and improved marine and oceanographic quality controls. Metadata for VOS and for buoys and other automated Ocean Data Acquisition Systems (ODAS) was also discussed;

(iv) 4th session of the Ship Observations Team (SOT-IV), Geneva, Switzerland, 16-21 April 2007; DBCP Chairperson attended the meeting, reported on the recruitment process for the Technical Coordinator, presented the satellite data telecommunication review of the DBCP. The SOT decided to establish an SOT Iridium Pilot Project similar to the DBCP one and to work closely with the Panel in this regard. Terms of Reference for the SOT Iridium Pilot Project Steering Team are given as Appendix;

(v) JCOMM Observations Coordination Group (OCG), Geneva, Switzerland, 23-25 April 2007; the DBCP Chairperson attended the meeting and represented the Panel. Major topic of discussion at the meeting was the development of an Observing Programme Support Centre (see discussion under agenda item 5.2); User Requirement Document in support of Marine Services was presented to the Group, including requirements for wave observations.

(vi) 10th session of the Global Sea Level Observing System (GLOSS) Group of Experts (GLOSS-GE), Paris, France, 4-8 June 2007, 33 national reports, and 3 regional reports were provided at this meeting. Of the 290 stations in the GLOSS Core Network (GCN), 217 (75%) have provided data recently to one of the GLOSS Data Centres, which represents the participation of 69 nations. It was decided that the GE will expand its activities to include technical advice and strategic planning for water level stations intended for hazards monitoring. GLOSS-GE will also explore funding opportunities to upgrade 50 GCN stations to include continuous GPS for land motion corrections. An update of the GLOSS Implementation Plan is under development and the first draft is expected to be completed by the end of 2007. More information about GLOSS is available at www.gloss-sealevel.org.

5.1.3 Besides regular DBCP Action Group meetings, the following meetings of interest to the Panel also took place during the last intersessional period:

(i) 12th session of the GCOS-GOOS-WCRP Ocean Observations Panel for Climate (OOPC-12), Paris, France, 2 - 5 May 2007;

(ii) 19th Session of the IOC Committee on International Oceanographic Data and Information Exchange (IODE), Trieste, Italy, 12-16 March 2007

5.1.4 The Panel was pleased to hear that the new updated version of the JCOMM Observations Programme Area strategic work plan until 2010 now included the target of 1250 drifters reporting air pressure worldwide.

5.1.5 The JCOMM web site had been completely re-designed and moved to a different location (now http://www.jcomm.info). Both IOC and WMO JCOMM related web sites have been integrated into one single web site managed in coordination between both Organizations.

5.1.6 For effective and frequent communication, a JCOMM newsletter had been regularly published since JCOMM-II in electronic form, on a bi-monthly basis. It was published on the JCOMM and other relevant web sites, 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 JCOMM's work. The latest issue of the newsletter can be found online: http://ioc.unesco.org/jcomm/news/newsletter5.php.

Requirements for wave observations

5.1.7 The Panel recalled the outcome of its previous Session with regard to additional high quality wave observations in support of the JCOMM Services Programme Area (SPA) activities in the area of Maritime Safety Services. Following DBCP recommendation, the JCOMM Expert Team on Wind Waves and storm Surges (ETWS) established a Task Team to produce an updated

Surface Wave Observation Requirement document, for wave forecast modelling and related activities. It is being dynamically updated, the current version can be found at http://www.jcomm-services.org/ETWS-Observation-Requirements.html.

5.1.8 This issue has been discussed at the Second meeting of the Observations Coordination Group (OCG), Geneva, Switzerland, 23-25 April 2007. The Group concluded the discussion with following suggestions and agreements:

(i) an experiment or a demonstration project (in a particular area during a particular period) was suggested to investigate impacts of wave observations. However, no specific funding had been identified by the group to support such activities;

(ii) the OCG stressed the importance of setting priorities among various observational requirements, and requested the SPA to explicitly set the priority in the document;

(iii) it was recommended that the OceanSITES increase wave measurements globally and considers required best practices.

5.1.9 At the last E-SURFMAR Data Buoy Technical Advisory Group (DB-TAG) meeting (Larnaka, Cyprus, 15-16 May 2007), E-SURFMAR recommended to enhance the three K-pattern moored buoys contributing to the EUMETNET Composite Observing System (EUCOS) with the capability to provide 2D wave spectra and 10-minutes wind data. Work is currently ongoing to provide spectral wave capability at synoptic times using Iridium as the transmission system. If/once proven on K5 the system will be procured and installed on the M1 and Lion buoys. In addition, Ireland (M1 buoy), Spain (PDE), and Greece (Poseidon project) have deployed directional wave buoys.

5.1.10 The Panel agreed that is would be appropriate in due course to establish a JCOMM Pilot Project for wave observations and one mechanism for that would be to organize workshop on low cost technologies for wave observations. The Pilot Project may be conducted with objectives including (i) developing new wave measuring technology, (ii) to assess impact of impact of wave observations in a particular region on wave models, and (iii) to assess their usefulness for validation of wave model and satellite products.

5.1.11 The Panel agreed to continue to work on the development of new cost-effective technology for making wave observations from drifters and moorings globally, through the DBCP Task Team on Technological Development (TT/TD) and the Actions Groups, particularly the GDP and the OceanSITES. The Panel invited its Members to consider funding such developments as part of the discussion under agenda item 8.6.5 (Technological developments in support of user requirements).

5.1.12 The Panel agreed that it would be very useful to have more feedback from the user community and the Numerical Weather Prediction and Marine Forecast activities in particular regarding the rationale and requirements for installing barometers on all drifters. This would help to make the case for obtaining funding at the national level, and especially in the USA. The Panel recalled that this recommendation was a direct outcome of the data users and technology workshop that was held at ECMWF in March 2006. However, the Panel recognized that the requirement had not been sufficiently documented and agreed that it would be useful to include NWP and Marine Forecast amongst the themes for next year's DBCP workshop and to invite Numerical Weather Prediction (NWP) experts and marine forecasters to make presentations at the workshop. The Panel asked the Chairman and the Secretariat to investigate feasibility (**action, Secretariat/Chairperson**). The E-SURFMAR Representative, Mr Jean Rolland reported that impact studies are planned for next years. He offered to report on the outcome of these studies at a future Panel Session (**action, Jean Rolland**).

5.2 FUTURE OBSERVING PROGRAMME SUPPORT

5.2.1 Following the last session, the DBCP chair visited IOC and JCOMMOPS in early 2007 to progress the discussion, to sketch out a possible structure for the Observing Programme Support Center (OPSC), and to stimulate debate. A 'strawman' document was circulated to encourage this latter activity. Simultaneously, Dr Peter Dexter, the JCOMM co-chair, informally approached a number of potential hosts to gauge their reaction to the OPSC concept. This met with a guarded response and it was clear that a detailed specification needed to be drawn up and circulated before potential hosts could give a considered reply as to their intentions. This was taken forward by the JCOMM secretariat with a view to agreeing a specification at the second JCOMM Observations Coordination Group (OCG) meeting, Geneva, Switzerland, 23-25 April 2007.

5.2.2 The Panel noted the outcome of the second OCG meeting regarding the development of an operational Observing Programme Support Centre to include the existing JCOMMOPS and new ocean observing programmes such as the GLOSS, OceanSITES, and the IOCCP. The OCG meeting spent some time debating the various issues, and agreed that there was a need for potential hosts to understand more clearly the resource demands that might be placed upon them and the benefits that would accrue. A draft specification was drawn up at the meeting and subsequently refined off-line. It was also agreed that the approach to potential hosts should be in the form of Joint Circular Letter to the member states of IOC and the permanent representatives of members of WMO. The letter would explain the background and justification for an OPSC, specifying the requirements of the host, and solicit a letter of intent from prospective hosts. The Joint Circular Letter was despatched in the late summer, with a deadline for response of 15 November 2007.

5.2.3 The Panel considered and assessed the possible future benefits or drawbacks to the Panel from such a development, in view of the Panel's role and contribution to its operation. The Panel agreed with the strategy proposed by the OCG.

5.2.4 The Technical Coordinator confirmed that she and the Argo Technical Coordinator were very open and supportive regarding the proposed changes.

5.2.5 The Panel noted that a short list of potential candidates for hosting the future OPSC should have been decided by the next panel session.

5.2.6 The Panel considered, if additional funding was identified, it would eventually be appropriate that the Technical Coordinator transfer her duties regarding the SOT to the Argo Technical Coordinator, and undertake OceanSITES activities instead. A half-time employment could be provided with the additional funding for technical assistant for both Technical Coordinators. The Panel noted that such an arrangement should be based on the agreement of all related programmes' steering bodies – DBCP, SOT, and Argo. The Panel requested the Secretariat to approach the, SOT, the OceanSITES, the Argo Steering Team, and the Argo Technical Coordinator for investigating whether this could be agreeable (**action, Secretariat**). Relevant discussion was also made under agenda item 8.5.

6. SCIENTIFIC AND TECHNICAL WORKSHOP

6.1 Under this agenda item, the Panel reviewed briefly the results of the preceding scientific and technical workshop. The workshop was opened at 9:15 on Monday, 15 October 2007 in Jeju, Korea, and ended on Tuesday 16 October at 12:00. The themes of the workshop covered technology developments, operational practices, applications of collected data and national practices. Twenty-one presentations were delivered covering each theme area.

6.2 The host country, the Republic of Korea, gave three interesting scientific presentations. One on applications of Argos drifter observations in the East Sea of Korea, one on the operational

forecasting of marine meteorology by KMA and another on operational storm surge monitoring by NORI for coastal disaster prevention.

6.3 The session on applications of collected data highlighted efforts by placing drifters in from of hurricanes, a thorough analysis by AOML of drifters from four manufactures, and NOAA's new partnerships to build observation arrays in the Indian Ocean Region.

6.4 The session on technological developments had a number of presentations on communication systems that deliver observations from marine systems. Iridium and Argos-3 communication services were highlighted in most of the presentations. Other developments included a presentation on Axys Technologies new services, new drifting instrumented chains, recent developments in tsunami R&D, and Arctic Sea Ice monitoring in 2007.

6.5 The session on operational practices highlighted tsunameter equipment standards in the international community, ways to reduce vandalism to moored buoys, and enhancements for arctic buoys. The session on national practices focused on upcoming satellites through the NOAA National Environmental Satellite Data and Information Service (NESDIS) and NDBC's data management practices.

6.6 Exhibitors at the workshop included Aanderaa, NORI, Korea Environmental Science & Technology Institute, Inc., and Shindong Digitech Co. Ltd. NORI displayed one of their moored buoys that would be deployed in the next year and from which the data will be distributed on the GTS.

6.7 The Panel expressed its appreciation to the Workshop Chairpersons, Mr Ken Jarrott (Australia) and Mr Bill Burnett (USA) for their excellent work in organizing and chairing the workshop. It agreed that, as before, the proceedings should be published in the DBCP Technical Document series, on CD-ROM only and made available via the DBCP web site. Authors were requested to submit their papers via e-mail or CD-ROM to the Workshop Chairperson, in electronic form (MS Office compatible format only), by 30 November 2007 at the latest **(action, Authors)**.

6.8 The Panel noted with appreciation that Dr Bill Burnett would continue to act as the Workshop Co-chairperson for 2008. The Panel invited South Africa to nominate a Co-chairperson (**action, South Africa**).

7. DATA AND INFORMATION EXCHANGE

7.1 REPORTS BY BUOY DATA MANAGEMENT CENTRES

7.1.1 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 Joe Linguanti presented the report.

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

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

7.1.4 The Panel noted with appreciation that ISDM had appointed Mr Bruce Bradshaw for acting as the DBCP contact points regarding RNODC/DB issues, and to replace Ms Cara Schock. The Panel thanked Ms Cara Schock for the valuable contribution she brought to the DBCP in recent years.

7.1.5 The Panel noted that the two respective IODE and JCOMM centres were completely separate but provided similar functions. The Panel requested 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**).

7.2 INFORMATION EXCHANGE

7.2.1 The Technical Coordinator reported on DBCP information exchange issues, including, in particular, the operation of the DBCP web server and the status of DBCP publications, as necessary.

7.2.2 The DBCP web site is a dynamic website embedded in the JCOMMOPS system (running on the new web server). Specific pages of this web site have been updated to reflect recent changes. Some re-wording, cosmetic changes, and restructuring have been performed for clarity and reduction of duplication. The information on Buoy Manufacturers was updated on the website. All manufacturers (who had not updated their details within the last year) were contacted to confirm/modify/remove their details. Some manufacturer listings were removed based on the email addresses no longer being valid. The remaining listings are confirmed and up to date. Panel Members are encouraged to inform the Technical Coordinator if there are any new manufacturers, which should appear on the list (**action, Members**).

7.2.3 The Panel agreed that the formal DBCP web address should be http://www.jcommops.org/DBCP/. The TC recommended that users should be automatically re-directed there, if they use the old URL (i.e. http://www.dbcp.noaa.gov/dbcp) and that all web pages at this old URL should be removed. This change will be communicated to the DBCP and JCOMM communities.

7.2.4 The Panel reminded the interested members and Action Groups (AG) to provide the technical coordinator with their annual reports (i.e. national reports and AG reports respectively) and deployment opportunity information in electronic form for inclusion in the DBCP web site (**action, Members**). The Panel also reminded National Focal points to check the information they had provided on deployment opportunities (e.g. ship track maps, point(s) of contact) and to provide updates to the Technical Coordinator in electronic form for inclusion in the JCOMMOPS server (**action, NFP**).

7.2.5 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

7.2.6 News items posted during the last intersessional period included (i) the launch of the Iridium Pilot Project and later news regarding its upgrade scheme, (ii) the launch of the META-T web site, (iii) the creation of Google Earth files (kml), (iv) the recovery of global drifter 1250, (v) deployment opportunities and Argo deployment planning. The Panel invited its Members interested in having news published via DBCP news section to provide the Technical Coordinator with one page of text plus one or two pictures.

7.2.7 DBCP maintains a number of mailing lists (e.g. dbcp@jcommops.org, buoys@jcommops.org). Registration details and other relevant information are available on http://www.jcommops.org/mailing_lists.html#DBCP. Iridium Pilot Project (iridium-pp@jcommops.org), META-T (meta-t@jcommops.org), and DBCP national focal points (dbcp-focalpoints@jcommops.org) mailing lists were established during the last intersessional period.

7.2.8 An updated version of the DBCP Brochure was currently under review and was presented to the Panel at this Session. The Panel invited its Members to provide feedback to the

Technical Coordinator (**action, Members**) and asked the Technical Coordinator to update it and work with a graphic designer to finalize it (**action, TC**). The Panel noted that a pdf double-sided A4 version of the brochure (compatible with the US letter format) should be sufficient but that it would be preferable to have it available in different languages. The Panel asked the WMO to investigate whether it could provide for the translation in the official WMO languages (**action, WMO**).

7.2.9 The Panel thanked NOAA/NDBC for offering the assistance of a graphic designer to develop the brochure design and a revised logo, and for proposing to develop a wikipedia web page on the DBCP (**action, NDBC**).

7.2.10 The Secretariat reported that the IOC/Ocean Observations and Services (OOS) were producing and re-printing brochures for GOOS and other related programmes, targeting the GEO Ministerial Meeting in November 2007. JCOMM brochure will also be re-printed, with revised design and contents. The Panel considered that the planned DBCP brochure should take this plan into account, and ensure consistency between JCOMM and DBCP brochures **(recommendation, TC)**.

7.2.11 The following DBCP Publications have been substantially reviewed and revisions will soon be published:

- DBCP Technical Document 3: Guide to Data collections and Location Services using Service Argos
- DBCP Technical Document 15: DBCP Implementation Strategy (reviewed and discussed under agenda item 4.2)

7.2.12 The following publications have bee published during the last intersessional period:

- DBCP Technical Document 31: DBCP Annual Report for 2006
- DBCP Technical Document 30: DBCP-22 Workshop, Technological Developments and Applications of Data Buoys, Presentations at the DBCP Technical Workshop, La Jolla, 16-17 October 2006

7.2.13 The Panel asked the Technical Coordinator to work with CLS for finalizing a new version of DBCP Technical documents 2 – reference guide to Argos (**action, TC**).

7.2.14 As for previous years, the Panel agreed that it was cost-effective, and useful to continue producing the DBCP publications on CD-ROM and not on paper.

7.3 BEST PRACTICES AND STANDARDS

7.3.1 The Panel considered the possible actions related to the documentation on instrument calibration, best practices and standards for implementation of buoy networks, which will eventually benefit both global and coastal applications.

7.3.2 JCOMM and its Management Committee (MAN) are stressing on the need for establishing properly resourced procedures for evaluating and possibly accrediting instrumentation and procedures used operationally by JCOMM observing system components and for implementing mechanisms to ensure that data collected by observing system operators conformed to agreed upon basic standards, formats, and levels of data quality

7.3.3 MAN agreed that specific Panel or Programme web sites could for example include information on existing and future products and services, requirements, standards and best practices, pilot projects, description of the data systems in place and how to access data. However, duplication of information should be avoided, and links to the web sites where the best practices information is being maintained provided.

7.3.4 Also, for climate monitoring and research, observing activities should adhere to the GCOS Climate Monitoring Principles, which provide on best practices for the planning, operation and management of observing networks to ensure high quality climate data.

7.3.5 The WMO Quality Management Framework (QMF) is promoting; (i) harmonization of the terminology related to quality and to the nomenclature of the technical guidance documents while adhering to the definitions provided in the ISO 9000:2005 *Standard for Quality-Related Terms*, and (ii) the review of the Technical Commission technical documentation, so that Members have easy access to all relevant valid documentation and, if appropriate, include the content of some technical documents in their guides/manuals and/or develop necessary Quality Assurance (QA)/Quality Control (QC) procedures.

7.3.6 The list of JCOMM Publications has been prepared and reviewed by the JCOMM Data Management Coordination Group (DMCG). At its second session (DMCG-II), Geneva, 10-12 October 2006, the Group agreed that the list should focus on the documents describing standards. The Panel reviewed the consolidated list. DMCG-II also recommended furthering developing Quality-Assurance and Quality Control procedures, to identify the JCOMM advantageous Technical Standards that would be submitted as joint ISO-WMO Standards, and to include relevant documents in OceanTeacher and prepare training modules.

7.3.7 At its last meeting, Geneva, 15-17 January 2007, the Inter Commission Task Team on Quality Management Framework (ICTT-QMF) agreed that the list should include publications that the commissions considered essential for on-going sustainability of the WMO QMF. This would ensure effective planning, operation, and control of processes related to meteorological, hydrological, marine, and related environment data, products and services.

7.3.8 The Panel reviewed the list of publications where itself or the OCG were listed the responsible group and agreed that the WMO Publication No. 8, Guide to Meteorological Instruments and Methods of Observations required substantial updating in its Chapter 4 of Part II, which is dedicated to Marine Observations. While the ship observations section is relatively well developed, the sections dealing with moored buoys (4.3) and drifting buoys (4.6) are relatively short.

7.3.9 The Panel noted that as a first exercise towards documenting DBCP Best Practices, the DBCP Training workshop, Ostend, 11-15 June 2007, has drafted a checklist for the deployment of drifters.

7.3.10 The Panel agreed that it would be useful to engage in an integrated approach to (i) compile current practices by Members and look at existing documentation, and (ii) integrating them in a DBCP Best Practices document which could then be published as a JCOMM Technical Document or included in other more general WMO and/or IOC Publications. The Panel asked its Task Team on quality Management to look into those aspects, to submit proposals to the WMO and/or IOC for updating or integrating specific publications, e.g. WMO No. 8, and to report at the next Panel Session (**action TT QM**).

7.3.11 The Panel also noted that an IODE/JCOMM Forum on Oceanographic Data Management and Exchange Standards was planned to be held at the IOC Project Office for IODE, Ostend, Belgium between 21 and 25 January 2008. It recommended that its Task Team on Quality Management be represented at the meeting (**action, TT QM**).

8. TECHNICAL ISSUES

8.1 QUALITY CONTROL

8.1.1 The following Principal Meteorological or Oceanographic Centres responsible for quality control of buoy data (PMOC) participated actively in the Guidelines during the last intersessional period:

Centre	Quality information messages	Buoy monitoring statistics	Mailing list service	Web pages and tools
BOM	X	X		
ECMWF		X		
IMO			X	
JCOMMOPS	X	X		X
MEDS	X	X		X
Météo France	X	X		X
MSNZ	X			
NCEP		X		X
UKMO	X	X		

Table 1. Participation in QC guidelines by PMOC

8.1.2 79 status change proposals were made by PMOCs during the period 1 August 2006 to 31 July 2007, which is well down on previous years, which may be due to the increased quality of buoy data or a drop in resources checking the data at PMOCs. Most of these messages were created via the web page directly instead of the mailing list. The Panel encouraged the PMOCs to continue working actively according to the DBCP QC guidelines and to investigate whether additional resources could be allocated to checking data quality and registering information via the web page or email (**action, PMOCs**). Other centres are encouraged to participate actively in the guidelines either for global data, regional data or specialized data (**action, Members**).

8.1.3 The Panel noted that JCOMMOPS, Météo France, NOAA/NCEP, ISDM, and the UK Metoffice also provided useful quality control tools. Details and links from the DBCP are available on the following web site: http://www.jcommops.org/dbcp/0qc.html.

8.1.4 RMS (Obs-FG) for drifting buoy air pressure dropped to a low of 0.78 hPa and has recently remained at about 0.80 hPa. 82% of the RMS values are now lower than 1 hPa, and less than 1.9 % above 3 hPa. This is a little better than June last year. The fact that the proportion under 1hPa continues to fall, highlights the improving quality of both first guess surface pressure field and the observational pressure data from drifting buoys. These figures demonstrate that we are maintaining a network where numerical models and air pressure observations from buoys will continue to agree very well. The percentage of gross errors (ECMWF) continues to be well below 1%. Air pressure quality is excellent with approximately half of the drifting buoys now installed with Barometers without the number of gross errors having increased. There have been concerns that the pressure measurements from the SVPB drifters are particularly unreliable in the rough seas of the southern hemisphere, which may, partly explain the rise in gross errors around June each year. However, air pressure observations from SVPBs also continue to produce excellent quality data.

8.1.5 RMS (Obs. - FG) for SST data from drifting buoys (source NCEP) continue to be relatively stable, at a level of about 0.65C, which is excellent. However the percentage of gross errors, which was beginning to appear quite stable during the previous intersessional period, has become quite sporadic and risen at times to around 2%, which had not been seen since the beginning of 2005. This quality measure varied between 0.30 and 2.12 % in the last year.

8.1.6 The number of observations of wind speed from drifting buoys has rapidly decreased in recent years to nearly none in recent months.

8.1.7 The number of observations of wind speed from Moored buoys has steadily increased in recent years and seems to be fairly reliable now at about 15,000 observations per month, which is a good number to study the data quality. The percentage of Gross Errors for moored buoys is very low (between 0 and 0.04%, so gross errors have not been a major concern up until now). The RMS (Obs-FG) for wind speed from moored buoys (source ECMWF) remains fairly stable at around 1.5 m/s. The distribution over the last six months shows that, 4.55% of the RMS is below

1m/s, 81.7% of the RMS values are in error by between 1 and 2 m/s and 11.11% are between 2 and 3 m/s.

8.1.8 The Panel noted that the RMS(obs-FG) monitoring statistics reflected not only observational errors but also errors in the background field of the NWP models, and that it was not possible to ascertain where the errors lied based solely on such statistics. The Panel agreed that providing estimates of the level of consistency between observing platforms could permit provide rationale regarding the quality of observations. The Panel agreed that more interaction was needed with the NWP users and that the DBCP scientific and technical workshop could be a good forum for this.

8.2 CODES

8.2.1 The Panel recalled that at its previous Session it had invited Spain to upgrade its encoding software in order to meet the requirements of the new BUFR template for directional and non-directional wave data from buoys. The Panel was pleased to hear that the Spanish Meteorological Service (IMN) was taking steps to implement required changes. The Panel asked the TC to follow the issue and to report to the Panel and the Executive Board in this regard (**action, TC**).

8.2.2 The Panel recalled that at the JCOMM Data Management Coordination Group, in October 2006, it was decided that a task team on Table Driven codes should be formed. The Task Team is particularly in charge of collecting and compiling requirements from JCOMM panels and expert teams and submitting them to the CBS Expert Team on Data Representation and Codes (ET-DRC), and for looking at templates and proposing content mapping.

8.2.3 The Technical Coordinator reported that she attended the last meeting of the CBS Expert Team on Data Representation and Codes (ET/DRC), Darmstadt, Germany, April 2007. She explained that no changes were proposed by the DBCP or JCOMM at this meeting. However, the Team appreciated the commitment of JCOMM to use of BUFR and expected then that at its next meeting in 2008, templates for all the oceanographic and marine data would be finalized.

8.2.4 The panel noted the recent developments in encoders/decoders and data verification software under development at ECMWF and in Brazil (http://www.ecmwf.int/products/data/software/ , http://tempo.cptec.inpe.br:9080/publicacoes/distribuicao.jsp).

8.2.5 The Panel noted that proposals for changes to the templates rely in part on input from the JCOMM Data management Coordination Group Table Driven Codes Task Team, but the work of this team is still in the initial stages. The Panel asked the technical coordinator to remain active in the discussions and to work with the DMCG closely. One definite change, which will need to be included, is for fluorescence sensor measurements from Moored Buoys.

8.2.6 Regarding Water Temperature instrumental metadata Pilot Project (META-T) requirements, the Panel noted,it was intended that recommendations for adjustments/additions to BUFR templates, based on the need for water temperature metadata documentation, would be completed prior to the April meeting of the ET/DRC. As this did not occur, the work plan for this project will now have to be adjusted to aim for the 2008 meeting. The representative of the KNMI, Mr Frank Grooters, explained that his institute had some concerns regarding the slow progress for implementing the BUFR template for META-T. The Panel noted however that the META-T task was quite challenging (dealing with a number of types of observing platforms including drifting and moored buoys, tide gauges, ODAS, VOS observations, Argo floats, XBTs, ThermoSalinoGraph (TSG), etc) and that progress was nevertheless being made. The Panel also noted that BUFR is not compulsory until 2012 for marine data.

8.3 ARGOS SYSTEM

8.3.1 Argos constellation

8.3.1.1 Bill Woodward and Christian Ortega presented a report from CLS/Service Argos, on 2006-2007 operations and system improvements. They also recalled that the METOP-A satellite, with the two-way capability Argos 3 instrument onboard, was launched on the 19th of October 2006, and commissioned on the 21st of May 2007. METOP-A data flows were processed since the 1st of August 2007. NOAA-14 (J) was decommissioned on 23 May 2007, after more than 12 years of service. NOAA-12 (D) was decommissioned on 10 August 2007 after more than 16 years of service. Now the constellation is made of 5 satellites,4 NOAA and 1 METOP. The Operational satellite service has been provided since May 2007 by NOAA-18 and MetOp-A. NOAA-17 (N) NOAA-16 (M) and NOAA-15 (K) are used as secondary satellites. All Global and Regional datasets collected are delivered and processed at the two Global processing centers. The TIP telemetry from NOAA-15 and NOAA-16 has been on STX2 (different polarization) since 31st August 2005.

8.3.2 Global and Regional Network of Receiving Stations

8.3.2.1 The Panel recalled that the Global network included Wallops Island (Virginia, USA), and Gilmore Creek (Fairbanks, Alaska, USA) delivering the STIP (Stored TIP) telemetry from the satellites NOAA-15, NOAA-16, NOAA-17 and NOAA-18.

8.3.2.2 Mr Woodward reported that eight new stations were added to the Argos regional network during the year: Andersen (Guam Is.), Hikam (Hawaii), Valley Forge (Pennsylvania, USA), Elmendorf (Alaska, USA), Kadena (Japan), Lajes (Azores, Portugal), Sembach (Germany), and Cape Ferguson (Queensland, Australia). The network now includes 58 stations. Some are operated under agreement between CLS and local operators, some are directly operated by CLS and its subsidiaries, some are CLS customer antennas under CLS maintenance contract, and some are being operated without written agreement on a best effort basis.

8.3.2.3 Regarding the Brazilian LUTs, Mr Ortega reported that further to oral agreement between INPE and CLS, real time SCD1 and SCD2 datasets are downloaded by INPE station in Cuiaba (central Brazil), and then transferred to Lima to be processed by CLS Peru that is interested in real time fishing vessel data. Data includes only data messages since the INPE system do not provide locations. No processing is done by global processing centers at this step.

8.3.2.4 CLS is now focusing on adding new ground stations compatible with NOAA and METOP satellites. CLS has already bought four NOAA/METOP ground stations. Two of them are located in Indonesia, in Bali and Bitung. One is installed in Lima. One is installed in Hatoyama (Japan) and is already operational for METOP. CLS is building a partnership and is in contact with NOAA, EUMETSAT (EARS network), and several other meteorological agencies such Environment Canada, Meteo Chile, Météo France, INCOIS (India) and Bureau of Meteorology (Australia). Today, the expected NOAA/METOP network comprises 22 stations.

8.3.2.5 The Panel noted with appreciation the cooperation being developed between CLS and the SAWS regarding the installation of new antennas in Cape Town, Marion Island, and Gough Island. The Panel noted that a decision should be made in 2008 in this regard.

8.6.3.6 The Panel asked CLS to report on the status of interferences that had been identified to disturb substantially the quality of Argos data collection and location in the Mediterranean Sea region. CLS explained that problems are still being seen and that the CNES was still investigating the issue. The Panel noted that in case the problem came from specific national sources, a formal request for corrective action would have to be made via the International Telecommunication Union (ITU).

8.3.2.7 More discussion on the regional network is also planned under agenda item 8.6.2.

8.3.3 Argos developments and future Argos GTS data processing system

8.3.3.1 Mr Christian Ortega, representative of CLS, reported on technical enhancements to the Argos System.

8.3.3.2 CLS and CLS America have improved its Internet link and are now connected each other to two different providers. CLS has initiated a project for creating a second computing centre in CNES ("Disaster Recovery Plan") in addition to the existing CLS computing centre. The Global Argos Control and Processing centre is being improved through two projects: Argos 2001 project and Argos 3 Ground Segment project.

8.3.3.3 Mr Ortega explained that the purpose of the Argos 2001 project was to upgrade the entire Argos processing system. This is a three-phase project. Phase I for the development and implementation of a new user interface allowing users to access data view and update technical files via a Web server. Phase II for the improvement and development of value-added services and tools for the monitoring of the Argos system. Phase III for the redesign of the core Argos processing system (IIIA): Redesign of Argos message data processing chain, and IIIB: Redesign of GTS data processing chain. Phases I and II have been operational for several years. Phase IIIA was operational on 1 October 2007 and Phase IIIB will be operational at the beginning of 2008. When Phase IIIB is operational, the GTS sub-system will be an entire part of the full Argos processing system. All data (Argos outputs and GTS formatted data) will be delivered by the same system. The data will then be made available either or both in satellite pass related messages - raw messages grouped by satellite pass, as per today – or in processed time-tagged observations. This will positively address the “classical” need expressed by users and manufacturers to access both raw and fully processed data.

8.3.3.4 Mr Ortega presented the so called SSA3 (Argos 3 Ground Segment) project which aims to take into account all the changes in the current Argos ground segment brought by the third generation of Argos instruments. It includes the downlink and the new format for the uplink messages (new modulation, high bit data rate…) as well as the interface with EUMETSAT. The sub-systems of the Argos 3 Ground Segment development have been completed and validated before the launch of the first METOP satellite, on 19 October 2006, and during its commissioning. The integration tests with EUMETSAT started in July 2005. The data is now received from EUMETCAST. All functions involved in Argos3 telemetry processing and downlink message management have been tested, including functions requiring the onboard instrument to be commissioned.

8.3.3.5 The Argos-3 satellite generation will allow users to have a two-way communication as well as a better control of uplinks at a higher data rate. To access these new facilities, users will have to implement a Platform Message Transceiver (PMT) in place of their current PTT. Users will access these functions in two steps: The first one through “PMT demo units” or first generation PMTs, currently available. The second one through “Industrial PMT RF modules” that will be available at the beginning of 2008 (low cost, low consumption and tiny). Pilot operations with manufacturers and some interested users will continue to develop throughout 2008 and performance analysis in real conditions will be produced. Off-the-shelf platforms should be available from the manufacturers by end of 2008 for first operational deployments.

8.3.3.6 The Panel noted with appreciation the kind offer by CLS to provide free of charge for the GTS distribution service of iridium data during the duration of the DBCP Iridium Pilot Project.

8.3.3.7 The Panel noted that the system set up by CLS for processing the Iridium data was only for demonstration and not yet a complete operational system.. CLS reported that the plans are to build a link from the operational Iridium system to the Argos data processing to provide for comprehensive data processing and GTS distribution.

8.3.4 Future Argos requirements (Argos-4)

8.3.4.1 The Panel noted with interest the developments of the Argos-4 generation that will

include polar orbiters and 2 equatorial satellites. The goal will be to provide for

(i) 30 minutes time response everywhere;
(ii) Expanded frequency bandwidth;
(iii) Four times the Argos 3 system capacity and processing capability;
(iv) Higher data volume (140kbits per pass);
(v) High data rate transmission power saving (3W instead of 5W);
(vi) Three times the Argos 3 downlink capability;
(vii) Two times the signal power of Argos 3;
(viii) Compatibility of Argos-3 PMTs with Argos 4 provided a minor software change, which is be being implemented.

8.4 NEW COMMUNICATION TECHNIQUES AND FACILITIES

8.4.1 DBCP Drifter Iridium Pilot Project

8.4.1.1 The Technical Coordinator reported on the development of the DBCP drifter Iridium Pilot Project which was established by the Panel at its twenty-second Session for a period of two years starting in July 2007. The Pilot Project seeks to evaluate the feasibility of Iridium technology for real-time telecommunication of drifter data globally (at least 50 units worldwide) and under various conditions, particularly in rough seas, to demonstrate performance with submergence, in various temperatures and levels of wind.

8.4.1.2 A white paper describing the project was issued soon after the last DBCP Session and technological developments have started immediately. She was please to report that until now 2 Iridium drifters have been deployed and tested successfully within the scope of the project and that many more deployments were imminent. Plans for future deployments, and data management procedures are underway, including for the quality control and GTS distribution of the data.

8.4.1.3 All manufacturers are actively participating in the project and are testing or have already provided prototype buoys. This progress has been based on using: (i) Iridium Short Burst Data messaging on a 9601 modem, (ii) optional GPS receiver, (iii) antenna suitable for mounting internal to the buoy hull or on top of the barometer port, (iv) a Real Time Clock synchronized to GPS or Iridium system time and capable of generating timed wakeup/polling requests for external equipment, and (v) serial and/or analogue inputs for external sensor data input, on demand.

8.4.1.4 The Iridium transmission format (version 3.2, 18 bytes) used by Météo France SVP-B prototype drifters can be found on the following web site:
http://www.jcommops.org/dbcp/iridium-pp/MF_SVP-B_Iridium_format_v32_200708081.doc

8.4.1.5 Currently, Météo France is inserting its own data directly onto the GTS. The messages from the buoys are emailed every few minutes. The processing system at Météo France converts the message into physical data, creates FM18-BUOY messages, and makes sure these are inserted on GTS within about 10 minutes after observation time.

8.4.1.6 The Chair of the DBCP has negotiated with Iridium and METOCEAN (in its capacity as a value added reseller of Iridium) to receive low cost communications for the duration of the project. CLS, as a value added reseller, will also be able to provide Iridium services by 2008; however, no indication has been given about the cost for the service. The Panel also noted that CLS, Météo France, and NOAA/NDBC would provide GTS service at no charge (CLS during the duration of the pilot project only; Météo France for drifters reporting in the standard format only). The Panel thanked the three centres for their offers.

8.4.1.7 The Panel noted with interest that the DBCP Executive Board approved the establishment of an upgrade scheme to accelerate the rollout of Iridium-equipped SVP-Bs. This functions in a similar manner to the well-established barometer upgrade scheme, allowing SVP-Bs already on order to be equipped with an Iridium modem at no additional cost to the purchaser. The

notional upgrade cost of USD500 per SVPB has been agreed with the manufacturers. Funds are met from the new Technical evaluation budget line in the DBCP trust fund for the implementation of the Pilot Project to a maximum of 50 drifters. Additionally, in September 2007, The USA has made a contribution in support of the project of 25,000 USD.

8.4.1.8 To date the 44 upgrades and related costs have been incurred or committed by the Pilot Project at a cost of $22500. 8 Iridium drifters have been deployed so far, and 2 of them have been recovered. About 30 drifters are planned for deployment in various ocean basins before the end of 2007 with participation from 8 DBCP Members.

8.4.1.9 The Panel endorsed the upgrade scheme, thanked the Chairperson for his commitments in defining it and leading its implementation, and asked the Executive Board and the WMO who is managing the DBCP Trust Fund to facilitate its implementation during the duration of the Pilot Project (**action, EB, WMO**). Details regarding the upgrade scheme can be found on the following website:

http://www.jcommops.org/dbcp/iridium-pp/IRIDIUM_PILOT_PROJECT_UPGRADE.pdf

8.4.1.10 The Panel recommended that Members deploying Iridium drifters as part of the project notify the deployments via the dedicated mailing list (iridium-pp@jcommops.org) and provide appropriate details (**action, Members**). The Panel also asked the Technical Coordinator to develop a notification web page for the project, to register deployment details directly in the JCOMMOPS database and relay the information to the mailing list (**action, TC**).

8.4.1.11 See the project website for details at http://www.jcommops.org/dbcp/iridium-pp/. Information regarding the side meeting on the DBCP drifter Iridium Pilot Project is also provided in ***Annex XI***.

8.4.1.12 The Representative of Indonesia, Michael Andreas Purwoadi, informed the Panel that his country was planning to deploy buoys with Iridium data telecommunication. Indonesia is interested of getting feedback from the Pilot Project. The Panel invited Thailand to liaise with the Pilot Project Chairperson, Mr David Meldrum, and/or the Technical Coordinator for obtaining required information.

8.4.1.13 To facilitate in the technology evaluation by the Pilot Project, the Panel encouraged strongly manufacturers to include the number of transmission failures in the data transmission format they propose for Iridium buoys (**action, Manufacturers**).

8.4.2 Review of satellite data telecommunication systems

8.4.2.1 As had become customary, Mr David Meldrum presented the Panel with an update on satellite communication technologies. No formal document was presented to the Panel but the chairperson made an oral presentation regarding the current status of the satellite data telecommunication systems that are potentially the most appropriate for DBCP activities. These included:

- The Iridium broadband system (bandwidth between 64k and 128kbits/s; modem slighter bigger than existing Daytona modem; use existing Omni-directional antennas; use existing network infrastructure; expected availability 3rd quarter 2007; rates are not yet established)
- Argos two-way (now functioning onboard METOP-A, Supports high data rate at 4800bps)
- Orbcomm (6 new satellites ordered; will carry Automatic Identification System (AIS) for vessel tracking and management; smaller antennae now available)
- Iridium (re-supply plans are rolling out fine now; new constellation delivered in the next 10 years; broadband 64 to 128 kbps)
- Globalstar (no global capability; land mainly; problems with the constellation)

- Inmarsat BGAN (data rate of up to 492 Kbits/s; broadband instruments easily adapted for use on BGAN; ideal for Tsunami monitoring; spot beams – no true global coverage; uncertain oceanic coverage)

8.4.2.2 The Panel invited its Members to share their experience regarding their possible use of any type of satellite data telecommunication system for buoy data, and to participate in the Iridium PP (**action, Members**).

8.4.2.3 The Panel noted that regular 1-minute transmissions are required for the transmission of Tsunameter data, and that Inmarsat could be used as an appropriate solution. However, the Panel noted with concern that little support was received from Inmarsat regarding the use of the system for low data rate telemetry.

8.4.2.4 The Panel thanked Mr Meldrum for his report, and asked that it be updated at its next session **(Action)**.

8.5 CURRENT OBSERVING PROGRAMME SUPPORT

8.5.1 JCOMMOPS

8.5.1.1 The Technical Coordinator reported on the operations and development of JCOMMOPS in general and highlighted items of interest to the Panel, including details on integrated database and monitoring tools, deployment opportunities for buoys, floats and other oceanographic devices, as well as on the JCOMMOPS integrated database.

8.5.1.2 The Panel recalled that JCOMMOPS was a component of the international coordination mechanism, which aims on behalf of JCOMM to develop synergies between observing systems, assist in the planning, implementation and operations of the observing systems. It will monitor and evaluate the performance of the networks, encourage cooperation between communities and member states, encourage data sharing, assist in data distribution on Internet and GTS, relay users feedback on data quality to platforms operators, provide technical assistance and user worldwide support, and act as a clearing house and focal point on all programmes aspects.

8.5.1.3 The Technical Coordinator reported on the current Information System configuration, including servers, database, Geographical Information System (GIS), network configuration, and web site. She stressed that the JCOMMOPS website(s) is only one component of the JCOMMOPS Information System and targets international users. It is used routinely by the Technical Coordinators to achieve various international coordination tasks, which require accurate and up to date information management. It is the main tool of the clearinghouse role of JCOMMOPS; information is available to all, routinely, via many different products and services, and on demand. The system routinely assimilates information and metadata from many different sources (including manual input by the Technical Coordinators), which are checked and re-distributed in various ways.

Developments

8.5.1.4 The Technical Coordinator then reported on the latest developments undertaken at JCOMMOPS during the last intersessional period. These include (i) new design and standardisation for all JCOMMOPS monthly maps, (ii) new observing system maps (iii) restructured and more reliable JCOMMOPS dynamic web site m, (iv) replacement and configuration of one server, (v) daily scripts reviewed, (vi) enabled Web Map Services to allow more GIS interoperability, and (vii) improvements and fixes made to DBCP/SOT metadata in JCOMMOPS.

8.5.1.5 The Panel agreed that future challenges included (i) website integration of all available products over all observing systems, (ii) providing up-to-date and appropriate information regarding deployment opportunities and assisting in the maintenance of the global networks.

Deployment opportunities

8.5.1.6 The Panel noted that deployment opportunity details came from multiple sources that needed to somehow be synthesized. The Panel suggested that the method used by Argo for planning deployments one year in advance could be a good example for the DBCP and the SOT. To that end, some flexible and simple procedures have to be set up to permit platform operators to notify JCOMMOPS of their future deployment plans. JCOMMOPS then has to develop ways of synthesizing and presenting this data in a useful way.

8.5.1.7 The Panel agreed that the Technical Coordinator will need to maintain a strong and consistent link with platform operators and be aware of implementation plans in advance. This is a challenge of capturing and then sharing information affectively between platform operators within each programme, then between programmes and with other communities, which may have deployments opportunities available. This, in part, requires tools developed by JCOMMOPS for communication and information sharing, but it also relies on the clarification and consistent efforts of National Focal points for platform operations, to gather information themselves but also to pass on that information to others, including JCOMMOPS.

8.5.1.8 The Technical Coordinator presented a number of developments proposed for the next intersessional period (e.g. monitoring tools and maps, 24/7 web services, improved metadata, Argo QC feedback, support for OceanSITES, Iridium, see document 8.5.1). The Panel asked the Technical Coordinator to proceed with these developments (**action, TC**).

8.5.1.9 The Panel asked the Technical Coordinator to work at providing services that would answer the question: *"How can we deploy the required instruments at the required time/space resolution to fill the gaps identified?"* (**action ,TC**).

8.5.1.10 Additional information on deployment opportunities is available under paragraph 8.6.1.

Resources

8.5.1.11 The Panel discussed the resources made available by the DBCP, Argo, and the SOT for supporting the activities of JCOMMOPS. The Panel agreed that in order for JCOMMOPS to develop in the future, more human resources would be required for:

(i) Providing the DBCP the same level of services, that Argo is getting thanks to the Argo Information Centre and its dedicated TC.
(ii) Extending support for the SOT beyond what is offered for SOOP;
(iii) Providing reliable management and building up a comprehensive and definitive source of metadata for buoys;
(iv) Managing ship related platforms and coordination with POGO regarding research cruises.
(v) Providing support to the OceanSITES
(vi) Working pro-actively on the donation of instruments and the organisation of deployment of instruments by new countries
(vii) JCOMMOPS IT support

8.5.1.12 The Panel agreed that recruiting a part time IT person could allow the DBCP/SOT and Argo Technical Coordinator to concentrate more on programme coordination and on the analysis and development of value-added products, or even to expand the support to observing systems. This would permit to achieve the short to medium term goals above. It recommended that JCOMM/OCG look into the possible funding of a part time person in relation with the OPSC discussion.

8.5.1.13 The Panel asked whether CLS would continue to operate the current JCOMMOPS database in case JCOMMOPS had to move to the location of the future OPSC. CLS reported that things were undecided and had to be discussed internally and with the JCOMMOPS staff in order to ensure as smooth as possible transition. The Panel noted that some planning and costs will be most probably be involved if the JCOMMOPS database had to move.

8.5.1.14 The Panel pointed out that the navigation of the JCOMMOPS web site was currently not structured in user-friendly manners, which prevented easy access to the useful and comprehensive information that the web site contained. It recommended that JCOMMOPS should improve it and perhaps ask someone external to JCOMMOPS to suggest changes to the web site directory structure (**action, JCOMMOPS**). The future development of the OPSC could be an opportunity to restructure the web site. The Panel stressed that revisiting the DBCP web site should be regarded as a priority for the Technical Coordinator, and requested her to set a plan taking the future OPSC plan into account (**action, TC**). As a short-term solution, the Panel agreed that static information should be linked with the jcomm.info web site, which was under development (**action, TC/Secretariat**). The Panel noted that the Argo Steering Team had apparently agreed to let the Argo TC spend a percentage of his time on typical JCOMMOPS issues, which would be supporting the website development. .

8.5.1.15 Meanwhile, the Panel noted with caution that the website development should be undertaken within the range that other priority work and duties were not impacted and properly conducted, where TC's skills were particularly required. It was noted that JCOMMOPS could also get assistance from external sources and Panel Members for the required developments of the JCOMMOPS web site. The Panel therefore invited the Panel Members to provide assistance to JCOMMOPS if needed and possible for them (**action, Members**).

8.5.2 Argo Information Centre

8.5.2.1 The Technical Coordinator presented the activity of the Argo Information Centre (AIC) and its future plans.

8.5.2.2 The international Argo Information Centre (AIC) is participating in the activities of the Argo Project Office and of the JCOMM in situ Observing Platform Support centre (JCOMMOPS). The AIC is funded on a yearly basis via voluntary contributions from the United States, Canada, France, Australia and the United Kingdom. In 2007 **China**, **India**, and **Germany** also began providing funds for the AIC.

8.5.2.3 In 2007 progress has been made on a number if issues, including (i) improving Argo implementation monitoring and planning, and Argo Data distribution monitoring, (ii) improving monthly reporting to Principal Investigators/Programmes Managers, float operators and data managers, (iii) upgrading the JCOMMOPS information System, and (iv) finalizing of the new AIC website.

8.5.2.4 The workload regarding JCOMMOPS issues has naturally grown up since 2001. The Argo co-chairs have recognized the TC growing responsibility in developing and operating JCOMMOPS, and have agreed to update the TC Terms of Reference to reflect this change in scope.

8.5.2.5 The planning and float deployment notification core function of the AIC has been reviewed, improved, and documented with an aim to provide a global and regular view on the Argo planning, up to a year in advance. This information is vital for the implementation and maintenance of the global array, the project transparency and accordance with international rules, and the cooperation within Argo and with other panels (e.g. DBCP). Careful planning should contribute to making Argo an operational and sustainable programme.

8.5.2.6 The AIC encourages and coordinates multilateral collaborations through “float donations” in order to build capacity for new participating countries, identify new deployment opportunities, and finally help to implement and maintain a global array. UNESCO lawyers are still reviewing the donation contract.

8.5.2.7 Retrieval of beached floats is an increasingly time consuming task. The Argo label affixed to most of floats has proven its worth where more and more people contact the AIC when they find a float. The list of beached floats and the status of retrieval procedure is tracked on-line and in monthly report. About 50 floats are awaiting retrieval. About 30 units were successfully retrieved, secured and shipped back to their owner.

8.5.2.8 The work of the IOC Advisory Body on the Law of the Sea (ABE-LOS) group is progressing. The Argo TC participates in the work and provides a concrete example with the implementation of the IOC Resolution XX-6. Argo is seen as a good example of an ocean observation programme, in particular, regarding its transparency, and its encouragement to international cooperation. ABE-LOS is drafting some guidelines for the deployment of float and drifters. The obligation for Argo programmes to notify the float deployments (that might drift in Exclusive Economic Zones (EEZ)) is seen by the AIC as an excellent opportunity to (i) strengthen Programme transparency, (ii) improve Programme planning & monitoring, (iii) strengthen international support, and (iv) develop international cooperation. Hence, the Argo TC encourages DBCP to develop a similar planning/notification system. It is to be noted that all products developed for Argo regarding EEZ monitoring could be easily applied to the drifters.

8.5.2.9 The 3000th operating float will be declared on 1 November 2007 and will celebrate the completion of the array and the end of the “phase 1” for the Argo “pilot project”.

8.5.2.10 The Panel tanked the Argo Technical Coordinator, Mr Mathieu Belbeoch, for submitting the written report and for the good cooperation of the Argo Information Centre with the DBCP and its Technical Coordinator, as part as his activities in support of JCOMMOPS.

8.6 OTHER TECHNICAL ISSUES

8.6.1 Deployment opportunities and strategies

8.6.1.1 During the second session of the JOMM Observations Coordination Group (OCG II), Geneva, Switzerland, 23-25 April 2007, it was recommended that efforts be made to achieve optimal spatial distribution of the buoy network.

8.6.1.2 The Panel discussed the air or ship-based opportunities for the deployment of buoys that Panel Members might provide to other Panel members or other panels (e.g. Argo, SOOP). JCOMMOPS routinely collects information from Member States on opportunities for the deployment and/or servicing of *in situ* marine observational platforms (e.g. drifting and moored buoys, profiling floats, and ship routes for deploying XBTs). Information is available on the following web site: http://www.jcommops.org/depl_opport/depl_opport.html. Whilst a lot of new information is available here, some of this data still needs updating. In addition, the list of National Focal Points for logistical facilities can be obtained from JCOMMOPS web site. The Panel invited its Members to check the accuracy and currency of both information on deployment opportunities and the list of focal points and to report discrepancies or required changes directly to the Technical Coordinator (**action, Members**). Documentation or information on new deployment opportunities should also be provided to her directly.

8.6.1.3 As it is difficult to identify ship deployment opportunities in certain regions, especially in the Southern Hemisphere and the Southern Ocean, the Panel invited its Members to investigate the possibility of eventually providing air deployments and therefore provide any information about conditions and costs for these deployments to the Technical Coordinator (**action, Members**).

8.6.1.4 The Panel noted with interest that JCOMMOPS had developed a new integrated map showing the complete observation network monitored by JCOMMOPS (http://w4.jcommops.org/website/JCOMM). The map, updated daily/monthly can show holes in the network and also which ship are going where on a regular basis.

8.6.1.5 The Panel was pleased to hear about new deployment opportunities presented by the Technical Coordinator:

- The Scholar Ship is an ocean-going cruise liner for teaching and research. The Ship will carry 600 undergraduate and postgraduate students over two voyages each year. Each cruise covers half the globe and lasts for 16 weeks, calling in at 7 ports per voyage. http://www.thescholarship.org.
- The International Arctic Buoy Programme (IABP) provides Antarctic Region Deployment Opportunities and details can be obtained from specific web sites and by contacting the Technical Coordinator.
- A Research Vessel (R/V ISLANDIA) from the Cape Verde Cape Verde Fisheries Department (INDP) is running every week-month between Cape Verde and the Tropical Eastern North Atlantic Time-Series Observatory (TENATSO) Position: 17.4 N, 24.5 W (Cape Verde).
- A component of the RAMA moored buoy array has been installed in the Indian Ocean as part of a partnership between Indonesia and the USA; this may create opportunities in future for use of Indonesian ships in deployment of platforms.
- Argo Deployment Planning can lead to deployment opportunities for drifting buoys. The Argo project has implemented advanced planning for deployments of floats in the future, which will be of benefit to members of the DBCP - as they may be able to share ship time and deployment opportunities with their Argo Colleagues. The Argo Technical Coordinator has asked Argo project participants to submit "draft" notifications to give advanced information about upcoming deployment locations and approximate dates.
- The DBCP training course in Ostend, Belgium, June 2007, provided potential new opportunities, as many participants were able to identify ships to use for drifter deployments.
- The GDP and the US Navy are working together to coordinate a ship which will follow the coast of West Africa starting in November 2007 and going through at least April 2008, providing training in Ocean observing systems and deploying platforms.

8.6.1.6 The Technical Coordinator attended and presented to a meeting for the launch of the System of Industry Metocean data for the Offshore and Research Communities (SIMORC) Service, which aims to develop and operate infrastructures for ocean data and information management and provision to add value for the offshore oil & gas industry, such as those represented in the Oil and Gas Producers (OGP) Metocean Committee. The objective of this workshop was to raise OGP members' awareness and become acquainted with the infrastructures and their specific ocean products and services, and to establish more communication and exchange between the industry and the research and public communities who are developing and operating these systems. A focus of the presentation given about JCOMMOPS was to highlight the potential for deployments of Buoys and Argo Floats from boats and ships used near or on offshore platforms. Representatives from the OGP were supportive of the capacity to support JCOMMOPS programmes. Since then the TC has provided information about the areas that are most in need of deployments to two representatives of the Oil and Gas Producers and also documentation on what is required to deploy a buoy. Coming out of this should be some good, repeatable opportunities for deployments from Oil/Gas Installations or during Oil/Gas exploration or towing of Oil/Gas Installations or equipment. The Panel invited its Members to contact the Technical Coordinator for further details if needed (**action, Members**).

8.6.1.7 The Panel recalled its agreement at DBCP-21, Buenos Aires, October 2005 that its trust fund could be used for to support collaborative arrangements such as purchasing ship time for

drifter deployment. The Panel invited its Members to make contributions to the Trust Fund for deployments for that purpose (**action, Members**).

8.6.1.8 The Panel also recognised the enormous contribution that the Ship Observations Team and its Panels have and could make in assisting with drifter deployments.

8.6.1.9 The Panel Members urged its Members to assist the Technical Coordinator in collecting information on deployment opportunities in advance and agreed that the following information was required:

- Contact points
- Ship name
- Length of the cruise,
- Dates of the cruise

8.6.1.10 The Panel recognized that contact information was essential and invited its Members to use the tools developed by JCOMMOPS (**action, Members**). The GDC representative, Mr Shaun Dolk reported that the time required to ship drifters from the warehouse to the deployment port could take between a couple of weeks to a couple of months so the Panel agreed that an advance notice for a deployment opportunity of 2 to 3 month should be sufficient. The Panel invited the GDC to provide via its web site information on where inventories are located (**action, GDC**).

8.6.1.11 The SOT Chairperson, Mr Graeme Ball, reported the SOT had changed the definition of ship routes in WMO Publication No. 47. The routes are now a variation of WMO Code Table 0161 (WMO No. 305, Manual on Codes) which is based on WMO Regional Association areas and sub-areas instead of nationally defined point-to-point shipping lines. This should facilitate the use of the publication for the identification of potential deployment opportunities. Panel members are therefore invited to check regularly the WMO Publication No. 47 for such information (**action, Members**).

8.6.1.12 The Panel noted that drifters are simpler to deploy than floats. Floats require two people, more detailed instructions, and more careful handling. The person loading the vessel is the one to explain deployment instructions. Someone knowledgeable of the deployment requirements should visit the ship and provide training. It was noted that the Port Meteorological Officers could also help in this regard.

8.6.1.13 The Panel agreed that the Technical Coordinator should play an active role in collecting information on deployment opportunities under the overall guidance of the Panel, the Executive Board, and the Capacity Building Task Team (**action, TC**).

8.6.2 GTS delays

8.6.2.1 Service Argos reported on the present status, and possible future improvements with regard to the network of delayed mode (global), and real-time (regional) ground receiving stations.

Ground network and Local User Terminals

8.6.2.2 The Panel noted that 15% of the stored (global) data delivered via NOAA-18, NOAA-17, NOAA-16, and NOAA-15 were received within one hour between January and July 2007. Those delivery times will be significantly improved with the Svalbard station on line, since we will be receiving NOAA-18 blind orbits from the EUMETSAT station and NOAA 15, 16 & 17 blind orbits from the National Polar-orbiting Operational Environmental Satellite System (NPOESS) antenna.

8.6.2.3 Regarding the Argos throughput time via the regional network, the Panel noted that 15% of the real-time data delivered via NOAA-18, NOAA-17, NOAA-16, and NOAA-15 and acquired by the HRPT receiving stations were received within 10 minutes. 45% were received within 15 minutes, and 88% within 45 minutes.

8.6.2.4 The Panel was pleased to hear that eight new stations were added to the Argos network during the year (see paragraph 8.3.2 for details).

8.6.2.5 UK and South Africa reported on the current status of establishing a data telecommunication link for Argos TIP data from Falklands/Malvinas Islands LUT to the Argos network. The UK reported on the status of the 64K telecommunication line to its Met Office headquarters in Exeter and indicated that appropriate software to transfer Argos TIP data via FTP and through local firewall had been written.

8.6.2.6 CLS reported that it has installed an antenna in Gabon in April 2007. This increases the real time coverage in South Atlantic. There is currently no LUT receiving station on St Helena Island but UK Met Office is ready to maintain and operate one. For the moment, CLS has no plan to supply a LUT in St Helena.

8.6.2.7 CLS reported that in 2006 it made a proposal to the South African Weather Service for three reception stations (LUTs): Gough Is., Marion Is. and SANAE (South African National Antarctic Expedition). In addition, CLS offered to upgrade the Cape Town LUT if the South African Weather Service (SAWS) ordered the 3 LUTs. For the moment, SAWS who should take a decision in 2008 are assessing the proposal.

8.6.2.8 The Panel noted that there was neither antenna, nor infrastructure available on Easter Island.

Blind orbit issue

8.6.2.9 Stored data collected from the NOAA satellites are done at Fairbanks Alaska and Wallops Island Virginia Command Data Acquisition (CDA) ground stations (Lannion in 2000 stopped providing such services in 2000). DBCP has continued to stress and demonstrate for several years that this had adverse effects on the timeliness of the buoy data distributed on GTS, particularly due to the “blind” orbits. The spacing of these two ground stations does not allow all satellite passes to be collected in a day. The satellite recorder will collect multiple passes usually twice a day prior to being able to download its data at the ground sites. These missed orbits are called blind orbits

8.6.2.10 Currently the Initial Joint Polar Agreement between EUMETSAT and NOAA covers the collection of blind orbit data starting with NOAA-18 and MetOp-A at a third ground station operated by EUMETSAT at Svalbard Norway. Between the three ground stations, all orbits in a day can be collected resulting in timely data availability. All future IJPS satellites will benefit from data collection from the three CDA stations. NOAA satellites launched prior to the beginning of the IJPS agreement NOAA 15, 16, and 17 are not eligible for collection at the EUMETSAT Svalbard ground station.

8.6.2.11 In preparation for the next generation of NOAA polar satellites called NPOESS; a new ground station was installed in Svalbard. This station is not currently in use, but could be used to collect stored data from NOAA satellites not covered by the IJPS agreement. NOAA has tested this capability and shown that the Svalbard equipment can successfully collect stored orbits, but the process requires the use of hardware used at NOAA for supporting the MetOp-A data collection. To protect the implementation of the MetOp-A data it was decided by NOAA to hold off on the NPOESS Svalbard data collection until after MetOp-A was declared operational. Based on the latest information available NOAA expects blind orbit collection to start for the non-IJPS satellites by the end of 2007.

Multi-satellite service

8.6.2.12 Technically, multi-sat service permits a reduction in the time a platform is "waiting" before a satellite is in view and the observations actually transmitted. In the new JTA tariff policy, Multi-satellite service is now included to the standard service without any additional charge. However, when multi-satellite service is provided, Argos users are charged for additional volume of information uploaded by them through Service Argos so called Automatic distribution system (ADS or ArgosDirect).

8.6.2.13 The Panel recalled the decisions by JTA-XXVI to (i) provide a discount up to 50% upon data volume to some ArgosDirect disseminations, (ii) to grant a dedicated rebate to the affected programs (IABP), and (iii) to optimize the ArgosDirect strategy for this program. CLS developed the dedicated processing and format to disseminate IABP Ice Mass Balance (IMB) buoys onto the GTS, so real-time ArgosDirect is no longer required, and related costs cut down. In addition, the user is happy to have his data inserted onto GTS with no more work on his side.

8.6.2.14 The number of observations received at Météo France within 50 minutes decreased in the second half of 2006, but increased a little at the beginning of this year. Overall, however, since 2002 the trend has been a decrease, even though there is double the amount of data coming in. The number of observations received within 100 minutes has fluctuated a lot over the last 5 years and has dropped since the start of the year. Over 40% of the global BUOY reports received in July 2007 by Météo France from the GTS have been received within 1 hour from observation time and close to 70% within 2 hours. This represents a good slight improvement on the figures for July 2006.

8.6.2.16 However, the Panel noted with concern, that during the beginning of 2007 the delays for many buoys were unusually high due to a lag within the Argos system. CLS explained that increasing volumes have pushed the limits of the Argos data processing capabilities, that it took some time to fix the problem, and that a new database had to be installed at CLS.

8.6.2.17 July 2007 on the contrary seems to have achieved a better than average result in terms of average delays. For this period March through June, the GTS sub-system in CLS America was not functioning, therefore all of the processing for the GTS sub-system was done at CLS France and consequently the sub-system in France was overloaded. It should be noted that this is unique to the GTS Sub-system, so once the GTS processing is integrated into the main processing chain of Argos 2001, this should not occur again.

8.6.2.18 Despite all the efforts by CLS, the Panel noted with serious concern that delays have not improved this year compared to 2006. The Panel urged CLS to make additional efforts to improve the situation in the ocean regions where more real-time data are needed, including the South Atlantic Ocean, the South-East Pacific Ocean, and the North of the Indian Ocean (Hyderabad station is not functioning properly) (**action, JTA/CLS**). Further analysis will have to be done by the TC looking at each different type of potential delays (**action, TC & CLS**). CLS reported that the new Argos3 system, with its GTS module will help to enhance the Argos throughput times in the future. The Panel agreed that the Technical Coordinator could assist CLS in the validation and the testing of the new GTS module (**action, TC**).

8.6.2.19 The Panel noted that operational meteorological centres have monitoring tools to detect problems and the capability to provide warnings to CLS so that corrective action can be made rapidly in case of GTS outage or excessive delays. JCOMMOPS real-time status is another mechanism that could be used to detect serious problems. However, the Panel invited CLS to put in place its own operational real-time tools for monitoring GTS data flow and data timeliness in order to improve its responsiveness to possible problems (**action, CLS**). The Panel invited CLS discuss the issue with the TC (**action, TC**). Finally, the Panel asked CLS and the TC to work together to reintroduce time-series graphs showing the long-term trends in delay statistics: such graphs had in the past proved extremely useful in identifying fundamental but subtle system problems such as the blind orbit issue **(action, CLS and TC)**.

8.6.3 Vandalism

8.6.3.1 As at previous Sessions, the Panel considered that vandalism remained a serious concern for Panel Members. A number of actions such as ongoing communication with International Organizations such as the International Hydrographic Organization (IHO), the International Maritime Organization (IMO), and the Food and Agriculture Organization (FAO), had been taken so far with limited success. The Panel recognized that writing to other international organizations than WMO or IOC was not necessarily effective and agreed that it was no longer necessary for the time being.

8.6.3.2 Actions to help prevent vandalism also include advertisement of data buoy use and education. Information materials on vandalism, including an article translated in English, French, Spanish, and Russian are freely available from the WMO web site at the following URL. Panel Members are invited to consider using this information and to distribute it nationally as appropriate (e.g. to port authorities, agencies delivering fishing licenses, fishermen, etc) (**action, Members**). The Korea Meteorological Administration (KMA), the National Fisheries Research and Development Institute (NFRDI), and NORI of MOMAF offered to distribute brochures provided by NOAA's Pacific Marine Environmental Laboratory (PMEL) which explain the importance of moored buoy arrays for improved weather and climate forecasts, and which also include instructions to fishermen for safely operating in the vicinity of the moorings. The KMA offered to translate material into Korean and ensure its distribution to local fishermen (**action, KMA**). The Panel agreed that raising public awareness regarding the use of data buoys (e.g. for hazard prevention and mitigation) could be effective in the long term and that this could be done most effectively at the national level.

8.6.3.3 Panel Members have worked on the development of vandalism resistant moorings that might potentially improve the situation. As required by the Panel at its previous Session, the Technical Coordinator has started to compile information on such designs (e.g. NIOT and PMEL have already provided details). The Panel invited interested Members to request such information to the Technical Coordinator but recommended not to distribute it outside of the Panel's scope.

8.6.3.4 The Panel agreed that displaying a Tsunami wave on a buoy was an idea to be used with caution. However, it might be an effective way to prevent vandalism for some of the buoys that the Panel Members may consider (**action, Panel Members**).

8.6.3.5 In addition to the vandalism cases reported by moored buoy programmes (e.g. TIP), the GDP expressed concerns regarding the substantial number of drifters picked up by fishing vessels or mariners every month. The Panel recognized that offering a reward for recovered drifters was not necessarily effective and could in fact encourage vandalism.

8.6.3.6 The Panel agreed that inviting an expert on data impact to make a presentation at the DBCP scientific and technical workshop could help in getting the message across.

8.6.3.7 The Panel noted that CLS was liaising closely with the fishing industry and regulating bodies and invited CLS to assist in the proper distribution of information on data buoy vandalism to the fishing fleets (**action, CLS**). The Panel agreed to make a recommendation to the JTA in this regard (**action, JTA**).

8.6.4 Instrumental Metadata

8.6.4.1 The Technical Coordinator reported on progress regarding implementation of the buoy metadata collection scheme that is implemented at JCOMMOPS. The Panel noted with concern that currently, a few countries (France, New Zealand) were using the Meta application to enter buoy metadata. The Technical Coordinator indicated that the usability of the system requires to be reviewed in light of difficulties experienced by these users. The panel noted that the DBCP TC does use the application to enter information, especially since the beginning of the Iridium Pilot Project and is using the opportunity to document areas that could be improved and usability issues.

A few countries appear to have stopped entering data entirely (no activity recorded since August 2005). Buoy manufacturers do not appear to have used the system as much as required. Several agencies (Japanese Met. Agency, Env. Canada, NDBC) sent text/MS Excel files to the TC, of basic buoy information (though not to the level of instrument sensors etc), which are processed as necessary by the TC. This process has not yet been automated as the TC and an international standard has not been recommended.

8.6.4.2 The Panel agreed that an ASCII format should eventually be developed by the DBCP so that Panel Members can submit the metadata to JCOMMOPS (**action, TC in cooperation with Panel Members**). The Panel asked the Technical Coordinator to provide Panel Members with the list of metadata required (**action, TC**).

8.6.4.3 While noting that the manufacturers did not comply with the requirements expressed at previous DBCP session in this regard, the Panel recalled that the manufacturers are required to enter the metadata in JCOMMOPS database via the “meta” application.

8.6.4.4 The Panel asked the Technical Coordinator to look at improving usability of the application for entering metadata, for making the process more effective for users and manufacturers alike or to suggest other effective solutions (**action, TC**).

8.6.4.5 The Panel urged its Members as well as buoy manufacturers to make use of the JCOMMOPS metadata collection scheme or to provide JCOMMOPS with metadata for uploading them in the JCOMMOPS database (**action, Members & manufacturers**).

8.6.4.6 Bill Burnett reported on the development of the Water Temperature Metadata Pilot Project (META-T PP, http://marinemetadata.org/meta-t), including the categorization of metadata proposed, the mechanisms proposed to make the buoy SST and/or temperature profile metadata available in real time, and the implications for designing BUFR templates for buoy data.

8.6.4.7 The Panel noted that the Technical Coordinator has contributed to this project through (i) the setting up of the project web site, (ii) providing input to or reviewing the documents on Data streams for drifting buoys and SOOP and VOS ships, relating to what information is recorded, how it is transmitted (real-time, delayed-mode, format, where it is stored, how it is accessed, if there are gaps and what are we going to do about the gaps, (iii) reviewing the document on categorization and requirements (version 2) and the Requirements Matrix (version 2) for the project, (iv) providing a report to the Meta-T Chair on the meeting of the Expert Team on Data Representation and Codes, (v) looking at how the BUFR templates in development can adequately encompass the required metadata, and (vi) maintenance of the META-T email list. The Panel thanked the Technical Coordinator for her active participation in the project and recommended that she continue to do so (**action, TC**).

8.6.4.8 The Panel noted the following work plan for the META-T:

- Obtaining agreement regarding the list of metadata required for the VOS BUFR template
- Submit the list to the SOT Task Team on Codes
- Select another project to develop another list of metadata regarding another type of platform
- Set up the META-T servers at both the NMDIS and NOAA/NDBC

8.6.4.9 The Team asked its new Task Team on Data Management to liaise with the META-T in order to take the META-T requirements for category 1 metadata into account when defining requirements for the BUFR templates for buoy data (**action: TT DM and META-T**).

8.6.4.10 The Representative of China, Ms Dongmei Qi, reported that NMDIS has made progress in setting up the META-T server but that the exact implementation schedule was not available at this meeting. The Panel asked her to provide information about the schedule after consultation with NMDIS experts in charge of the project (**action, China**).

8.6.4.11 The Panel invited its Members to fully assist the Pilot Project in achieving its aims and particularly to help in facilitating distribution of the metadata to the pilot project data centres (**action: DBCP Members**).

8.6.5 Technology developments in support of user requirements

8.6.5.1 The Panel reviewed present and potential technical developments regarding the buoy technology that will permit to better meet the user requirements such as NWP, ocean modelling, climate variability and predictability, climate forecast, ocean research. These arose from previous DBCP Session discussions, the recommendations from the DBCP data user and technology workshop, Reading, UK, March 2006, and from the twelfth Session of the GCOS-GOOS-WCRP Ocean Observations Panel for Climate (OOPC-12), Paris, France, 2 - 5 May 2007. These included:

- The making of near surface temperature profiles by the use of longer lifetime thermistor strings 80m to 150m long and GPS to increase space/time resolution (GDP purchasing Pacific Gyre and Clearwater drifters; Météo France purchasing Marlin drifters).
- Redesign of drogue attachment methods (Marlin)
- Redesign of drogue sensors mainly through the use of tether strain sensors (GDP working with Clearwater). Technocean has been working at improving on improving the sensitivity of the submergence sensor but the GDP has not seen any significant change in submergence detection performance.
- Advancements in safety and ease of deployments
- AOML is now providing weekly updates of a 90 day drifter array forecast at http://www.aoml.noaa.gov/phod/dac/gdp_maps.html using a statistical approach to the drifter data. AOML has offered to cooperate with SAMS regarding a more dynamic advection-diffusion model of the array's evolution, which would rely on funding being sought to support a student or Post doctorate position to lead the project.
- The recording and transmission of hourly SST and Sea Level Pressure data per OOPC recommendations. The PTT real-time clock can be used with sufficient accuracy. On the other hand, accurate real time clocks have been installed on some prototypes.
- The making of wave observations from drifters using small acoustic current meter installed under the surface float that would record the wave near surface horizontal velocity relative to the drifter float. During wave passages, buoys have shown that back and forth currents (relative to the float) can be measured. This method would allow for determination of a directional wave velocity spectrum that can be converted to a wave height or other spectra from known relationships of deep-water wave dynamics. It is estimated that developing the technology requires establishing a 3-year pilot project.
- The making of wave observations from moorings. Investigations are being made into mounting wave measurement instruments on existing OceanSITES platforms. The main issue for making this work is to ensure the system does not add significant cost and that it can be run within the existing power budget of the existing buoy. OceanSITES see this as a major area requiring research in the future, but so far, the resources have not been available to perform this research.
- The development of new satellite data telecommunication techniques such as Iridium (see agenda item 8.4.1).
- The development of appropriate technology to measure pCO_2 from drifters in cooperation with the International Ocean Carbon Coordination Project (IOCCP) for studying both short-term variability in surface pCO_2 and air-sea flux as well as ocean acidification.

8.6.5.2 After discussion, the Panel made the following recommendations:

Recommendation 1: Following the drifter Data Assembly Center investigations and results showing that submergence has proved extremely problematic in determining drogue presence, the Panel recommends that all manufacturers adopt tether strain. The Panel also recommends that all manufacturers adopt the same model gauge, attachment methodology and recording/transmitting algorithm developed by Clearwater, so that the resulting data stream is manufacturer-independent.

Recommendation 2: The Panel recommends that all manufacturers include coloured warning labels with each drifter to reinforce that drifters must be deployed with the drogue and tether bound by the paper tape attached. For ease of deployments, storage and also safety (primarily to ensure the paper tape stays dry and intact), the drifters should be individually shrink-wrapped in clear plastic and include deployment instructions on the outside of this plastic wrap. See: http://www.aoml.noaa.gov/phod/dac/dep_inst.html

8.6.5.3 Mr Sergey Motyzhev expressed reservations about Recommendation 1 above, and explained he was confident that the technology developed by his company was reliable and had shown evidence of that during the scientific and technical workshop; the Panel agreed to revisit the issue at the next Panel Session.

8.6.5.4 The Panel asked its Task Team on Technological Developments to liaise with the IOCCP and prepare a technical report on pCO_2 measurement from drifters, addressing power requirements, lifetime, data issues, implementation, etc. (**action, TT TD**)

8.6.5.5 The Panel recalled the discussion regarding wave observations as discussed during the scientific and technical workshop and under various agenda items during the Session. It asked its Task Team on Technological Developments to consider the development of a Pilot Project on wave observations (new developments on drifters, OceanSITES) and liaise with the Executive Board in this regard during the next intersessional period in the view to make a proposal at the next Panel Session (**action, TT TD**):

8.6.5.6 Regarding the deployment of drifters from some height and/or some speed, the GDP reported no further progress from the manufacturers, and that no changes would be proposed to the deployment instructions without undertaking appropriate testing and validation beforehand.

C. ADMINISTRATIVE COMPONENT

9 REPORTS

9.1 CHAIRPERSONS AND VICE-CHAIRPERSONS

Chairperson

9.1.1 The Chairperson reported on his activities during the last intersessional period, and explained that this has been a busy year, with the running of the Iridium Pilot Project and the Training Workshop at Ostend being added to the normal list of intersessional duties. Additionally the Chairperson, in consultation with the Argos JTA chair and the joint secretariats, led discussions on the future shape and strategy of the DBCP and the JTA. The Chairperson represented the DBCP at the OCG meeting in April, working with CLS and the animal tracking community to achieve an acceptable charging regime for this substantial group of users. The Chairperson also represented the OCG at the JCOMM Services Coordination Group session in Exeter.

9.1.2 While most of the travel costs associated with these missions have been borne by the DBCP Trust Fund, the Chairperson's DBCP-related staff costs and attendance at this and the following JTA session have been covered entirely by the Scottish Association for Marine Science (SAMS). Until recently SAMS was able to recover these costs through a margin on its Argos sales activities levied on the UK JTA community: this funding route is no longer available now that CLS has wisely gone over to direct invoicing.

9.1.3 This has led to considerable concern at SAMS, an independent research laboratory with no direct provision for the funding of international activities such as the DBCP. To date

attempts to find a source for such funding (e.g. from the UK Natural Environment Research Council) have been unsuccessful, although the search is ongoing. The chairperson thanked those who wrote to the SAMS Director in support of his continued involvement with the DBCP.

9.1.4 The current position is that the SAMS Council has agreed to support Mr Meldrum's DBCP activities until 31 December 2008. If no other source of funding is forthcoming for his support beyond that date, he will be obliged to resign from the DBCP in October 2008.

9.1.5 Finally, the Chairperson thanked the able assistance given to him by many colleagues in pursuit of the DBCP's intersessional objectives, not least the vice Chairpersons, the TC and the joint secretariat.

Vice-chairpersons

9.1.6 A written report was provided by the Vice-chairperson from Asia, Dr K. Premkumar, regarding his activities during the twenty-third intersessional period of DBCP. He has continued to make efforts along with his colleagues in National Institute of Ocean Technology (NIOT) in the development of Deep Ocean Tsunami Wave Detection system (Tsunameter) for India. During the course of the development of Tsunameter, Acoustic Test Facility (ATF) of NIOT has been fully utilized and the facility could be presented as the reference test facility for Tsunameter.

9.1.7 As the Chairperson, representing WG2 on "Sea Level Measurement, Data Collection and Exchange has organized the first International Tsunameter Partnership (ITP) meeting at National Institute of Ocean Technology (NIOT) in end February 2007. The meeting facilitated many Tsunameter developers, participating Indian Ocean rim of countries to exchange their views and present their capabilities. The WG2 Chairperson of ICG/IOTWS has attended the 4th session meeting at Mombasa, Kenya from 26 February to 2 March 2007. Further, the intersession meeting of WG2 was held at Jakarta on 4-5 September 2007 followed with the second ITP meeting on the 6-7 September 2007. Both DBCP Chairpersons Mr Premkumar and Mr Ken Jarrott, also Chairperson of the ITP are working closely in bringing out the common standards and guidelines for Tsunameter as well for coastal sea level gauges.

9.1.8 Through the Indian Coast Guard effective monitoring being ensured to safeguard the data buoys as well through Indian National Hydrographic Office prompt mariners notifications are released as and when a new platform is deployed.

9.1.9 The Vice-chair for the southern Hemisphere, Mr Ken Jarrott briefly reported on his activities on behalf of the Panel during the last intersessional period and particularly regarding his role as a liaison with the International Tsunameter Partnership (ITP).

9.1.10 Mr Jarrott reported that during the DBCP intersession period, his main engagements have not been in a direct capacity as DBCP Vice Chair, but as a contributor to sea level monitoring instruments and observing networks for tsunami warning systems. His particular focus has been in deep ocean tsunameter networks. K Premkumar from India and him have maintained their roles as Chair and Vice Chair of the Indian Ocean Tsunami Warning and Mitigation System's working group on Sea Level Data Collection and Exchange. Meetings of that group were held in Mombasa in Feb 07 and Jakarta in Sep 07. During the year, progress has been made in establishing and implementing methods for the international (GTS) exchange of sea level data from coastal stations. Mr Jarrott was appointed Chair of the International Tsunameter Partnership at its first meeting in Feb 07 at a meeting hosted by India's NIOT in Chennai. In that meeting and at a subsequent meeting in Jakarta hosted by Indonesia's Agency for the Assessment and Application of Technology (BPPT), he and ITP colleagues, including K Premkumar have pursued the introduction of equipment and data exchange standards for deep ocean tsunami detection stations. The travel costs for these activities were funded by the Bureau of Meteorology, as part of its contribution to the development of the Indian Ocean Tsunami Warning System.

9.1.11 The Panel recalled that it had not elected a vice-Chairperson for North America after the resignation of Elizabeth Horton at DBCP-22. No report was therefore submitted for this Panel Session.

9.1.12 The Panel expressed much appreciation and thanks to Ken Jarrott and Elizabeth Horton for their contributions made over the years to the Panel activities. The Panel agreed that an email should be sent to Ms Horton to inform her of the Panel's appreciation and gratitude at this Panel Session (**action Chair/Secretariat**).

9.2 EXECUTIVE BOARD

9.2.1 The Panel recalled its decision at its previous Session to establish an Executive Board to act relatively swiftly in priority issues such as (i) Capacity Building, (ii) technology evaluation initiatives, (iii) engaging with other observing systems, assisting them with coordination, support and data management issues, particularly the free exchange of data in near-real-time via the GTS, the Internet and other channels, and (iv) promoting the mission of the Panel. The Panel then expressed confidence in its Chairperson to act wisely on its behalf in this regard, and asked him to convene an Executive Board to assist him in directing the Panel's resources appropriately during the intersessional period. During the last Intersessional period, after consultation with a number of Panel Members, the Chairperson selected Sid Thurston (NOAA) as Panel Member to participate in the Executive Board. The WMO and IOC were requested to propose individuals to represent them. Consequently, the Executive Board is presently comprised of David Meldrum, Chairperson, Sid Thurston, Panel Member, Edgard Cabrera, WMO, Candyce Clark, IOC, and Hester Viola, DBCP Technical Coordinator.

9.2.2 The Panel noted that the Executive Board has been consulted during the last intersessional period to approve the following expenditures, within the guidelines established at DBCP-XXII:

- Missions by the Chairperson
- Travel by the trainers for the DBCP training course
- Iridium upgrades for the DBCP Drifter Iridium Pilot Project

9.2.3 The Panel agreed with these expenditures and thanked the Executive Board for it very efficient work during the last intersessional period.

9.2.4 According to the discussion under agenda item 4.1, the Panel decided to revise the Terms of reference and Membership of the EB. Particularly, the Panel agreed that the vice-chairs should be added in the membership. These are detailed in ***Annex IV***.

9.3 SECRETARIATS

9.3.1 The Secretariats reported on their activities on behalf or in support of the Panel during the last intersessional period. These included (i) follow-up on decisions of DBCP-XXII and preparation for DBCP-XXIII; (ii) continued management of the Panel's trust fund, as well as the employment and missions of the Technical Coordinator; (iii) close liaison with JCOMM, in particular in the development of coordination and integration procedures; (iv) liaison with CBS on codes, quality management, user requirements, and other matters; with other IOC and WMO technical commissions and regional associations (or equivalent bodies) on relevant issues; and with the WCRP Climate Variability and Predictability (CLIVAR), GCOS, GOOS, and ICSU Scientific Committee on Oceanic Research (SCOR); (v) presentations on the DBCP and other in situ marine observing activities to various fora; (vi) maintenance of the WMO buoy ID number register; (vii) support for the DBCP Action Groups as required; (viii) preparation of the DBCP annual report, of material for the WWW Operational Newsletter, the WMO Bulletin, and other Publications (see also agenda item 7.2). In addition, the Secretariat worked closely with the DBCP Chairperson and the Executive Board to draft a proposal for the future modus operandi of the DBCP.

9.3.2 The Panel reviewed the list of National Focal Points for buoy programmes as well as the register of WMO buoy and float ID numbers, and asked its Members to check both lists for accuracy and to inform the Secretariat of any discrepancies. As agreed at DBCP-XVI, a list of national focal points for logistic support for JCOMM observing systems in general has been compiled and is maintained on the JCOMM web site. The Panel was invited to review the list and inform the Secretariat should there be any change **(action, Members)**.

9.3.3 The Secretariat reported on governing bodies activities during the last intersessional period that are directly related to the Panel's activities or potentially impacting it, including the Twenty-fourth Session of the IOC Assembly, Paris, France from 19 to 28 June 2007, the fifteenth WMO Congress, Geneva, Switzerland from 7 to 25 May 2007, and the -ninth WMO Executive Council, Geneva, Switzerland from 28 to 30 May 2007.

9.3.4 The Panel was reported on a potentially significant discussion was made during the IOC Assembly regarding the future of IOC; the IOC Member States felt that the "state of IOC" was a state of crisis, in which the budget and staff resources were not adequate to allow the IOC effectively address its overall responsibilities. A document on "The Future of IOC" was presented during the discussion in this context, which identifies the problems IOC faces and the different options to be explored. To explore the options for the future institutional status of IOC, an intrasessional Working Group was formed.

9.3.5 The IOC Assembly also adopted IOC Biennial Strategy for 2008–2009, including four IOC high-level objectives, such as 1) Prevention and reduction of the impacts of natural hazards, 2) Mitigation of the impacts and adaptation to climate change and variability, 3) Safeguarding the health of oceans ecosystems, and 4) Management procedures and policies leading to the sustainability of coastal and ocean environment and resources.

9.3.6 The activity of the ad hoc Working Group on the Framework for a Global Tsunami and other Ocean-Related Hazards Early Warning System (GOHWMS) was reviewed during the IOC Assembly. Considering that the harmonization and standardization of relevant observation, data management and communication, forecast, warning and mitigation practices in tsunami, other ocean hazard warning systems, and the implementation of a multi-hazard warning system framework at the national level, it was decided to establish a Working Group on Tsunamis and Other Hazards related to Sea Level Warning and Mitigation Systems (TOWS-WG). JCOMM was requested to play a key role in providing scientific and technical guidance as well as the coordination of related global observing systems such as GLOSS.

9.3.7 The WMO Cg-XV amended the preamble of the WMO Convention, with effect from 1 June 2007, to reflect and make clear how the scope and responsibilities of the Organization have evolved since it was established in 1950. The WMO Strategic Plan for 2008-2011 and beyond was approved, including three top-level objectives, five strategic thrusts and the eleven Organization-wide expected results for the 15th financial period. Particularly the following Expected Results have been approved: the integration of WMO observing systems (ER-4), the development and implementation of the WMO Information System (WIS) (ER-5), and enhanced capabilities of Members in multi-hazard early warning and disaster prevention and preparedness (ER-6).

9.3.8 The WMO Cg-XV drew the attention of Members to the risk of disruption in essential observational datasets and urged Members to develop efforts aimed at ensuring continuity of measurements and timely transfer of research-based systems into operational status. Congress urged the WMO Secretary-General, IOC Executive Secretary and the co-presidents of JCOMM to further strengthen the integration of WMO and IOC activities, in order to provide a more effective and cost-efficient JCOMM work plan, including enhancing coordination of JCOMM with the Intergovernmental Coordination Groups of the different tsunami warning and mitigation systems in order to sustain the systems initiated through the IOC as an integral component of a comprehensive multi-purpose global ocean observing system. Congress requested the Secretary-General to work with Members and space agencies to ensure better continuity and overlap of

relevant space-based and in situ ocean observing systems and to move experimental observing systems into operational status;

9.3.9 WMO EC-LVIII acknowledged the proposals made by the JCOMM Ship Observations Team (SOT) on ship call sign masking and encoding, and stressed the importance of developing a general and universally acceptable solution to this issue that would address ship owners and masters' concerns, as well as, the operational, data monitoring and quality information feedback, and climate requirements. The Council adopted Resolution 7.7/1 (EC-LIX).

9.3.10 The Third Forum of the GOOS Regional Alliances was held in Cape Town, South Africa from 14 to 17 November 2006. The Forum stressed the importance of improved modelling capabilities, and closer ties to the development of GOOS as the oceans and coasts component of the GEOSS, especially with the adoption by the GEO Secretariat of the proposal to establish a Coastal Zone Community of Practice. The board recommended forming a GOOS regional council and a coastal scientific advisory body.

9.3.11 The Tenth Meeting of the GOOS Scientific Steering Committee was held in Seoul, Republic of Korea from 13 to 16 March 2007. The complementary roles of the intergovernmental IOC-WMO-UNEP Committee for GOOS (I-GOOS), JCOMM, GOOS Scientific Steering Committee (GSSC), and the GOOS Regional Alliances were discussed. An important distinction was made between GOOS Regional Alliances (regional policy and coordinating bodies) and the Regional Ocean Observing Systems (ROOSs, the observing systems themselves). Recommendations include immediately forming a sub-committee of the GSSC, the Panel for Integrated Coastal Observations (PICO), with the goal of forming a joint panel with the Global Terrestrial Observing System (GTOS). JCOMM should coordinate the integration of common variables in coastal observations as the data streams become operational. The new PICO panel should liaise with the GEO Coastal Community of Practice in developing pilot studies. Although the Global Module of GOOS was over 50% complete, the completion of the initial design and its maintenance is contingent upon additional resources by Member States.

9.3.12 The Twelfth session of the GCOS-GOOS-WCRP Ocean Observations Panel for Climate was held in Paris, France from 2 to 5 May 2007. Its request to DBCP on hourly SST measurement was reviewed during the meeting, of which the details are recorded under agenda item 8.6.5 of this report.

9.3.13 The Eighth session of the IOC-WMO-UNEP Intergovernmental Committee for GOOS was held in Paris, France from 13 to 16 June 2007. The discussion was focused to i) the sustainability of GOOS; ii) GOOS regional development, and iii) Capacity Building: The development of the capacities. GOOS National Reports were submitted to this session, which enabled an initial benchmark of the system, and a synthesis of GOOS. Meanwhile, the Session recognized overall lack of efforts toward the establishment of the coastal module. Continuous satellite mission for ocean colour observation was also emphasized for future GOOS work planning. Member States endorsed the GOOS regional development, following the recommendation of GSSC, the definition and roles of the Regional Ocean Observing Systems (ROOSs).

9.3.14 The Panel, in noting that it enjoyed particularly able support from both Secretariat representatives, thanked both the WMO and IOC Secretariats for their outstanding commitment to and very effective work on behalf of the Panel during the last intersessional period.

10. FINANCIAL AND ADMINISTRATIVE MATTERS

10.1 FINANCIAL SITUATION

10.1.1 The Panel considered the financial statements provided by IOC and WMO as follows:

(i) IOC Statement of Account for the year 2006;

(ii) IOC Statement of Account for the period 1 January 2007 to 31 July 2007;

(iii) Interim WMO Statement of Account as at 31 July 2007;

(iv) WMO Final Statement of Account as at 31 December 2006.

These statements are reproduced in ***Annex VI***.

10.1.2 The following points were particularly noted by the Panel:

(i) The Panel expressed its appreciation to donor countries to the DBCP Trust Fund for their continuous commitment. The Panel also expressed its appreciation to the USA for its USD 25,000 contribution in support of the DBCP Drifter Iridium Pilot Project (contribution was received in September 2007 so it does not appear in the WMO statement).

(ii) Canada contributed USD 20,000 in 2006 for JCOMMOPS as a whole in support of the DBCP and the SOT.

(iii) The E-SURFMAR - an optional programme of EUCOS with the membership of Belgium, Croatia, Cyprus, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Netherlands, Norway, Portugal, Spain, Sweden and the United Kingdom - made its contribution to DBCP through France. The Panel also appreciated the contribution from Germany for 2006 and for 2007 in support of SOOPIP.

(iv) Part of the payment for TC's logistic support by CLS for 2005/2006 (USD 13,527.27) was paid directly from the UNESCO/IOC regular budget, to clear up the discrepancy (see final reports of the 20th, 21st, and 22nd reports and 2006 IOC Statement in ***Annex VI***. The payment for logistic support by CLS in 2007 (EUR 12,200, covering the period of June 2006 ~ May 2007) was not made until September 2007; this would be included in the final statement for the year 2007 as well as in a financial report to the next session.

(v) The CLS Argos contribution for JTA Chairperson in 2007 (USD 30000) covers the year 2006/2007 (USD 15000) and the year 2007/2008 (USD 15000).

(vi) A number of travel related expenses covered the following activities: (i) the missions of the DBCP Chairperson on behalf of the Panel and of the five TC/DBCP candidates interviewed in Reading in March 2006, (ii) the mission of Mr E. Charpentier to Toulouse in July 2006 to provide training to the newly recruited Technical Coordinator, Ms H. Viola, and (iii) the missions of the Trainers (E. Charpentier, D. Meldrum, J. Turton, G. Ball, S. Motyzhev, M. Pazos) to Ostend for the DBCP training course.

10.1.3 The Panel then recalled the decision made at it 21st session, requesting Mr Frank Grooters (The Netherlands) to act on its behalf and to work with IOC and WMO to produce a consistent, comprehensive and comprehensible set of annualised accounts. As for the previous year, Mr Grooters has produced an excellent set of interim accounts. The Panel expressed particular thanks to Mr Grooters for his efforts in this regard. The report by Mr Grooters is reproduced in the accompanying CD-ROM.

10.1.4 The Panel noted with appreciation that its financial position was secure. It also noted that the current financial situation was healthier than anticipated because some new initiatives from its previous session were not yet realized, such as collaborative arrangements. The Panel figured that, providing the current level of the contribution would continue in the future, approximately

90,000 USD would be available for the Panel's activities including TC's travel/mission, Capacity Building, the Iridium Pilot Project, future collaborative initiatives, JCOMMOPS infrastructure support, outreach and publication activities. The Panel agreed to keep the estimated expenses for 2008 on those items at the level that was agreed for 2007; i.e. the figures for maximum allowable expenditures.

10.1.5 The Panel recognized that the exchange rate between US dollars and Euros has been impacting the DBCP budget, that is, cost for TC employment and supporting her activities was increasing. In this context, the Panel encouraged the Members to consider contributing in Euros, as it was feasible **(recommendation, Members)**. At the same time, the Panel agreed that the estimated expense for TC employment and missions should bear possible increase in this regard.

10.1.6 The Panel recalled its decision at the 22nd session (2006, La Jolla), to set aside monies for a notional contribution towards any eventual relocation expenses for JCOMMOPS, for contingencies, and for any other new activities that the Panel might agree upon. The Panel also reached rapid agreement that the apparent surplus in the Panel's accounts should not be allowed to trigger payment holidays or reductions by contributors, but that any excess in these established regular contributions over and above the Panel's normal expenses in supporting its Technical Coordinator should be used wisely to support Panel activities, as had been the custom in previous years. In this context, the Panel again confirmed that the contingency should be carried over years with a realistic amount, and it should be separately noted from the cash balance, which would indicate available amount for the Panel's activities.

10.1.7 The Panel recalled that it had established an Executive Board at its 22nd session, to act on its behalf in these matters during the intersessional period. The Panel authorized the Executive Board to set a plan and execute for 2008 expenditure, taking above points into account. (**Action, EB**) The Panel asked the Executive Board to liaise with Mr Frank Grooters and to update the interim financial report so that the Executive Board can make financial decisions based on accurate information. 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 **(Action)** (See ***Annex VIII***).

10.1.8 As its 22nd session, the Panel agreed on the reporting schedule for DBCP Accounts, that is, i) to present an interim statement of the budget at the DBCP meeting, and ii) to distribute the final statement to the Panel members in early Year+1 as soon as the organizations' fiscal year accounting was finalized. The final statement would be included in the Panel's annual report to be published as CD-Rom only. The Panel requested Mr Grooters and the Secretariats to work together to meet such a schedule during the intersessional period **(Action)**.

10.2 EMPLOYMENT OF THE TECHNICAL COORDINATOR

10.2.1 The contract established by IOC/UNESCO for the employment of the Technical Coordinator was considered. The Panel noted the arrangement since 1 July 2006 for the Technical Coordinator's employment, as a UNESCO Appointment of Limited Duration (ALD), grade P2, through funds provided by the Panel and deposited in the IOC Trust Fund. The Panel approved this arrangement as it stood.

10.2.2 The Panel recalled the Secretariat report in its twentieth session, informing it that the contract for logistic support for the position of the Technical Coordinator was to be transformed into a standing agreement between IOC and CLS 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.

10.3 FUTURE COMMITMENTS

Employment of the Technical Coordinator

10.3.1 The Panel recalled that, at its seventeenth session (Perth, October 2001), it had agreed on the following arrangement with its Technical Coordinator:

(i) The Technical Coordinator would be requested to inform the Chairperson, every year "Y" by the 1st of October, of his/her wish, or otherwise, to continue to work as Technical Coordinator 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 Coordinator, subject to the availability of funds, and subject to the ALD limitations described in 10.3.3. below;

(ii) At any time, should the Technical Coordinator decide to give up the position, he/she would be required to inform the Panel as soon as possible, and in any case preferably six months in advance, of his/her decision, as well as 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 Coordinator.

10.3.2 This previous arrangement had continued for the current Technical Coordinator until 2007. According to that arrangement, Ms Viola addressed the Chairperson on 2 August 2007, to inform him of her intent to continue working as Technical Coordinator of the Panel for the period 1 July 2008 – 30 June 2009., depending on the renewal of her contract and renegotiations with IOC and the DBCP concerning the level of remuneration offered, as prescribed in the conditions of the UNESCO Appointment of Limited Duration (ALD). The Panel agreed to continue the employment of Ms Viola as its Technical Coordinator for the year 1 July 2008 to 30 June 2009, subject to the necessary contractual arrangements and the availability of funds for the purpose.

10.3.3 Meanwhile, the Panel recognized that the above arrangement could no longer justify for its formal procedure. Therefore it agreed the item (i) of 10.3.1 be replaced with

> "The Technical Coordinator would be requested to inform the Chairperson and the Secretariat of his/her wish, or otherwise, to continue to work as Technical Coordinator 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 Coordinator, subject to the availability of funds, and subject to the ALD limitations;"

It was agreed and reinforced that, 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 Coordinator.

10.3.4 The Panel recalled that the current TC employment contract (ALD) was able to be extended to a maximum of 4 years but not further. The Panel expressed its concerns on the possible risk against the stable and continuous services to be provided by the Technical Coordinator under the current arrangement, and requested the IOC to investigate possibilities to extend the TC's contract beyond the authorized ALD duration (**action, IOC Secretariat**). It also requested the WMO to investigate whether the TC could be recruited by WMO on a long-term basis (**action, WMO Secretariat**). The Panel agreed that this issue should in future carefully considered within the context of the future OPSC; in particular, to minimize impact for the Panel activity and the Technical Coordinator in transitioning

Management of the Trust Fund

10.3.5 The Panel reviewed the table of income and expenditures for the year 2008 as detailed in ***Annex VII*** *and* ***Annex VIII***, along with the table of provisional contributions. Notwithstanding some expected surplus in the coming intersessional period, the Panel agreed that the scale of national contributions to the Trust Fund should remain at the same level as previous years, considering that requirements falling to the Panel were increasing, as were the number of activities that it was planning on its own accord.

10.3.6 The Panel was informed that, as of 1 January 2008, the IOC special account was to charge 10% of support cost, for all expenditures including the employment cost and any other additional expenses such as missions/travels. To avoid duplicate charges for organizations' service cost and for efficient conduct of the Trust Fund, the Panel agreed that the expenses incurred for the Technical Coordinator's activities should be executed within the DBCP Trust Fund in WMO from 2008, whereas the salary and logistical support should remain to be managed within the DBCP Trust Fund in IOC based on the contract and related agreement (**action, Secretariat**).

10.3.7 The Panel agreed to maintain line items that was introduced in 2007 in the provision of 2008 expenditure, including (a) Technical Evaluations (Iridium Pilot Project), (b) Capacity Building, (c) Collaborative Arrangements, (d) JCOMMOPS infrastructure support, (e) outreach and publication activities, and (f) contingency. The Panel requested the Executive Board, assisted by Mr Grooters, to identify indicative figures for upper limits of expenditure. A proposal suggesting these new indicative figures is attached as ***Annex VIII***.

10.3.8 Regarding the collaborative arrangements, the Panel instructed the Technical Coordinator interacting with the Executive Board to define priority and plans, considering how the funds should be used to help Action Groups and other related programmes (**action, TC**).

10.3.9 The Panel carefully reviewed this proposal, and finally agreed to the 2008 contributions and planned budget as proposed.

10.3.10 The Panel emphasized that the current healthiness of the Trust Fund, despite the Panel's activities were significantly increased, was due to the additional external resources and contributions for various activities conducted during 2007, such as IOC/IODE's contribution to the DBCP Training Course – full support for trainees and logistics. It recognized the importance of such a joint activity not only for sharing resources but also building synergies between similar initiatives. In this context, the Panel urged the Member and the Secretariat to seek additional resources for organizing various DBCP activities, and opportunities for joint activity with related programmes. (**recommendation**).

10.3.11 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 WMO and IOC. The Panel encouraged the Members to ensure that their contributions were made in good time **(Recommendation)**, and again expressed its sincere thanks to those nations that were able to contribute to the Trust Fund.

10.4 REVIEW OF THE DUTIES OF THE TECHNICAL COORDINATOR

10.4.1 Under this agenda item, the Panel reviewed the arrangements for the employment of the technical coordinator, as well as the sharing of his activities between the Panel and the Ship Observations Team.

10.4.2 In line with the discussion under agenda items 5.2 and 8.5, the Panel agreed to carry out discussions with SOT, OceanSITES and Argo on possible re-arrangement of the work assignments for DBCP and Argo Technical Coordinators. Subject to the conclusion and agreement by those interested groups, the duties of the Technical Coordinator should be re-defined during the intersessional period. (**action, EB, Chair, Secretariat, and OceanSITES co-chair**)

D. CONCLUDING COMPONENT

11. RECOMMENDATIONS TO THE ARGOS JTA

11.1 The Panel thanked CLS for its ongoing efforts to improve the quality of service available to its members, and noted the following recommendations to be passed to the Argos JTA meeting following the Panel session:

- Efforts should continue to effectively identify and minimise delays affecting the timely distribution of data inserted by CLS on to the GTS, i.e. (i) filling the gaps in global coverage by the regional network, including the South Atlantic Ocean, the South-East Pacific Ocean, and the Indian Ocean; (ii) upgrading the data processing system to be more reliable; (iii) developing appropriate monitoring tools to improve responsiveness to problems;

- CLS to take action with the fishing fleets they monitor and provide them with information leaflet on data buoy vandalism;

- JTA to note the decision by the DBCP to restructure its activities and consider how this could impact the JTA activities;

- Address the impact of the Iridium Pilot Project; there may be a move in the community to increase the use of iridium which may impact the Argos charging and therefore the negotiations;

- Maintaining the present arrangements for the funding of the independent JTA chair;

- Establishing new arrangements for the JTA to contribute to the DBCP trust fund in order to cover the cost of Panel Members undertaking activities on behalf of the JTA;

- To make PMTs available to the community for evaluation purposes;

- The JTA should recommend that the Argos Operations Committee review the MOU between NOAA, CNES, and EUMETSAT so as to permit fair competition by other satellite data service providers by opening up free and open use of the global Argos datasets that were currently only distributed to CLS.

12. WORKPLAN

12.1 As in previous years, the Panel reviewed and updated its operating procedures, as well as the overall work plan for itself and the Technical Coordinator for the coming intersessional period. These work plans are given in ***Annex XII***.

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

13.1 The Panel re-elected Mr David Meldrum as its Chairperson, to serve until the end of the next Panel session. It so re-elected Mr Ken Jarrott as its Vice-chairperson for the Southern Hemisphere, for the same period.

13.2 The meeting noted that Dr Premkumar had expressed his intention to resign from the position of vice-Chair for Asia, and that the position was likely to be vacant. Nominations for the position are being invited.

13.3 The Panel recalled its invitation its Members at the previous DBCP Session to identify a new Vice-chairperson to replace Ms Horton who resigned from that position last year. The Panel unanimously elected Mr Al Wallace to serve as Vice-chairperson for North America.

14. DATE AND PLACE OF THE NEXT SESSION

14.1 The Panel welcomed the potential offer from the South African Weather Service for hosting its 24th session in the Republic of South Africa, and subject as always to a similar

agreement by JTA-XXVIII. Tentative dates for the session were agreed to be in October or November 2008, ensuring minimum duplication with schedules for events of other JCOMM and related programmes. Waiting for the final decision by South Africa, the Panel agreed to hold the Session in Paris or Geneva hosted by IOC or WMO respectively as an alternate choice.

15. CLOSURE OF THE SESSION

15.1 In closing the session, the Chairperson Mr David Meldrum once again paid a special tribute to the National Oceanographic Research Institute (NORI) of the Ministry of Maritime Affairs and Fisheries, and especially Mr. Jung-Hyun Kim, Mr. Soo-Ho Lee, and Mr. Jang-Hyun Ahn, for the excellent facilities, support and hospitality that they had provided for the meeting, which had contributed substantially to its success. He also thanked the participants, the Technical Coordinator, and the Secretariat for their active and positive contributions to the meeting and to the work of the panel in general.

15.2 Finally, the Chairperson applauded all participants for engaging openly in the re-evaluation of the Panel's mission, and for their readiness to embrace new challenges. This could only lead to a new era of success for the Panel and the observing systems that it supported.

15.3 The twenty-third session of the Data Buoy Cooperation Panel closed at 15h45 hours on Friday, 19 October 2007.

ANNEX I

AGENDA

A. ORGANIZATIONAL COMPONENT

1. ORGANIZATION OF THE SESSION

1.1 OPENING OF THE SCIENTIFIC AND TECHNICAL WORKSHOP
1.2 OPENING OF THE SESSION
1.3 ADOPTION OF THE AGENDA
1.4 WORKING ARRANGEMENTS

B. IMPLEMENTATION COMPONENT

2. IMPLEMENTATION REPORTS

2.1 TECHNICAL COORDINATOR
2.2 ACTION GROUPS AND RELATED PROGRAMMES
  2.2.1 Action Groups
  2.2.2 Progress report of the Tsunameter Group
  2.2.3 New Action Groups
2.3 DBCP EVALUATION GROUP
2.4 NATIONAL REPORTS

3. SUSTAINED SCIENTIFIC PROGRAMMES

3.1 GLOBAL DRIFTER PROGRAMME
3.2 OCEANSITES
3.3 ARGO

4. REVIEW OF THE DBCP IMPLEMENTATION STRATEGY

4.1 FUTURE INITIATIVES AND ACTIVITIES OF THE DBCP
4.2 IMPLEMENTATION STRATEGY
4.3 CAPACITY BUILDING

5. JCOMM ACTIVITIES RELEVANT TO THE DBCP

5.1 REPORT ON JCOMM ACTIVITIES
5.2 FUTURE OBSERVING PROGRAMME SUPPORT

6. SCIENTIFIC AND TECHNICAL WORKSHOP

7. DATA AND INFORMATION EXCHANGE

7.1 REPORTS BY BUOY DATA MANAGEMENT CENTRES
7.2 INFORMATION EXCHANGE
7.3 BEST PRACTICES AND STANDARDS

8. TECHNICAL ISSUES

8.1 QUALITY CONTROL

8.2 CODES

8.3 ARGOS SYSTEM

8.3.1 Argos constellation
8.3.2 Global and Regional Network of Receiving Stations
8.3.3 Argos GTS sub-system
8.3.4 Argos developments and future Argos GTS data processing system
8.3.5 Future Argos requirements (Argos-4)

8.4 NEW COMMUNICATION TECHNIQUES AND FACILITIES

8.4.1 DBCP Drifter Iridium Pilot Project
8.4.2 Review of satellite data telecommunication systems

8.5 CURRENT OBSERVING PROGRAMME SUPPORT

8.5.1 JCOMMOPS
8.5.2 Argo Information Centre

8.6 OTHER TECHNICAL ISSUES

8.6.1 Deployment opportunities and strategies
8.6.2 GTS delays
8.6.3 Vandalism
8.6.4 Metadata
8.6.5 Technological developments in support of user requirements
8.6.6 Others

C. ADMINISTRATIVE COMPONENT

9. REPORTS

9.1 CHAIRPERSON AND VICE-CHAIRPERSONS
9.2 EXECUTIVE BOARD
9.3 SECRETARIATS

10. FINANCIAL AND ADMINISTRATIVE MATTERS

10.1 FINANCIAL SITUATION
10.2 EMPLOYMENT OF TECHNICAL COORDINATOR
10.3 FUTURE COMMITMENTS
10.4 REVIEW OF THE DUTIES OF THE TECHNICAL COORDINATOR

D. CONCLUDING COMPONENT

11. RECOMMENDATIONS TO THE ARGOS JTA

12. WORKPLAN

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

14. DATE AND PLACE OF THE NEXT SESSION

15. CLOSURE OF THE SESSION

ANNEX II

PARTICIPANTS LIST

I. PARTICIPANTS FROM MEMBER STATES

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ANNEX III

OPERATING PRINCIPLES OF THE DBCP

(i) In odd years, the regular session of the DBCP will be held at either WMO or IOC. This will lessen the burden on the secretariat, and allow other WMO or IOC officers to participate in the session as appropriate;

(ii) In even years, the regular session of the DBCP will be held at an external location, should a suitable invitation come forward. This will encourage staff at all levels within the host organisation to participate actively in the work of the Panel, in particular through presentations to the Scientific and Technical Workshop and other networking opportunities.;

(iii) The agenda for the regular session will be drawn up by the Panel chair, in consultation with other Panel members and the secretariat;

(iv) 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;

(v) The intersessional decision making of the Panel will be entrusted to an Executive Board, led by the Panel chair, that will act within principles and financial limits defined by the Panel;

(vi) Task Teams will be established to work proactively on key issues identified by the Panel, and ensure that the workplan is implemented during the intersessional period. The Panel will appoint task Team chairs, and the teams will report to the Panel at its regular sessions.

(vii) The Panel discussion at the regular session will be completed within 2.5 days. As one means of achieving this, some parallel sessions may be introduced as required;

(viii) 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;
- 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 accounts;

- Table of national contributions;
- Budget for the next year;
- Participants list;
- Action list / workplan;
- Selected buoy and GTS statistics (showing trends in numbers, quality, delays, plus a few maps);
- Action Group summaries;
- 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 include:

- Technical Coordinator'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;
- Technical Document list, including available electronic versions.

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

ANNEX IV

TERMS OF REFERENCE AND MEMBERSHIP OF THE EXECUTIVE BOARD AND DRAFT TERMS OF REFERENCE AND MEMBERSHIP FOR THE TASK TEAMS

Terms of Reference of the DBCP Executive Board

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 Coordinator 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 Coordinator (*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.

Draft Terms of Reference for the DBCP Task Team on Data Management

The DBCP Task Team on Data Management shall:

1. Receive and review reports from the Data Management Centres specialized with buoy data, i.e. (i) the SOC/DB, and (ii) the RNODC/DB;

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 real time distribution of the data issues, including GTS issues;

4. Address delayed mode distribution of the data issues;

5. Address archiving of the data issues;

6. Review data timeliness issues;

7. Review instrumental metadata issues;

8. Review all relevant JCOMM Publications, to make sure they are kept up to date and comply with Quality Management terminology;

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

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

Membership:

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

- Mayra Pazos (TT Chairperson and GDP representative)
- RNODC representative
- SOC representative
- NDBC data manager
- CLS data manager
- DBCP Technical Coordinator (*ex officio*)
- A representative from buoy manufacturers may be invited as an associate member

Draft Terms of Reference for the DBCP Task Team on Quality Management

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

The DBCP Task Team on Quality Management shall:

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).

6. Define specific criteria for evaluation purposes (e.g. ocean areas, definition of acceptable quality data, e.g. early failures, life-times, delays, accuracies, resolutions, etc.)

7. Review all relevant JCOMM Publications to make sure they are kept up to date and comply with Quality Management terminology;

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

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:

- Bill Burnett, NDBC (TT Chairperson)
- Pierre Blouch, Météo France
- The DBCP Technical Coordinator
- Julie Fletcher, MSNZ
- Ken Jarrott, BOM
- David Meldrum, SAMS
- Peter Niiler, SIO
- Sarah North, UKMO
- Mayra Pazos, NOAA/AOML
- Satheesh Chandra Shenoi, NIO
- Paul Whiteley, UK MetOffice

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Draft Terms of Reference for the DBCP Task Team on Technology Developments

The DBCP Task Team on Technology Developments shall:

1. Propose technological developments in terms of sensor technology, on-board hardware and data processing, that might be engaged in order to meet the user requirements better and remain cost-effective;

2. Review operational satellite data telecommunication systems, investigate how well they meet the use requirements as well as their cost-effectiveness;

3. Review operational platform location systems, their accuracy, and whether they meet the user requirements (e.g. Argos, GPS);

4. Investigate upcoming satellite data telecommunication systems that might potentially be used for the collection of buoy data, and keep a review document up to date;

5. Propose recommendations, if needed, to the Argos Joint Tariff Agreement. Such recommendations shall be passed via the DBCP Executive Board or the DBCP as appropriate;

6. Evaluate, test, and promote buoy designs that prevent vandalism;

7. Review all relevant JCOMM Publications to make sure they are kept up to date and comply with Quality Management terminology;

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

9. Provide the DBCP Executive Board or the DBCP with technical advice needed for addressing the issues above;

10. 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:

- Jean Rolland (TT Chairperson)
- Pierre Blouch
- Julie Fletcher
- Shaun Dolk
- K. Premkumar
- Paul Freitag
- Yvonne Cook
- Frank Grooters
- Bill Burnett
- Bill Woodward
- Philippe Gros
- Steve Piotrowicz
- Sergey Motyzhev
- Andy Sybrandy
- David Meldrum
- DBCP Technical Coordinator

Draft Terms of Reference for the DBCP Task Team on Moored Buoys

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;

7. Review all relevant JCOMM Publications to make sure they are kept up to date 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;

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:

- Jon Turton, UK MetOffice (TT Chairperson)
- Paul Freitag, NOAA/PMEL
- Bill Burnett, NOAA/NDBC
- Richard L. Crout, NOAA/NDBC
- Chris Meinig, NOAA/PMEL
- K. Premkumar, NIOT
- Ariel Troisi, SHN
- Uwe Send, SIO

Draft Terms of Reference for the DBCP Task Team on Capacity Building

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;

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:

- Sid Thurston, NOAA/OCO (TT Chairperson)
- DBCP Chairperson
- DBCP Executive Board members
- DBCP vice chairs (or their respective deputies)
- DBCP Technical Coordinator
- Representative of the IOC secretariat
- Representative of the WMO secretariat

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ANNEX V

STRAWMAN ORGANISATION OF THE DBCP (and ARGOS JTA) MEETINGS

1. Programme

It is expected that Action Groups and Task Teams will convene at their discretion during the weekend prior to the session as previously. As usual, the Joint Secretariat will be available to provide technical/administrative support at the regular DBCP sessions as required.

Day	Morning (180 min)	Afternoon (180 min)
Monday	Workshop	Workshop
Tuesday	DBCP session	DBCP session
Wednesday	DBCP session	DBCP session
Thursday	DBCP/EB and National Reports	Review DBCP report
Friday	JTA	JTA
Saturday	Review JTA report	

1.1 DBCP Workshop (1 day)

No basic changes are proposed in the structure of the DBPC scientific and technical workshop.

1.2 DBCP Main Session (all participants) (2 days):

Agenda item	Time (min)
Session opening, agenda, working arrangements	30
TC Report	20
Action Group reports	90
New Action Groups	10
Parallel Sessions 1 & 2 (National Reports & Executive Board) – see para 1.3	180
Implementation (strategy, deployment opportunities)	40
JCOMM	30
Report by TT on Data management, recommendations and discussion	30
Report by TT on Quality Management, recommendations and discussion	30
Report by TT on Satellite data telecom., recommendations and discussion	30
Report by TT on Moored Buoys	30
Report by TT on Capacity Building	30
Information Exchange	15
Technological developments, new activities and pilot projects	30
Issues (e.g. vandalism, etc.)	20
Report by the DBCP Executive Board, budget and future commitments	60
Recommendations to the JTA	10
Election of the Chairperson, vice-Chairpersons	10
Date and place of the next Session	10
Closure of the Session	15
TOTAL	**720**

Note: After the meeting, and based on the meeting's approved provisional final report, the Secretariat will prepare the Work plan for the next intersessional period, and will distribute it by email to Panel Members for review.

1.3 DBCP Parallel Working Sessions (3 hours):

1.3.1 Parallel sessions may be organized on the Thursday morning to cover the National Reports and to allow the Executive Board to meet. This time may also be used by the secretariat to collate the draft final report.

1.3.2 National Reports (all participants except the DBCP Executive Board). Each presenter will be given 10 minutes for presenting his/her national activities. The number of slides will be limited and a template will be provided by the Secretariat.

1.3.3 Executive Board. Interested Panel Members may attend the Executive Board session as observers, subject to the availability of space. The following agenda items will be dealt with during the DBCP/EB, among those that are discussed currently in plenary.

- Chairperson and vice-Chairpersons report
- Secretariat report
- Financial situation
- Future commitments
- Review of the duties of the TC

1.4 Argos JTA

1.4.1 The Argos JTA will make their own arrangements as to the structure of their meeting.

ANNEX VI

INTERIM STATEMENTS OF ACCOUNT

TABLE 1: IOC STATEMENT OF ACCOUNT FOR THE PERIOD OF 1 JANUARY 2007 ~ 31 JULY 2007

193-GLO-2001

INTERGOVERNMENTAL OCEANOGRAPHIC COMMISSION

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

(Statement of Account from 1 January 2007 to 31 July 2007)

(Expressed in US Dollars)

Balance Brought Forward as at 1 January 2007				**124,292.69**	
Funds Received from:	WMO		Jun-07	60,000.00	
	NOAA		Jun-07	105,000.00	289,292.69
Deduct:					
Disbursements					
Salary of Ms Hester Viola:		1/2007 - 7/2007			49,709.74
Missions :	Ms Hester Viola				
	Geneva - July 2006			2,330.27	
	USA - October/November 2006			7,535.11	
	Brest - December 2006			1,805.86	
	Geneva / Darmstadt - April 2007			6,858.79	18,530.03
Sub-contract :					-
Cash balance as at 31 July 2007					**221,052.92**

Note: IOC Statement for the period 1 January 2006 to 31 December 2006 can be found in the DBCP annual report for 2006.

TABLE 2: WMO INTERIM STATEMENT OF ACCOUNT FOR THE PERIOD 1 JANUARY 2007 TO 31 AUGUST 2007

DATA BUOY CO-OPERATION PANEL

Interim Statement of income and expenditure
For the period 1 January o 31 August 2007
Amounts in United States dollars

1. Balance brought forward , 1 Jan 2007					113,350
2. Income:					
2.1 Contributions received					92,033
3. Total available funds during reporting period					205,383
4. Expenditure		Actual	Obligations	Total	
4.1 Direct project costs					
4.1.2 Travel of staff to other WMO mtgs		2,614	-	2,614	
4.1.3 Travel - Other Representatives ad hoc travel		13,071	-	13,071	
4.1.4 Travel - Other Representatives -other WMO mtgs		8,267	1,836	10,103	
4.1.7 Payment to IOC for 2007: DBCP Tech. Coordinator		60,000	-	60,000	
4.1.8 Total direct costs		83,952	1,836	85,788	
4.2 Indirect project costs					
4.2.1 Support costs at 3%		2,519	55	2,574	
4.2.2 Bank charges		24	-	24	
4.2.3 Exchange differences		(2,068)	-	(2,068)	
4.2.4 Rounding differences		(38)	-	(38)	
4.2.5 Total indirect costs		437	55	492	
4.3 Total project expenditure					86,280
5. Balance of fund at 31 August 2007					**119,103**

Contributions received	**Amount**
Australia	16,200
CLS Argos	15,000
France	53,333
India	3,000
South Africa	4,500
Total	**92,033**

Certified correct:

Luckson Ngwira
Chief, Finance Division
17-Sep-07

Note: WMO Statement for the period 1 January 2006 to 31 December 2006 can be found in the DBCP annual report for 2006.

ANNEX VII

TABLE OF NATIONAL CONTRIBUTIONS

Country	DBCP	SOT	JTA	Comment
Australia	USD 16,200			
Canada	CAD 12,500	CAD 12,500		CAD 25,000 for JCOMMOPS
CLS			USD 17,500	USD 15,000 for JTA Chairperson, USD 2,500 for activities of DBCP Members on behalf of the JTA
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 5000		
India	USD 3,000			
New Zealand	USD 2,400			
South Africa	USD 4,500			
USA	USD 80,000	USD 25,000		Contribution made to IOC

ANNEX VIII

BUDGET FOR THE NEXT YEAR

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

TABLE 1

DBCP TRUST FUND Summary

INTERIM BUDGET BASED ON WMO and IOC ACCOUNTING FOR 2004-2007 IN USD [as at 18 Oct. 2007]

Item	Receipts	2004-2005 Obligatior	Balance at 31 Dec.	Receipts	2006 Obligatior	Balance at 31 Dec.	Receipts	2007 Obligatior	Balance at 31 Aug.	Receipts	2008 Obligatior	Balance at 31 Dec.	Receipts	2009 Obligatior	Balance at 31 Dec.
DBCP															
Carried over	163,506			206,640			237,643			305,655			265,605		
Contributions	748,556			126,188			304,533			229,950			229,950		
Adjustment				9,015			2,106								
Expenditure															
Technical Coordination		281,734			55,152			49,710			98,000			100,000	
Consultancy		20,903			12,090			17,500			17,500			17,500	
Travel		53,668			28,151			44,319			43,000			43,000	
Bank Charges/Support Cost		3,659			1,399			2,598			12,500			12,500	
IOC		286,600						60,000							
Marine Programme		12,000													
JCOMMOPS		43,858			7,408			22,000			22,000			22,000	
Outreach and Publications											2,000			2,000	
Supp Meetings/Workshops		3,000													
New Technical Evaluation								22,500			30,000			30,000	
Capacity Building											25,000			25,000	
Contingency								50,000			50,000			50,000	
Collaborative Arrangements								20,000			20,000			20,000	
Total DBCP	**912,062**	**705,422**		**341,843**	**104,200**		**544,282**	**288,627**		**535,605**	**320,000**		**495,555**	**322,000**	
Unliquidated obligations					11,847										
Balance of DBCP Trust Fund			**206,640**			**225,796**			**255,655**			**215,605**			**173,555**
Contingency									***50,000***			***50,000***			***50,000***
Carried over			**206,640**			**237,643**			**305,655**			**265,605**			**223,555**
										Rough estimation			Rough estimation		

TABLE 2

Interim Statement for DBCP-23 of the DBCP Trust Fund: Income and Expenditure in USD
(based on WMO Finance Information as at 31 Aug. 2007 and IOC Finance Information as at 31 July 2007) **[18 October 2007]**

DBCP	Final account Jan-Dec 2006 WMO	IOC	Interim budget Jan-Dec 2007 WMO	IOC	Estimated budget Jan-Dec 2008 WMO	IOC	Estimated budget Jan-Dec 2009 WMO	IOC
Receipts								
Brought Forward	22,161	184,479	113,350	124,293	99,602	206,053	87,552	178,053
Contributions (listed below)	126,188	0	139,533	165,000	124,950	105,000	124,950	105,000
Adjustment	9,015		2,106					
Total Receipts	**157,364**	**184,479**	**254,989**	**289,293**	**224,552**	**311,053**	**212,502**	**283,053**
Expenditure/Oblig'ns								
Consultancy (JTA Chair)	12,090		17,500		17,500		17,500	
Tech Coordination		55,152		49,710		98,000		100,000
JCOMMOPS logistic supp		890		15,000		15,000		15,000
IOC			60,000		0		0	
Marine Programme								
Travel/Missions								
Tech Coordinator		4,144		18,530	10,000	10,000	10,000	10,000
DBCP Chairman	21,988		15,269		21,000		21,000	
DBCP Representatives	2,019		10,520		2,000		2,000	
Bank Charges/SuppCost	1,399		2,598		2,500	10,000	2,500	10,000
Projects & Activities								
Outreach and Publications					2,000		2,000	
JCOMMOPS Data Devt	6,518		7,000		7,000		7,000	
JCOMMOPS IS migration								
Supp. DBCP Mtgs/WSs								
New Technical Evaluation			22,500		30,000		30,000	
Capacity Building					25,000		25,000	
Contingency			30,000	20,000	30,000	20,000	30,000	20,000
Collaborative Arrangement			20,000		20,000		20,000	
Total Expenditure	**44,014**	**60,186**	**185,387**	**103,240**	**167,000**	**153,000**	**167,000**	**155,000**
Unliquidated Obligations		*11,847*						
Balance of Fund	**113,350**	**112,446**	**69,602**	**186,053**	**57,552**	**158,053**	**45,502**	**128,053**
Contingency carry over			***30,000***	***20,000***	***30,000***	***20,000***	***30,000***	***20,000***
Carried over	**113,350**	**124,293**	**99,602**	**206,053**	**87,552**	**178,053**	**75,502**	**148,053**
Contributions								
Argos Inc								
Australia	16,200		16,200		16,200		16,200	
Canada (1) (2)	20,000		20,000		22,750		22,750	
CLS			17,500		17,500		17,500	
E-SURFMAR * (3)	62,393		53,333		53,600		53,600	
France(incl E-SURFMAR)*								
Germany *	11,000				5,000		5,000	
Greece								
Iceland								
India	3,000		3,000		3,000		3,000	
Ireland								
Japan								
Netherlands								
New Zealand *	4,800				2,400		2,400	
Norway								
South Africa	4,500		4,500		4,500		4,500	
United Kingdom	4,295							
United States of America		0	25,000	105,000		105,000		105,000
WMO		0		60,000		0		0
Total	**126,188**	**0**	**139,533**	**165,000**	**124,950**	**105,000**	**124,950**	**105,000**
	*=including 2007 contribution				E		E	

(1) = Contribution made in CAD and converted to USD per exchange rate average in 12 months period preceeding 11/2007 (i.e. $0.91)
(2) = The $20000 indicated for the Canadian Contribution in the Interim Budget for Jan-Dec 2007 was about to be made at the time of DBCP-23
(3) = Contribution made in EUR and converted to USD per exchange rate average in 12 months period preceeding 11/2007 (i.e. $1.34)
E=Estimate

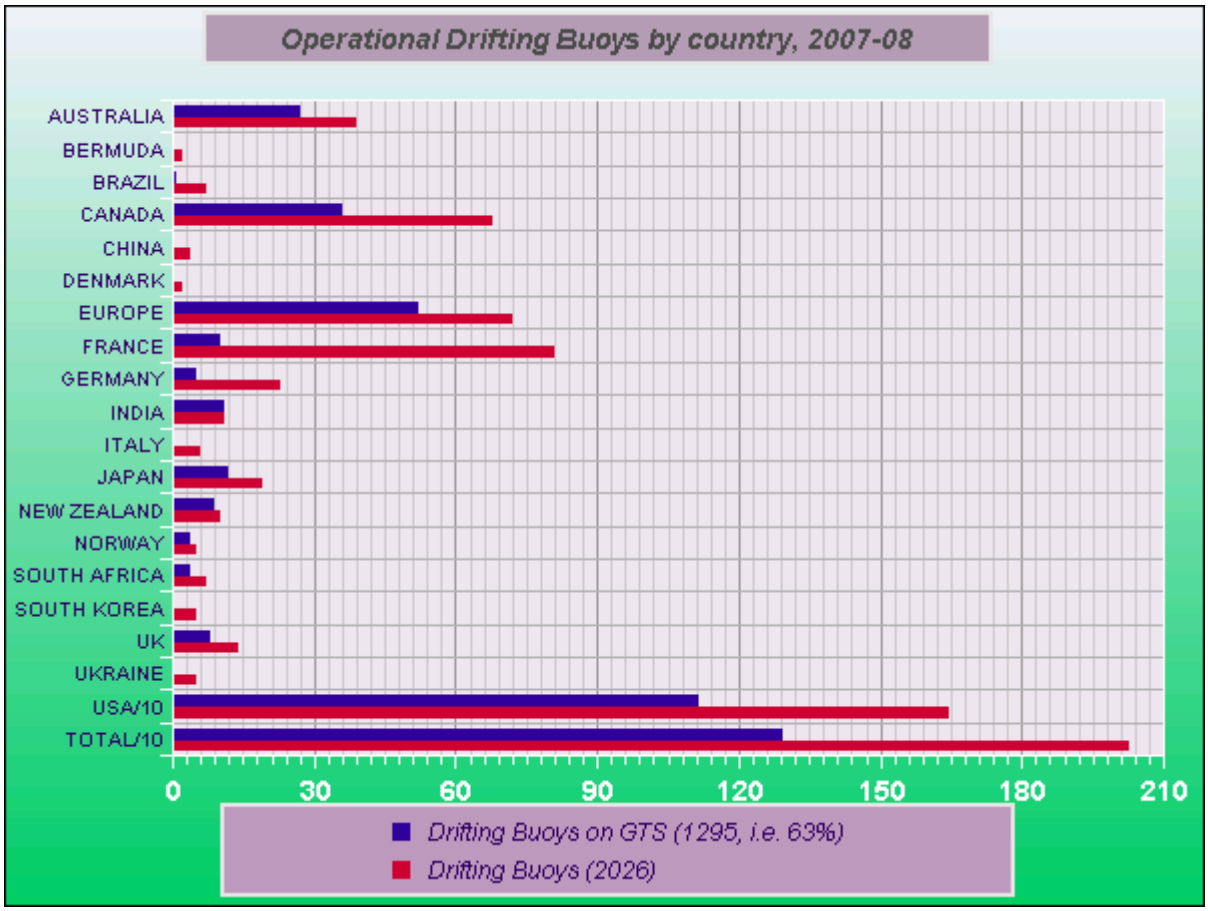
Notes:

1. Some member states have paid 2007 contribution in 2006
2. IOC unliquidated obligation for travel TC 2006 is part of expenditure travel TC in 2007
3. Positive adjustment (income) in WMO accounts for exchange/rounding differences
4. Capacity building: travel Ostend Workshop for lecturers under Travel/Missions: DBCP Representatives

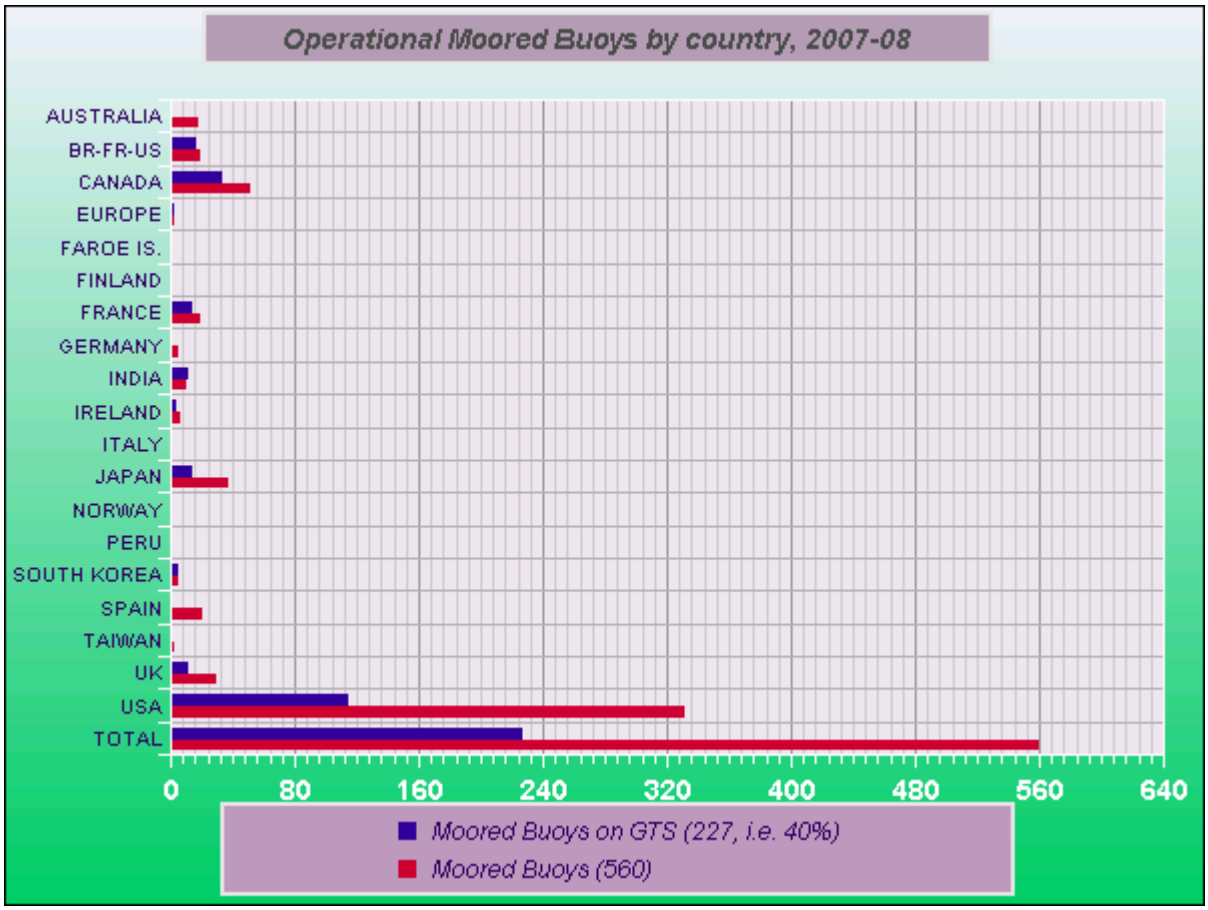
ANNEX IX

STATUS REPORTS AND MAPS

Present status of buoy platforms



Graph 1. Drifting Buoys reporting via Argos and those on the GTS by country for August 2007:



Graph 2. Moored Buoys reporting via Argos and those on the GTS by Country for August 2007.

Amongst the drifting and moored buoys reporting on the GTS in BUOY (and SHIP) message formats; the following variables were measured in August 2007. There has been a significant growth in the number of buoys reporting Air Pressure in the last year, owing mainly to the US programme (110 added - some of which are barometer upgrades by other programmes, which show as US buoys), but also to Canada (29 added) and in part to Australia (7 added) and South Africa (5 added). For Moorings, however, a big drop was experienced between September and October 2006 in the number of US buoys sending data onto the GTS.

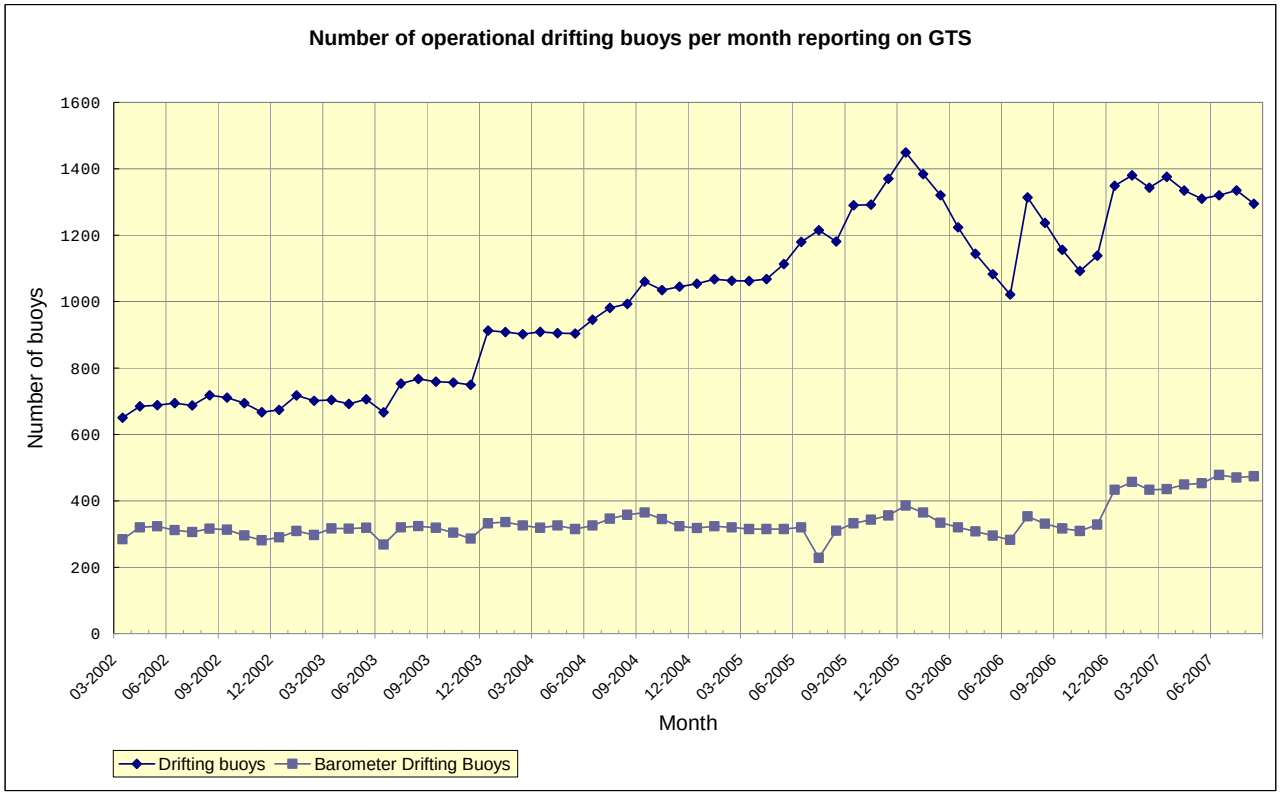
Variable	Any	Air P	Tend.	SST	Air T	Hum.	Wind	Waves	Sub/T
Drifting Buoys	1295	474	424	1139	46	1	11	9	12
Moorings	227	73	45	127	120	73	111	64	65
Remarks									TAO, PIRATA, TRITON.

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

Global Implementation

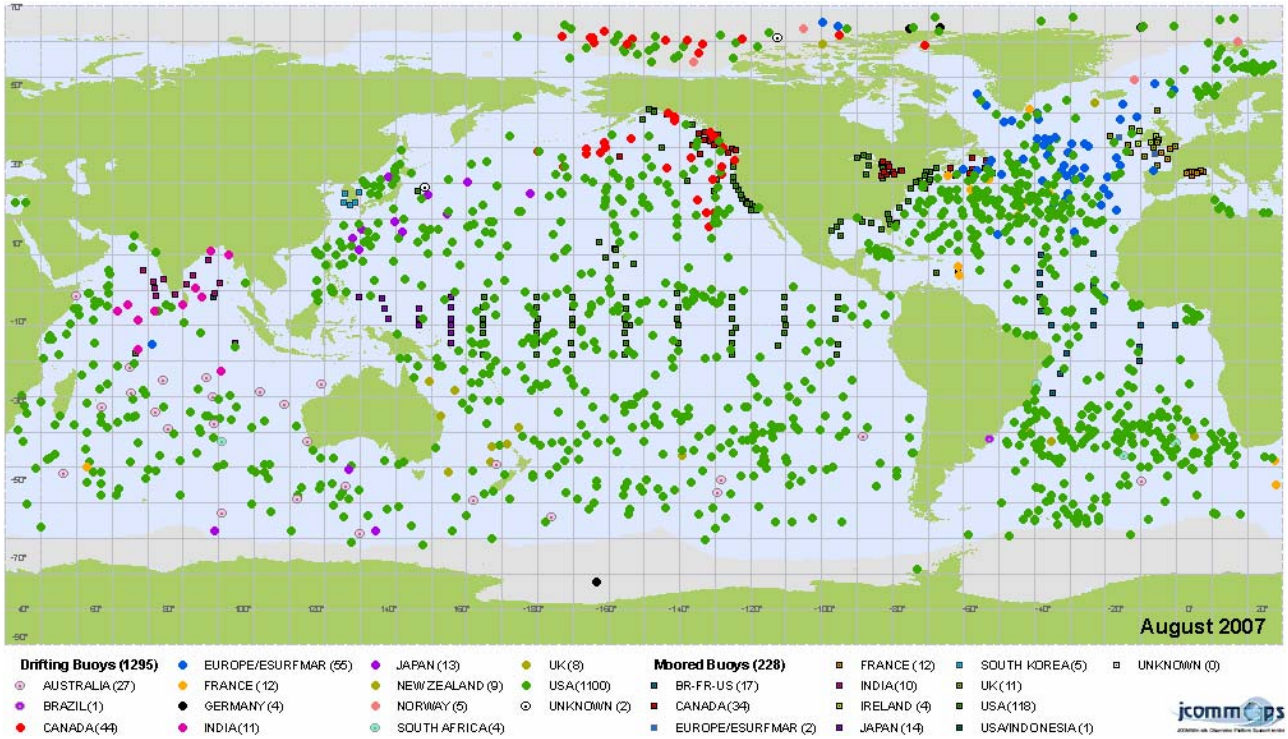
Status of operational buoys on the GTS

The graph below shows the number of operational drifting buoys over the last 5 years.

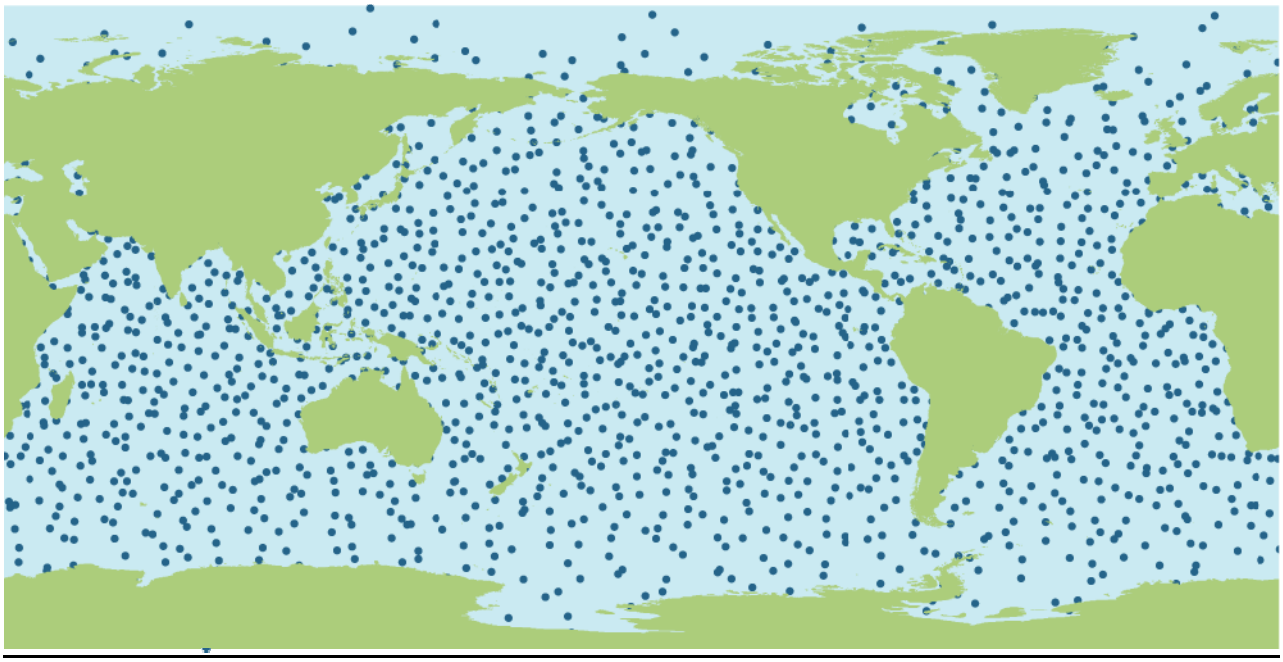


Graph 3: Monthly evolution of the number of operational drifting buoys reporting on GTS from March 2002 to August 2007 and those reporting air pressures.
Data derived by statistics computed from GTS *in situ* marine data provided by Météo France.
N.B. data for this chart was derived differently to the charts prior to 2006

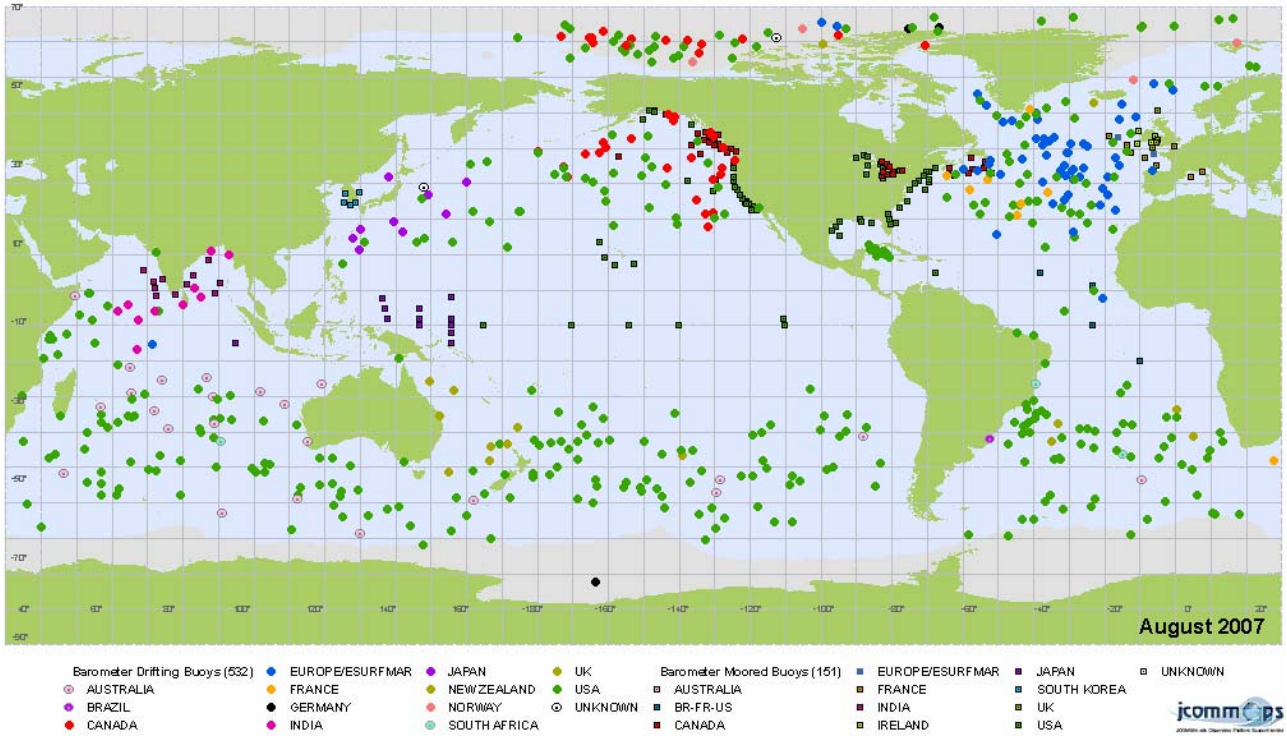
This graph shows the significant growth in the number operationally reporting air pressure measurements in the last year. The number of operational buoys has fluctuated a lot in the last 2 years, but the increase in the number of barometers on those buoys is a very positive sign for the panel. It shows that the barometer upgrade scheme offered by the USA is working and that the recommendation by the JCOMM Observations Programme Area to equip all buoys with barometers is being well supported. The graph does seem to show that the number of buoys has become more stable in the last few months though, presumably as buoy operators become more used to how many buoys need to be deployed to stay in 'maintenance mode' for the network. It appears that it will be a challenge for the panel to maintain its network above 1250 buoys, so efforts must be made in optimizing deployment opportunities (within DBCP and with other programmes), buoy lifetimes and also assessing where buoys need to be placed, to ensure an even coverage across the globe. International cooperation and good planning are the only way to ensure the maintenance of the network.



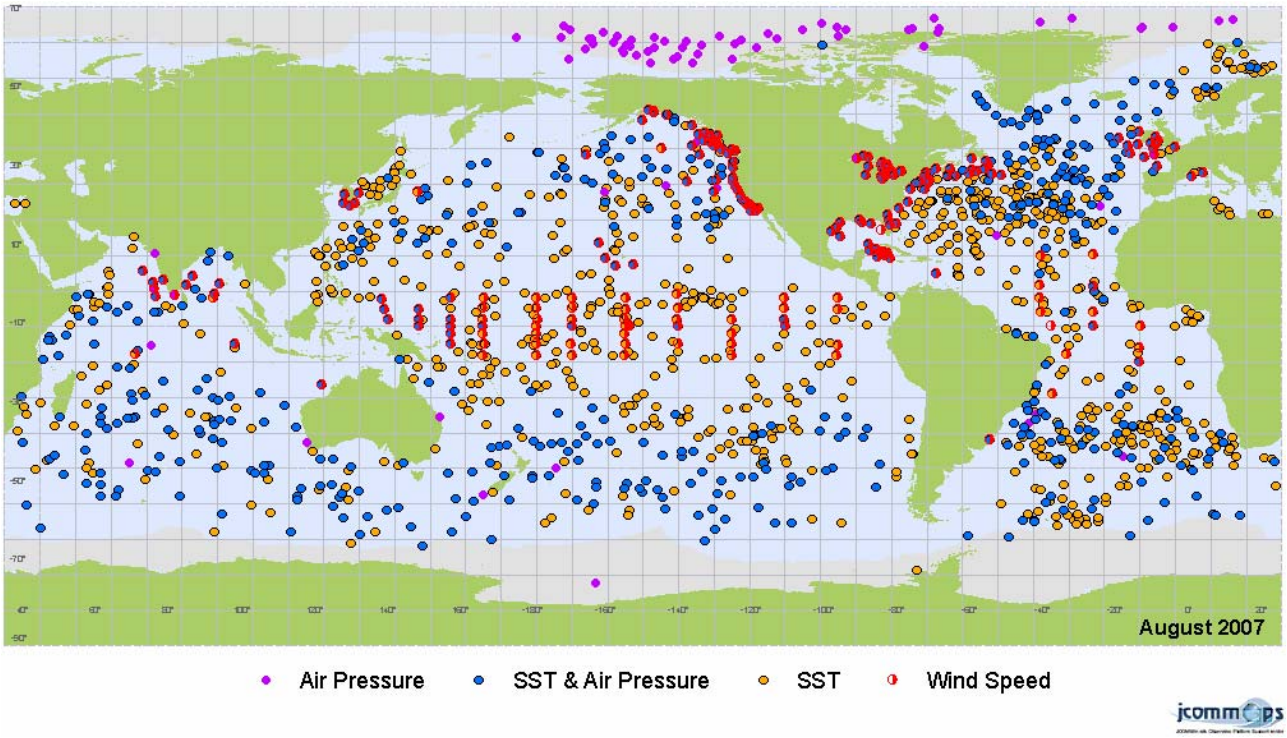
Map 1. DBCP monthly status by country for August 2007. (Data Buoys reporting on the GTS via Météo France)



Map 2. A theoretical network of drifting buoys randomly distributed at a resolution of 500km x 500km



Map 3. DBCP Barometer Buoy monthly status by country for August 2007. (Data Buoys reporting Pressure measurements on the GTS via Météo France)



Map 4. Drifting and moored buoys reporting SST, Air Pressure and Wind in August 2007. (Data Buoys reporting on the GTS via Météo France)

Evolution of drifting buoys reporting onto the GTS:

Year	Operational drifting buoys	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 2006	2026	1295	64%

Table 2. Evolution of GTS Buoy data percentage

Météo-France provided the Data Availability Index Maps on a monthly basis. The maps are 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. The maps show clearly the impact of the TAO array ATLAS moored buoys (wind), of DBCP regional action groups such as the ISABP (air pressure), or of specific national programmes such as MSNZ (air pressure).

Platforms in the Southern Ocean – Air Pressure

The Southern Ocean Buoy Programme, as part of the DBCP Implementation Strategy, aims to have 80 operational drifting buoys with barometers distributed across the Seas south of 40°S. Currently the number of operational buoys is around 100 out of 168 (with an all-time high of 118 buoys in March 2007) which means this target is achieved and successfully continuing in 'maintenance mode'.
The broader plan as part of the JCOMM Observations Coordination Group's phased-in implementation plan is to equip, eventually at least 700 drifting buoys with barometers outside of the tropics – meaning about 300 for the Southern Ocean. The panel is invited to discuss how this can be best achieved.
The main participants were:

- NOAA/AOML, USA
- Alfred Wegener Institute, Germany,
- Bureau of Meteorology, Australia
- Dunstaffnage Marine Laboratory, UK
- Met Office, UK
- Météo France
- New Zealand Meteorological Service
- South African Weather Service

It is note that this year, being part of the International Polar Year, a lot more buoys were deployed around Antarctica (the Global Drifter Centre deployed 124 in the Southern Atlantic), however many of these were not equipped with barometers and have subsequently moved out of the Southern Ocean region into the Atlantic.

Country	Buoys purchased	Additional upgrades	Total

Australia	5	5	10
France	0	14	14
Germany	4	-	4
New Zealand	0	10	10
South Africa	0	40	40
UK	6	-	6
USA*	95	-	95
Total	**110**	**69**	**179**

Table 3. SOBP Proposed Commitments for the period September 2007 to August 2008
The Global Drifter Centre commented on the fact that deployment opportunities are very unpredictable in this region, so whilst commitments are made, the actual implementation is not assured.

The Global Drifter Centre, supported by NOAA, continues to offer the Barometer upgrade opportunity for standard SVP drifters for ~$1000 per unit (see: http://www.jcommops.org/dbcp/svpb_upgrade.html)

ANNEX X

ACTION GROUP SUMMARIES

1) DBCP-PICES North Pacific Data Buoy Advisory Panel

Summary of activities for September 2006 – October 2007

This is the sixth annual report of this Panel, which is jointly constituted under DBCP and PICES-POC.

During the intersessional period WMO and IOC jointly wrote to the Permanent Representatives of the Russia Federation, South Korea, China and Japan asking them to name representatives to the Panel. Unfortunately, no responses had been received prior to the annual meeting. The Panel thanks Craig Engler for his contributions as Technical Coordinator, and welcomes Shaun Dolk as the new Coordinator. During the year, the United States and Canada continued to be members.

During the course of the year, the Global Drifter Programme and Canada deployed 34 SVP-B buoys into the North Pacific. The Integrated Science Data Management group (formerly MEDS) reported that on average there were 140 buoys reporting in the North Pacific and produced an average of 73,000 messages. Gaps in coverage by drifting buoys continue to exist, particularly in the Bering Sea and Northern Gulf of Alaska. NOAA added 3 moored buoys in the Gulf of Alaska, and both the United States and Canada maintained existing moored networks.

The Naval Oceanographic Office will no longer be able to support air deployments into the North Pacific. The NPDBAP thanks Elizabeth Horton for her significant contributions to ocean monitoring in the north Pacific.

Meetings

The Panel met in La Jolla California in October of 2006 and again in advance of DBCP XXIII in Jeju, Korea on Sunday, October 14, 2007. The intent to reinvigorate the Panel was affirmed. New deployment opportunities were identified through NOAA during servicing of the moored buoy and DART networks, and with the Canadian Coast Guard. Work for the upcoming year will include recruitment of new members, and it is noted that Korea has expressed interest, reviewing the terms of reference, updating the web site, promoting development opportunities, and seeking an opportunity to more closely link with PICES. The next meeting of NPDBAP will be held on the Sunday prior to DBCP XXIV in South Africa.

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2) Global Drifter Programme (GDP)

The **Global Drifter Program (GDP)**, managed by Dr. Rick Lumpkin, is composed of the Drifter Operation Centre (DOC) and the Data Assembly Centre (DAC). The GDP is one of the primary branches of the Physical Oceanography Division at NOAA's Atlantic Oceanographic and Meteorological Laboratory (AOML).

The objectives of the GDP are to maintain a global 5x5 degree array of 1250 ARGOS-tracked surface drifting buoys and provide a data processing system for scientific use. A sustained array of 1250 surface drifting buoys helps create an accurate and globally dense set of in-situ observations of mixed layer currents, sea surface temperature, atmospheric pressure, winds and salinity. With these observations, the data processing system is used to perform research, as well as monitor and predict short-term seasonal to interannual (SI) climates.

In order to obtain these objectives, the GDP determines areas of interest, locates Vessels of Opportunity (VOS) (who help deploy buoys while in transit), coordinate deployment locations, process data, archive data, develop and distribute data-based products and post all quality controlled results on the GDP website (http://www.aoml.noaa.gov/phod/dac/gdp.html).

Within these daily activities, the GDP works closely with various companies and institutions. One of the biggest collaborators with the GDP is NOAA's Joint Institute of Marine Observations (JIMO). Thanks to JIMO, managed by Dr. Peter Niiler, drifter inventory is maintained, product advancement continues and cooperation increases on a global level.

Along with JIMO, the GDP works closely with the drift buoy manufacturers. These relationships are a vital part of this project, as clear communication and understanding are needed to ensure both the safety of those involved, as well as the ability to obtain accurate results.

In early 2006, the DAC undertook a complete re-evaluation of drogue presence for all drifters, January 1998 to March 2006. This re-evaluation was necessary because in some cases, drogue status was not being correctly interpreted due to changes in sensors: divergence between different manufacturers' procedures, differences in submergence sensitivity, and possible misinterpretation of tether strain records. Based on this experience, several recommendations and suggestions were made at the 2006 DBCP meeting in La Jolla. Overly sensitive submergence sensors were to be modified as quickly as possible to reduce signal noise; in the longer term, the GDP recommended that all manufacturers change from submergence sensor to tether strain (or add tether strain) for drogue detection, currently used by one manufacturer. At present, we have not seen improvements in the sensitivity of submergence sensors where it is necessary, and additional manufacturers have not implemented tether strain.

In addition to the drogue detection modifications, there is also a need to modify the ability to activate the buoy without the removal of the magnet prior to deployment. Currently, three of the four manufacturers are using a system in which the magnet is connected with water-soluble tape and as such, the magnet falls off after it has been deployed. This solution has proven to be a good remedy as the buoys remain "off" (not transmitting) until they have been deployed. At present, one manufacturer is still using the "pull pin" magnet to activate its buoys. This is concerning because there have been instances when buoys have been deployed without this pin being removed. In these cases, the buoys never transmit a location and are classified "Failed on Deployment".

Finally, the GDP would like to reiterate the importance of the packaging of these drift buoys. Safety is a major concern for all who are involved in this project and every precautionary measure should be taken to ensure this point. One of the easiest ways to promote safety is to educate the individuals who are deploying and handling these instruments. Though a drift buoy is harmless,

when it ends up in the hands of someone who has never seen one, we want them to know how to handle it. The way to educate people how to deploy (and handle) these instruments is to have detailed instructions that explain proper usage. Ideally, the GDP would like to see all buoys wrapped in clear plastic contain detailed (coloured) instructions on the outside of the wrapping and (coloured) labels on water soluble tape that indicates the proper deployment techniques. It is the belief of the GDP that taking these measures will maximize safety.

In the upcoming year, the GDP is looking to resolve these problems and make proper adjustments to continue the advancement of these instruments. The communication and cooperation between the GDP and drift buoy manufacturers in the past show that these adjustments can be made easily.

In FY2007, (1 September 2006 to 31 August 2007) there were a total of 1003 buoys deployed, surpassing the planned deployment of 960 buoys. When these deployment totals are compared to that of the deployments from last FY, you see there were 119 more buoys deployed, bringing the total number of buoys on GTS to 1215. Last year at this time, 884 buoys had been deployed with 1059 transmitting on GTS.

Of the1003 buoys deployed in FY2007, a total of 142 of these were classified as research buoys (Consortium Research). The break down of these deployments is as such:

North Atlantic	219
Tropical Atlantic	169
South Atlantic	152
North Pacific	63
Equatorial Pacific	206
South Pacific	41
Indian Ocean	147
Mediterranean Sea	6

Being that FY2008 is International Polar Year, there is a strong desire to increase the awareness of the sea surface temperature, barometric pressure and mid level ocean current velocities in the higher latitudes (>40°). Historically, these areas have been sampled with less regularity, thus creating a need to increase the number of buoys deployed in these regions.

In FY2007, there were a total of 323 buoys deployed in areas with latitude greater than 40°.

Taking a closer look at the type of buoys deployed; of the 323 buoys, a total of 180 of these buoys were SVPB's (55.7%), 121 were SVP's (37.5%) and 22 were SVPG's (6.8%).

Based on these results, it is the goal of the GDP to increase the number of these deployments and reach a combined total of 375 buoys in regions with latitude greater than 40°. The GDP would also like to increase the amount of SVPB's deployed at these higher latitude locations to a rate of 60%. These increases in the upcoming year are to be achieved with hard work and the help of numerous institutions throughout the world.

One such institution that has recently joined the GDP is the National Oceanographic

Research Institute (NORI) of the Republic of Korea. NORI began its participation early in the calendar year of 2007 making strides to join the likes of the many other major players in the deployment of drift buoys and processing of drifter data. Since joining the program in May of 2007 NORI has already deployed 17 buoys and has the capacity to deploy another 41 before the end of the FY. The GDP would not only like to thank NORI for their participation in this quest, but also for hosting the 23rd annual meeting of the Data Buoy Cooperation Panel.

3) Surface Marine programme of the Network of European Meteorological Services, EUMETNET (E-SURFMAR)

The EUMETNET Composite Observing System (EUCOS) surface marine (ESURFMAR) programme is an optional programme involving 17 out of the 22 EUMETNET members, who fund the activity on a GNI basis. Its main objectives are to coordinate, optimise and progressively integrate the European meteorological services activities for surface observations over the sea – including drifting and moored buoys, and voluntary observing ships. ESURFMAR is responsible for coordination of buoy activities carried out by the European meteorological services, and the programme supports a Data Buoy Manager (Jean Rolland, Meteo-France) to manage these activities. The DBM is supported and advised by the ESURFMAR Data Buoy Technical Advisory Group (DBTAG), which has superseded the European Group on Ocean Stations (EGOS) as an action group of the DBCP.

ESURFMAR aims to increase the number of drifting buoys operating in its area of interest (the North Atlantic and the Mediterranean) to as many as 150 by 2012 (subject to budget approval by its contributing members). In the reference period 1st September to 31st August 2007 95 drifting buoys were deployed, with 95 drifters operating at end August. All of these operating buoys are SVPB drifters including 40 barometer upgrades provided through the Global Drifter Programme and 3 SVPBW as a contribution of Environment Canada. Most of the buoys use the Argos system to report their data. The evaluation of the Iridium communication system began as a contribution to the DBCP drifter Pilot Project.
The mean lifetime of the SVP drifters was 350 days (including 8 drifters that failed on deployment). At the end of August, the average age of the network was 287 days. More than 2000 observations are reported daily, with around 70% being received within 100 minutes of the observation time. Routine monitoring against the French NWP model shows that only a small number of drifters (<0.5%) exhibit large ‘errors’, the rms pressure differences to the model being typically ~0.5 hPa. Meteo-France maintains a set of web based QC monitoring tools used by the programme (and other buoy operators).
In 2007, ESURFMAR provided 7 buoys, which were deployed in the Arctic as a contribution to the International Polar Year (IPY).
ESURFMAR has also taken on from EGOS the monitoring of the K-series moored buoys operated by the UK Met Office, Meteo-France and Met Eireann/Irish Marine Institute, plus SeaWatch buoys operated by the Spanish Puertos del Estado. In September 2006, a new Irish buoy (M6) was deployed to the west of Ireland. Four of these buoys K5, M6 (previously M1), Lion and Cabo Silleiro are designated as ESURFMAR buoys and receive partial funding through the programme.
The availability of moored buoy data depends on the number of buoys operating, with generally more than 200 observations each day from the former EGOS K-series buoys. For the 3 ESURFMAR K-series buoys (K5, M6 and Lion), about 70 observations have been reported each day. Timeliness of data from the K-series buoys is generally very good with over 95% of data received within 50 minutes. Similarly, data quality is high with <0.5% of observations showing large errors, rms pressure differences to the French NWP models being typically ~0.5 hPa.
One of the requirements for the 4 ESURFMAR moored buoys is to provide directional spectral wave data for satellite calibration/validation. At present, only Cabo Silleiro has directional spectral wave capability but it is expected that K5 will soon have such capability.

4) Tropical Moored Buoys Implementation Panel (TIP)

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 5 subsurface Acoustic Doppler Current Profiler (ADCP) moorings (4 maintained by NDBC and 1 by JAMSTEC). In addition to these core moorings, there are several moorings deployed as enhancements, including 4 TRITON moorings in the far western tropical Pacific along 130ºE and 137ºE, and test site(s) maintained by NDBC for mooring refresh development.

At present (August 28, 2007), La Nina-like conditions prevail in the tropical Pacific, with eastern tropical Pacific sea surface temperature anomalies as large as -2.0 ºC, western warm pool anomalies greater than 0.5 ºC, and easterly wind anomalies over much of tropical Pacific. The most recent (August 9, 2007) EL *NIÑO/SOUTHERN OSCILLATION (ENSO) DIAGNOSTIC DISCUSSION* issued by NOAA's Climate Predication Center states that "ENSO-neutral conditions are expected to continue through August 2007, with a slightly greater than 50% chance of La Niña developing during the next couple of months**.**".

The Pilot Research Moored Array in the Tropical Atlantic (PIRATA) moored array increased in 2007 to a 17 surface mooring and 1 subsurface ADCP mooring configuration with the addition of 2 ATLAS moorings in the northern tropical Atlantic. One mooring, deployed on a one-year test basis in a South African led effort as part of the Benguela Current Large Marine Ecosystem Project (BCLME), was removed. This mooring in the southeastern equatorial basin (designated the SE Extension) may be redeployed in the future. Mooring preparation, data processing, and evaluation are provided by the US. Brazil, France, and the US provide ship time for mooring maintenance. Cruises are staffed by US, French and Brazilian technicians.

The primary data telemetered in real time from moorings in both the TAO/TRITON and PIRATA Arrays are daily mean surface measurements (wind speed and direction, air temperature, relative humidity and sea surface temperature) and subsurface temperatures. NextGeneration ATLAS moorings provide optional enhanced measurements, which include precipitation, short and long wave radiation, barometric pressure, salinity, and ocean currents. High temporal resolution (10-min or less record interval) measurements are available in delayed mode. A new initiative to add heat, moisture, and momentum flux measurements at 4 TAO and three PIRATA moorings was completed in 2007. Additional flux measurement sites are deployed or have been identified within the Indian Ocean moored array presently under development (see below). The addition of sea surface salinity (SSS) measurements to all TAO moorings was essentially completed with 54 of 55 moorings deployed in 2007.

TAO/TRITON data return remains good, with an overall value for real-time primary data availability of 82% for the period 1 October 2006 to 15 August 2007. (Data return statistics for the period 1 October 2006 to 30 September 2007 will be available at the time of the Panel meeting.) Damage to moorings and sensors due to fishing activity continues to be of concern. This damage accounts for a significant amount of data loss, especially in the far eastern and far western portions of the Pacific basin. PIRATA real-time data return for the same period was 90%. PIRATA data return has typically been lower than that for TAO, primarily due to a greater relative amount of vandalism (concentrated in the Gulf of Guinea) and a smaller array size. The occurrence of vandalism can be episodic (perhaps in response to the abundance of fish and number of fishermen) and the amount of vandalism appears to have been lower than normal for PIRATA in the past year. Moreover, the increase in array size over the past several years from the original 10 moorings to 17 in 2007 has effectively decreased the percentage loss represented by any one mooring.

Management of the TAO portion of TAO/TRITON officially transferred from PMEL to NDBC in October 2004. Responsibility for field operations transferred to NDBC on January 1, 2007. Instrument preparation remains at PMEL while a “refreshed” ATLAS system comprised of more “off-the-shelf” components is underway at NDBC. Two prototype refreshed systems were deployed in 2007, one in the Gulf of Mexico and one in the TAO array.

Progress continues towards the development of a 47-element Indian Ocean Observing System (IndOOS), a multi-national, multi- platform network designed to support climate forecasting and research. IndOOS is a regional cornerstone of the Global Earth Observing System of Systems (GEOSS) and has been endorsed by committees of the World Climate Research Program and the Intergovernmental Oceanographic Commission. Initial moorings in the array included one subsurface ADCP mooring (first deployed in 2000) and 2 TRITON moorings (first deployed in 2001) maintained by JAMSTEC, and 3 subsurface ADCP moorings (first site deployed in 2000) maintained by NIO. PMEL's specific contribution to IndOOS is a network of ATLAS and acoustic Doppler current profiler (ADCP) moorings at strategic locations throughout the basin. ATLAS moorings were first deployed in the Indian Ocean array in 2004. In the past year, the array of ATLAS moorings expanded from 4 to 8 sites. The total moored buoy array, including all national contributions, is now 32% complete.

Indian Ocean ATLAS moorings are maintained through collaboration between the US, which provides equipment, data processing, and dissemination and technicians for field operations, and India, Indonesia and France, which provide ship time. The Indian Ocean ATLAS moorings are instrumented similarly to those in PIRATA. In addition, all have near surface (10 m) current meters, and two sites have OceanSITES flux enhancements, which include longwave radiation, barometric pressure, and additional subsurface current meters. The People’s Republic of China First Institute of Oceanography plans to deploy a subsurface mooring south of Java in September/October 2007. Other expansion plans for the coming year include two additional ATLAS mooring to be deployed in the Bay of Bengal in October/November 2007 and two additional ATLAS moorings to be deployed in spring 2008, all from the ORV Sagar Kenya.

PMEL is planning several changes to the moored array in an attempt to decrease the amount of data lost to vandalism. To address the problem of theft of instrumentation, standard hardware on surface moorings will be replaced by hardware that requires special tools. Initial deployments of this hardware are scheduled for September/October 2007. Another change will be to remove meteorological sensors from some surface moorings and to modify the buoys to discourage vandals from boarding or attaching a line to the buoy. Surface and subsurface measurements will continue to be telemetered from these moorings from a transmitter embedded in the buoy. If this modification results in a decrease in mooring loss, surface meteorological sensors with vandal resistant packaging may be reintroduced to the sensor suite. Prototypes of these moorings are scheduled for deployment in spring 2008. A third change will be to increase the number of subsurface moorings relative to surface moorings. Prototype ADCP subsurface moorings, enhanced for upper water column measurement of temperature and salinity, are being designed for deployment in spring 2008.

More information on TAO/TRITON, PIRATA, and the Indian Ocean Array along with data display and dissemination are available on the web at www.pmel.noaa.gov/tao.

5) International Arctic Buoy Programme (IABP)

Participants of the IABP continue to work together to maintain a network of drifting buoys on the ice of the Arctic Basin to provide meteorological and oceanographic data for real-time operational requirements and research purposes including support to the World Climate Research Programme (WCRP) and the World Weather Watch (WWW) Programme.

IABP 17th ANNUAL MEETING
Members of the International Arctic Buoy Programme met 24-25 May 2007 in Washington, DC. CMDR Ray Chartier (RC), Commanding Office, U.S, National Ice Service and Pablo Clemente-Colón, Chief Science Officer, U.S. National Ice Service hosted the meeting. Christian Haas, Alfred Wegener Institute chaired the meeting. There were 20 attendees representing 11 of the 23 Participants.

In addition to Participant Reports, IABP Participants got briefings on science projects in the arctic basin:

- National Ice Center (NIC) Overview [J. Rice]
- Arctic Observing Network (AON) [F. Korsmo]
- State of the Arctic Ocean [J. Richter-Menge]
- Applied Physics Laboratory Ice Camp [J. Hutchings]
- Sea Ice Drift Speed and Ocean to Ice Heat Flux [T. Kikuchi]
- Using Buoy Data for Ice Forecasts at NIC [S. Helfrich]
- Outlook for Summer Sea Ice Extent [I. Rigor

HIGHLIGHTS
More buoys on ice than ever - Incremental opportunities are important to the IABP. It is the sum of these opportunities that are significant for a program that typically has 30-45 buoys in the field, which at the time of this report had over 92 buoys on ice due largely to IPY activities. It can be noted that (i) the number of "sophisticated" buoys such as oceanographic profiling buoys is increasing, (ii) SVP buoys have joined the array, and (iii) meteorological data from some buoys is not going on GTS.

Buoy array – Following maps are available from the IABP web site (http://iabp.apl.washington.edu):

- Buoy map with 60-day track and ice concentration 14 September 2007
- Buoy map with buoys by type 14 September 2007.

Array has limitations:

- Many buoys are deployed in tight arrays (Automated Drifting Stations) such as Applied Physics Laboratory Ice Camp.
- There are some large holes in the array especially in Eurasian Arctic.
- Ice "shrinkage" and a larger area of younger, thinner ice has taken a toll on IABP array, highlighting need for buoys which can survive in open water, survive freeze up, and pack ice conditions (i.e. seasonal ice buoys), especially in the Eurasian Arctic

Annual summer airdrop deployment by US Naval Oceanographic Command may be over – The US Naval Oceanographic Office White Trident airdrop of ICEX buoys has been the backbone of the IABP annual deployments for several years. However, the 2007 airdrop might have been the last one. Alternatives are being considered.

Seasonal ice buoys – With the ice on the arctic basin showing significant changes in area coverage and thickness by late summer, IABP participants seek cost effective air deployable buoys that are capable of operation in ice and open water through freeze/thaw cycles with sensors/measurements that include surface air temperature, surface pressure, GPS location, and

Argos transmitter. Such buoys – and SVP buoys - have the potential to extend coverage of the buoy array into the marginal seas.

Key Issue Persists - A key issue for the Chairman, Coordinator, and Participants of the IABP is getting the science community to put the meteorological and position data from the buoys that they deploy onto the GTS (Global Transmission System) in real time. The Chairman et al also seek to have ocean profile data posted to GTS.

6) International Buoy Programme for the Indian Ocean (IBPIO)

During the intersessional period, members of the IBPIO deployed a total of 161 buoys, which surpassed the previous record of 136 deployments achieved in 1998/99 Of the 161 deployments, 119 were fitted with pressure sensors (118 SVP-B and 1 SVP-BW). The remaining 42 were SVP buoys (SST only).

In May 2007, 103 buoys reported air pressure in the IBPIO area of interest, however this reduced to about 90 by the end of August 2007. By way of comparison, only 66 buoys reported air pressure in the IBPIO area of interest at the end of August 2006. Whilst the number of air pressure observations is now almost 2000 per day, the number of observations reaching the analysis and modelling centres via the GTS within 100 minutes of the observation time is only about 40%. This compares less than favourably with almost 70% of observations being received within 100 minutes from the North Atlantic.

The challenge for the IBPIO is to maintain the high deployment rate to (1) sustain the network at or above the original IBPIO network, requirements of 100 evenly spaced buoys, and (2) improve the spatial density of the buoys reporting air pressure in the Indian Ocean. The number of planned deployments during the next intersessional period, as advised by members at IBPIO-X, is 150 buoys comprising: 89 x SVP-B, 6 x SVP-BW and 55 x SVP.

As a direct result of the DBCP Training Workshop (June 2007, Oostende, Belgium), Mozambique (School of Marine and Coastal Sciences, Eduardo Mondlane University) has officially joined the IBPIO as of October 2007. During the next intersessional period, the IBPIO Programme Committee will continue its efforts to increase membership of the IBPIO by inviting participation from PMEL as well as the National Meteorological Services of Kenya and Indonesia.

7) International South Atlantic Buoy Programme (ISABP)

The International South Atlantic Buoy Programme (ISABP) was established in 1993 at a meeting in Buenos Aires, Argentina, in order to address the problem of data sparseness in the South Atlantic Ocean. The main objective of ISABP is to establish and maintain a network of platforms in the Tropical and South Atlantic Ocean in order to provide meteorological and oceanographic data for both real-time and research purposes. The task includes support to the World Weather Watch Programme (WWW), the Global Climate Observing System (GCOS), the World Climate Research Programme (WCRP), and the Global Ocean Observing System (GOOS), as well as to the research activities of participating institutions.

PARTICIPANTS TO ISABP

There are 19 organisations or institutions participating in the programme from the following countries: Republic of Argentina, Brazil, Canada, Caribbean, France, Ghana, Namibia, South Africa, Tristan da Cunha, Ukraine, United Kingdom, and USA.

The programme is open to any institution interested and committed to the objectives and operating principles of the programme. It is self-sustaining and supported by voluntary contributions from participants in the form of equipment (buoys) and/or services such as communications, storage, deployments, data archiving and co-ordination.

PROGRAMME MEETINGS

Following a decision taken in 2001, the Programme Committee meets every two years, preceded by a technical workshop. The next ordinary meeting will be held in 2008 and the plans include a Capacity Building chapter during the technical workshop.

OPERATIONAL PROGRAMME

Coverage of SVP drifters in the ISABP area is good, though gaps remain in the area of interest specially the Gulf of Guinea, Angola Basin, Equatorial Atlantic and particularly dynamic areas as the SW Atlantic. The low amount of SVP-B is also noted.

Drifting Buoys

In the intersession period 1 September 2006 to 31 August 2007, 217 drifters were deployed in the ISABP area of which 166 were SVP and 51 SVPB drifters. The deployments were carried out by GDC, Navoceano, Brazil, Argentina, and South Africa mainly from research vessels and ships of opportunity and in the case of the Tropical Atlantic (30N – 20S) some were deployed from US Navy aircrafts. The number of drifting buoys reporting on the GTS in the ISABP area during the intersessional period oscillated between 255 and 286 per month as indicated in MEDS monthly statistics, with an unusual -yet unexplained- month (Oct 2006) registering 559 platforms reporting on the GTS.

Fixed Stations

The Argentine Navy is maintaining two moored buoys in the Southwestern Atlantic, while the South African Weather Service continues maintaining fixed platforms on Gough, Marion, Tristan da Cunha and Southern Thule Islands. The drifters used as fixed stations on Tristan da Cunha and Southern Thule were be replaced by ICEX automatic weather stations and the SVP-Bs redeployed. The Brazilian Navy is maintaining one moored buoy in the vicinities of the Rio Grande Harbour and the INMET is operating an automatic weather station at the São Pedro e São Paulo Archipelago

and had installed recently a new automatic weather station at Trinidad Island and 20 AWS in the coastal areas of Brazil.

Data reception and dissemination

Some communication inconvenient persists in the area. The South African Weather Service is currently tending to the problems with Gough and Marion Islands stations, investigating the possibility of replacing the LUTs.

Other developments

The Global Drifter Centre continues with the comparison study of SVP drift buoys built with mini drogue, called Atlantic Demonstration Buoys (ADB) where performances are being compared (transmitter failure rates, submergence or strain sensor performance, drogue lifetime, SST thermistor performance, etc.). The preliminary results of this study were presented and discussed during the workshop preceding the 21st DBCP as well as during the XI ISABP.

It was agreed that the ARGO program was a clear contribution to the ISABP goals and was to be considered an integral part of the observational effort, recognizing the benefits of cooperation and collaboration. This led to the inclusion of floats as monitoring platforms in the program's objectives and operating principles

FUTURE PLANS

Participants are constantly encouraged to increase their contributions of buoys and to fund especially the upgrade of SVP drifters to barometer drifters. The program should try to increase the barometer drifter deployments. The GDP will continue its support to the programme activities. During XI ISABP, the group highlighted the need to increase observations and deployments in the SW and SE Atlantic, Drake Passage, Gulf of Guinea and Angola Basin. The group also raised the need to advertise the benefits of participating in the ISABP to other countries in addition to Brazil, Argentina, South Africa, and the USA. It was suggested that the GOOS Africa, Regional Ocean Observing and Forecasting System for Africa (ROOFS) coordinators and participants of the Reading DBCP Buoy Technical/Metadata base Workshop of March 2006 should be contacted as to attract the attention of African countries towards ISABP.

Because of these efforts, last 19th July, the Marine Fisheries Research Division of Ghana submitted a letter of intent, becoming since then a full member of ISABP. During the intersessional period, the Fisheries Department of Tristan da Cunha also joined the group. The Servicio de Oceanografía, Hidrografía y Meteorología de la Armada (SOHMA) of Uruguay has recently expressed its will to become a member. Argentina will continue to maintain two moored buoys as well as providing deployment opportunities in the SW Atlantic and Antarctica. Brazil will acquire one fix buoy to coastal waters and one moored buoy to be deployed offshore at south or southeast coast to support the Severe Weather Virtual Centre (between the NMS of Argentina, Brazil, Uruguay and Paraguay) and as well as providing deployment opportunities in the Tropical Atlantic and in Antarctic cruises. The South African Weather Service is coordinating with the community on Tristan da Cunha the deployment of buoys at regular intervals. In total, it is expected that 250 drifters will be deployed.

The dates and venue of the XII ISABP Meeting are not set yet though the possibility of holding the meeting in South Africa in 2008 is being analyzed.

INFORMATION ON THE ISABP

ISABP information is available on the web site at ***http://www.dbcp.noaa.gov/dbcp/isabp***. The pages give a description of the programme, its objectives, and links to the DBCP. The page is also available in Spanish.

8) OCEAN Sustained Interdisciplinary Timeseries Environment observation System (OceanSITES)

In the past year, the global timeseries project OceanSITES experienced a phase of stagnation. To some extent, this is due to funding difficulties and due to new initiatives still being developed (but not fully approved or implemented yet).

At the implementation level of individual sites, we believe that most existing stations have been maintained, and some new ones have proven themselves. Noteworthy are the NOAA operated/funded KEO site in the Kuroshio extension and the recent deployment of a mooring at station PAPA in the northeast Pacific (Gulf of Alaska). Existing sites like the air-sea flux stations NTAS or STRATOS, transport sites like MOVE and RAPID, and others around the world are being successfully continued. A new initiative funded by NOAA to develop a boundary current observing capability under the CORC consortium, has started the technological developments needed to occupy boundary current regimes operationally with moorings, gliders, and PIES (inverted echosounders with bottom pressure). On the other hand, some locations like moorings at Hawaii and Bermuda are in serious peril and may be discontinued since funding from the US National Science Foundation (NSF) appears to come to an end.

Major initiatives that would contribute to OceanSITES in the future are ORION/OOI in the US and EuroSITES in Europe. Both are still in the negotiation phase and not certain at this time. EuroSITES would integrate 11 existing timeseries sites in the North Atlantic and the Mediterranean; coordinate the technology, operation, data management, and exploitation. This would significantly enhance the value, visibility, and chances for sustained funding in a future in the European ocean observing system. The US Ocean Observatory Initiative (OOI), which would be the basis of the ORION project, has a global observatory component, which has been significantly reduced, in terms of the number of sites to be occupied. The present plan is to install ambitious and “transformative” infrastructure at 4 locations: the south Pacific off Chile at 55S, station PAPA in the northeast Pacific, Irminger Sea (subpolar North Atlantic), and the mid-Atlantic Ridge in the subtropical N. Atlantic. Partial implementation would begin as early as 2009.

For the OceanSITES network/pilot project, the lack of project office and data management support has made progress very difficult. We do not have the student in Kiel anymore who had maintained contact with operators, and had updated tables, site descriptions, and maps. Therefore, also the website lacks updated material and input. Other projects like ARGO and IOCCP have 2-4 staff helping their coordination efforts, while OceanSITES currently has none. This situation urgently needs to be addressed. Part-time technical support from JCOMM being discussed might fill this gap partially, but it is not the same as the tasks carried out by a project office.

The data management team and system for OceanSITES needs assistance from the US side. Coriolis remains willing to be one partner, but cannot do the job alone and needs a counterpart, like was done for ARGO. As a result, Coriolis does not have the manpower to chase after timeseries operator for data delivery, validate the conformance with the format and requirements, and submission of data is sparse at present. We are trying to remedy this with some renewed initiative from the science analysis side, but a US partner for the OceanSITES data management system is urgently required.

9) WCRP-SCAR International Programme for Antarctic Buoys (IPAB)

Participants of the IPAB continue to work together to maintain a network of drifting buoys on the sea ice of the Southern Ocean to provide meteorological and oceanographic data for real-time operational requirements and research purposes including support to the World Climate Research Programme (WCRP) and the World Weather Watch (WWW) Programme.

IABP EXECUTIVE AND COORDINTOR

Chairperson: Dr S. Ushio, National Institute for Polar Research, Japan (ushio@pmg.nipr.ac.jp)
Member: Dr P. Heil, University of Tasmania, Australia (Petra.Heil@utas.edu.au)
Member: Dr C. Geiger, University of Delaware, USA (cgeiger@udel.edu)
Member: Dr P. Clemente-Colon, US National ice Center (Pablo.Clemente-Colon@natice.noaa.gov)
Coordinator: Dr. C. Haas, Alfred Wegener Institute, Germany (Christian.Haas@ualberta.ca, now at University of Alberta)

RECENT IPAB MEETINGS

The 5th IPAB biennial meeting was held in Dunedin, New Zealand, on December 2005. A report is published at the IPAB website at
http://www.ipab.aq/fileadmin/chaas/MeetingReports/IPAB_5_2005_Dunedin.pdf.
An IPY planning meeting was held during the SCAR conference 2006 in Hobart, Tasmania. The meeting was designed to coordinate and publish plans for IPAB buoy deployments during IPY. 12 IPAB participants attended it from 10 countries. A meeting report is still pending.
The next IPAB biennial meeting will be held in 2008, either during the SCAR conference in St. Petersburg or during the next DBCP meeting planned to be held in Capetown.

HIGHLIGHTS

Enhanced buoy coverage during IPY

More than 20 buoys will be deployed during IPY, i.e. in the 2007/2008 seasons. These will yield a unique snapshot of ice dynamics and meteorological conditions of most sea ice regions of the Southern Ocean (see Figure 1). However, even more buoys would be required for a better coverage and longer overlaps between individual observation periods.

Coordinated, international meso-scale buoy arrays

During two IPY icebreaker voyages, three deformation arrays will be deployed to observe meso-scale ice dynamics and deformation, and relate it to the prevailing meteorological and tidal conditions, and to changes of the sea ice mass balance. Two arrays will be deployed during the current Australian Sea Ice Physics and Ecosystem Experiment (SIPEX) of RV Aurora Australis in September and October 2007 (http://www.sipex.aq). One array will be deployed during the US campaign Sea Ice Mass Balance in the Antarctic Seas (SIMBA) of RV Nathaniel Palmer, also in September and October 2007 (http://www.polartrec.com/simba-antarctic-sea-ice).

Analysis of ISPOL buoy array data

The data of IPABs 2004 array during the German pre-IPY Ice Station Polarstern (ISPOL) expedition (http://www.ispol.de) was readily analysed, and results published in a ISPOL, special Issue of Deep Sea Research II (Heil, P., Hutchings, J.K., Worby, A.P., Johansson, M., Launiainen, J., Haas, C., Hibler III, W.D. Tidal forcing on sea-ice drift and deformation in the Western Weddell Sea in early austral summer, 2004. DSR II ISPOL, special issue, 2007 in the press).. Figure 2 shows the most interesting drift tracks of four buoys, which were left on the ice after completion of the experiment.

Ice dynamics retrieval from satellite radar imagery

IPAB has been granted free synthetic-aperture-radar (SAR) imagery from the European Space Agencies (ESA) Envisat satellite, following submission of a joint proposal to ESA's special IPY call. The proposal, titled "Sea ice motion, deformation, thickness, and lead dynamics in the Antarctic"

will provide complementary SAR imagery over the two main IPY study regions (see above) allowing the extrapolation of buoy data, the development of new ice tracking algorithms, and the validation by means of buoy data.

Key Issue Persists

A key issue for the Chairman, Coordinator, and Participants of the IPAB is getting the science community to put the meteorological and position data from the buoys that they deploy onto the GTS (Global Transmission System) in real time. The Chairman et al also seek to have ocean profile data posted to GTS.

CHALLENGES

- There are some large holes in the array, both spatially and temporally. More buoys would be required to allow synoptic observations of the complete Southern Ocean.
- Due to the seasonal and divergent nature of Antarctic sea ice, the lifetime of most buoys is only very short. IPAB participants seek cost effective (and possibly air deployable) buoys that are capable of operation in ice and open water through freeze/thaw cycles with sensors/measurements that include surface air temperature, surface pressure, GPS location, and Argos transmitter. Such buoys – and SVP buoys - have the potential to extend coverage of the buoy array.

ANNEX XI

REPORT OF THE MEETING OF THE DBCP IRIDIUM PILOT PROJECT

Jeju, Republic of Korea, 17 October 2007

Background

The Pilot Project will seek to evaluate the feasibility of Iridium technology for real-time telecommunication of drifter data under various conditions. It will form a pilot study for technology evaluation and assessment of satellite communication options with Iridium
See also:

- DBCP23 Document 8-4-1 for background and project status.
- http://www.jcommops.org/dbcp/iridium-pp/

At the time of the meeting seven buoys had been deployed with Iridium Satellite communications and five of those were still active. Most manufacturers were developing prototypes buoys.

Attendees

David Meldrum, Chair of DBCP
Jean Rolland, Météo France
Hester Viola, JCOMMOPS
Yvonne Cook, Environment Canada
Shaun Dolk, AOML
Mayra Pazos, AOML
Julie Fletcher, UZ Met Service
Graeme Ball, Australian Bureau of Met
Michael Andreas Purwoadi, Indonesia
Ignatius Rigor, Uni of Washington

Manufacturers and Communications providers

Mark Blaseckie, AXYS Technologies
Emily Macpherson, MetOcean
Jeff Wingenroth, Technocean
Bill Woodward, CLS America
Christian Ortega, CLS Argos
Michel Guigue, CLS Argos
Seema Owen, CLS America

Meeting Report

- The DBCP chair demonstrated the use of the Short Burst Data communications using iridium to send a simple message to and from an iridium modem in the meeting room.

- The deployments made so far were discussed, and a summary of the buoys deployed was presented. At that time 5 buoys were transmitting successfully.

- The Chair then explained the process that project participants should go through to make use of the **Iridium Upgrade scheme**. Under this scheme project participants have the opportunity to upgrade drifters to Iridium Satellite communications for a small additional cost ($500 of which will be financed by the project).

- Metocean confirmed that it would continue to provide low cost communications for the duration of the project as negotiated.

- CLS Argos committed to providing the same offering for the duration of the project, once its Argos 3b system was in place (projected to be by March 2008)

- Data Formats: Buoys should communicate using one of the supported transmission formats (currently at version 3.2). Météo France explained that this format is very lean and is sufficient for the moment. The group decided that it should have a review of the usefulness of the data format in January 2008. Data from the buoys are to be sent to both of the following email addresses:

  - cmm-vos@shom.fr (to facilitate the GTS transmission, via Météo France)
  - dbcpiridium@gmail.com (to allow all pilot project participants to view SBD messages)

- Météo France reported that its system for GTS dissemination was working well. It planned to make some improvements to the operational level of the system, though this was not a direct requirement of the Pilot Project, as it is not anticipated that Météo France would need to provide the long term solution for GTS dissemination of Iridium Buoy Data.

- CLS reported that is also able to provide a full end-to-end solution to insert data onto the GTS, after March 2008 for all buoys participating in the Pilot Project and as mentioned will offer reduced priced satellite communications for the duration of the project.

- It was confirmed that the pilot project will be considered to have begun in July 2007 and will continue until end of June 2009.

- The DBCP Technical Coordinator stressed the importance of notification of buoy deployments – the following metadata elements are required (preferably in an Excel Spreadsheet). For everyone deploying Iridium buoys as part of the project, they need to notify each deployment (or batch of buoys deployed) on **iridium-pp@jcommops.org** - giving at least the following details:

  - **Platform Metadata**
    WMO Number,
    Iridium Number (IMEI),
    GTS bulletin header,
    Platform Model,
    Manufacturer,
    Manufacture date (MM/YYYY),
    Any other Serial number used
    Deployment Metadata

Deployment date,
Deployment location (latitude, longitude),
Deployment type (e.g. ship name, cruise),
Iridium Upgrade used Y/N,
Ocean Basin (e.g. Indian, South Pacific, North Atlantic)

For example, the format could be as follows (in a text file or excel spreadsheet):
WMO Number, Iridium No (IMEI), GTS bulletin header, Platform Model, Manufacturer, Manufacture date, Serial number if available, Deployment date, Deployment Latitude, Deployment Longitude, Deployment type (e.g. ship name & by who), Iridium Upgrade used Y/N, Ocean Basin
62509,508430,"SSVX13 LFPW","SVPB","METOCEAN","04/2007",12345,"03/05/2007",43,-63,"From Canadian Coast Guard's ship - Off Nova Scotia","N","North Atlantic"
etc

- Météo France's Iridium Buoys (WMO 62509, 44746 and 44747) had been reporting an Iridium location instead of GPS locations since the end of July and this was working perfectly. There appears to be no difference in the comparisons with model outputs. The accuracy of these positions is sufficient for meteorological purposes. Buoy manufacturers stressed that the accuracy of the Iridium Locations may not be sufficient for Oceanographic purposes.

- The Chair stressed that he hoped the manufacturers would be able to capture and include the number of failed message attempts in messages, to assess the capabilities of the Iridium system, particularly in remote areas.

- Issues to consider in future include archiving of Iridium Messages. The messages are currently being sent to dbcpiridium@gmail.com which provides a form of archive as the raw data is stored there for each platform, but perhaps another solution is needed.

Actions

- All participants should notify of deployments onto the email address iridium-pp@jcommops.org, preferably in an Excel spreadsheet.

- Conduct a review of the appropriateness of the data format in January 2008.

- Manufacturers should look into capturing and including the number of failed message attempts in messages, to assess the capabilities of the Iridium system, particularly in remote areas.

- Data archiving and access to old data should be addressed and data accessible to all project participants.

ANNEX XII

ACTION LIST / WORKPLAN

DBCP WORKPLAN FOR THE NEXT INTERSESSIONAL PERIOD (2008)

(actions arising from this Panel session are indicated in bold)

-1- IMPLEMENTATION & TECHNICAL WORKPLAN

No.	Task	Ref	Carried out by	Supported/ assisted by	Reported to/ Due date
1	**To identify sources of buoy data not currently reported on the GTS & determine reason for non-availability, (particularly for the Arctic Buoys IABP).**	**TC ToR and DBCP-23 3.3.8**	**TC, CLS**	**Members Secretariats**	**Chair & Panel for information/Ongoing**
2	To maintain summary of requirements for buoy data to meet expressed needs of the international meteorological & oceanographic communities.	DBCP ToR	TC	Members Secretariats	Chair for presentation to the Panel/Ongoing
3	To maintain a catalogue of existing ongoing ocean data buoy programmes	DBCP ToR	TC	Members Secretariats	Chair & Panel for information/Ongoing
4	**To continue review of satellite data telecommunications systems – particularly supporting the DBCP Iridium Pilot Project**	**DBCP-23 8.4.2.4**	**Chair, TC**	**Members**	**Panel/Ongoing**
5	**To share experiences regarding usage of various satellite communications systems for buoy data and participate in the DBCP Iridium pilot project**	**DBCP-23 8.4.2.2**	**Members**	**Chair, TC**	**Ongoing**
6	**To notify of all deployments of Iridium Drifters via a dedicated mailing list (iridium-pp@jcommops.org) and eventually via a notification web page on the JCOMMOPS web**	**DBCP-23 8.4.1.10**	**Participants in Iridium PP**	**TC**	**Ongoing**
7	**To develop a notification tool for all iridium platforms and relay the information to the Pilot Project mailing list**	**DBCP-23 8.4.1.10**	**TC**	**Members**	**January 2008**
8	**To support the evaluation phase of the Iridium Pilot Project by including the number of transmission failures in the data transmission format they propose for all Iridium buoys**	**DBCP-23 8.4.1.13**	**Manufacturers**	**Members**	**During the pilot project**
9	**To put in place real time tools for monitoring GTS data flows and data timeliness in order to improve its responsiveness to possible problems,**	**DBCP -23 8.6.2.19**	**TC, CLS**		**Panel/ ongoing**

	this should include an analysis of the long term trends in delays through the system at each stage.				
10	To monitor Argos GTS sub-system & arrange for modifications as necessary.	DBCP-21	TC	CLS	Panel & users/Ongoing
11	**Participate in validation and monitor implementation by CLS of new system for GTS data processing – especially for flexibility for extension of WMO numbers, new BUFR templates in future and reduction in delays in the short term**	**DBCP-22, DBCP-23**	**TC**	**CLS**	**March 2008**
12	**Investigate and implement appropriate solution to decrease delays within the Argos system**	**DBCP-23 2.2.1.3 (xiii) 8.6.2.18**	**TC and CLS**		**Ongoing**
13	To coordinate operations of DBCP QC guidelines.	TC ToR	TC	Members Operational services	Panel/Ongoing
14	To follow up & possibly assist in implementing requirements expressed by the buoy users within the Argos system.	DBCP ToR JTA	CLS	TC	Panel, meeting on JTA/Ongoing
15	To support, as required, existing DBCP action groups, and provide assistance on request to other internationally coordinated buoy programme developments.	TC ToR	TC Secretariats	Chair	Panel/Ongoing
16	**To promote an enhanced participation of African countries in the DBCP**	**DBCP-23 2.1.11**	TC	Panel	Next Panel session
17	To coordinate with IOP implementing strategy for the Indian Ocean Observing System as far as data buoys are concerned.	DBCP-20	IBPIO	Chair TC Secretariats	Panel/Ongoing
18	To focus on achieving optimal spatial distribution of the drifter array	DBCP-22 5.1.4	Panel		Panel/next Panel session
19	**To encourage other centres to act as PMOC and existing centres to invest more resources in the implementation of QC guidelines**	**DBCP-23 8.1.2**	**Members**	**TC**	**Panel/Ongoing**
20	**To provide information on deployment opportunities – annual reports, action group annual planning, ship schedules, national plans, national contact points etc**	**DBCP-22 & DBCP-23 7.2.4, 8.6.1.1 8.6.1.13**	**Members, Task Team on Capacity Building**	**TC**	**Ongoing**
21	**To investigate whether air deployment opportunities could be provided. Contact US National Hurricane Center about air deployments (Peter Black)**	**DBCP-22 2.2.1.2 (xvi), DBCP-23 2.2.1.3 (i)**	**Members & TC**	**Secretariats**	**Panel/next Panel session**

22	**Advertise deployments via monthly email and update information on the JCOMMOPS website.**	**DBCP-22 8.6.1.3, DBCP-23 8.6.1.2**	**TC**	**Members**	**Panel/next Panel session**
23	**To check the DBCP list of National Focal Points for logistical facilities and report discrepancies, changes, or additions to the WMO Secretariat.**	DBCP-22 8.6.1.1 **DBCP-23 9.3.2**	**Members**	**WMO Secretariat**	**WMO Secretariat/Ongoing**
24	**To produce a table of national commitments in the Southern Ocean. To seek additional commitments for barometer upgrades, and deployment opportunities in the Southern Ocean to achieve a level of 300 buoys south of 40S.**	**DBCP-16 & DBCP-23 4.2.4**	**TC**	**Members**	**Panel**
25	To routinely provide the list of moorings reporting in SHIP or BUOY format	DBCP-21	Members	TC	Panel/Ongoing
26	To enhance buoy safety through improved design (refer recommendations) and keep the Panel informed about related changes.	DBCP-17	Manufacturers, Members	Members, TC	Panel/Ongoing
27	**To have all ice buoys under IABP report on the GTS**	**DBCP-23 2.2.1.3 (xvi)**	**IABP**	**TC**	**Next Panel session**
28	**Provide reference documents about the conditions under which scientific equipment can be deployed from ships in Antarctic waters south of 60S**	**DBCP-23 2.2.1.3 (xvii)**	**G Ball**	**TC**	**October 2008**
29	**To develop and keep up to date standardized training materials in parallel with the organization of training programmes**	**DBCP-23 4.3.6**	**TT/CB**	**Secretariat**	**ASAP & Ongoing**
30	To provide info/materials for DBCP/JCOMMOPS web sites (news, brochure)	DBCP-22 7.2.3	Interested Members	TC	Panel/Ongoing
31	**To provide feedback on required updates and ways to restructure JCOMMOPS web sites – especially contact details**	**DBCP-22 7.2.1, DBCP-23 7.2.2, 8.5.1.13, 8.6.1.10**	**Members**	**TC**	**Panel/Ongoing**
32	**Redesign the DBCP website to ensure it is user friendly.**	**DBCP 8.5.1.13**	**TC**	**Members**	**Panel/next Panel session**
33	**To link, as much as possible, to the JCOMM (http://www.jcomm.info) websites for JCOMM related information and redesign the DBCP website**	**DBCP 8.5.1.13**	**TC, Secretariats**		**Panel/Ongoing**

34	**To provide assistance to JCOMMOPS in redevelopment of the DBCP website**	**DBCP 8.5.1.14**	**TC**	**Members**	**Panel/Ongoing**
35	To maintain close links with SOT members so that support on deployment opportunities can be obtained from the SOOP and VOS Panels of SOT.	DBCP-19	Chair	TC	Panel/Ongoing
36	To work at installing and/or connecting new in the southern hemisphere,	DBCP-21	CLS		Panel/next Panel session
37	To comply with buoy metadata collection scheme	DBCP-21 **DBCP-23 8.6.4.5**	Buoy operators, manufacturers	TC	Panel/Ongoing
38	**To address the issue of usability of the JCOMMOPS metadata collection system.** **To provide Panel Members with the list of metadata required**	**Metadata workshop & DBCP-23 8.6.4.2**	**TC**		
39	**To continue to actively participate in the Meta-T Pilot Project**	**DBCP-23 8.6.4.7**	**TC**		**Panel/Ongoing**
40	**To 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-23 8.6.4.9**	**Task Team on Data Management**	**TC**	**Panel/Ongoing**
41	**To provide information about the progress made in setting p the META-T server at NMDIS**	**DBCP-23 8.6.4.9** **8.6.4.10**	**D Qi, China, NMDIS**		**Panel/January 2008**
42	**To discuss with buoy operators alternate solutions for routine submission of metadata (agree on formats, distribution FTP).**	**DBCP-23 8.6.4.4**	**TC,**	**Members**	**Panel/next Panel session**
43	To provide input on buoy models for JCOMMOPS database	DBCP-21	Manufacturers	TC	Panel/Ongoing
44	**To compile document(s) on Best Practices and calibration procedures and submit proposals to WMO and IOC for updates to specific publications e.g. WMO Publication no. 8.**	**DBCP-23 7.3.11**	**TT on Quality Management**	**TC,Members**	**Panel/next Panel session**
45	**To work with CLS for finalizing a new version of DBCP Technical documents 2 – reference guide to Argos**	**DBCP-23 7.2.13**	**TC, CLS**		**Next Panel session**
46	**To look into those Best Practices aspects, to submit proposals to the WMO and/or IOC for updating or integrating specific publications, e.g. WMO No. 8. TT/QM to be represented at the IODE/JCOMM Standards forum**	**DBCP-23 7.3.10 7.3.11**	**TT/QM**	**Members**	**Jan 2008** **Next Panel session**

47	To review best practices prior to drifter purchase for safety, and GTS data processing purposes	DBCP-21	Members	Evaluation group, TC	Panel/Ongoing
48	To provide Service Argos with list of most used buoy models and formats they operate.	DBCP-21	Manufacturers	TC	Service Argos/Ongoing
49	To investigate quality of records of WOTAN wind speed data	DBCP-21	Evaluation group		Panel/next Panel session
50	To perform further study on delays	DBCP-22 8.6.2.3	TC, Chair	Service Argos	Panel/next Panel session
51	To participate actively in IPAB and/or to provide for deployment opportunities	DBCP-22 2.2.1.2 (ii)	Members		Panel/next Panel session
52	To work at developing deployment strategies using GDP tools	DBCP-22 2.2.1.2 (iv)	Members	GDC	Panel/next Panel session
53	To provide details on its requirements for hourly SST	DBCP-22 2.2.1.2 (v)	OOPC		Panel/next Panel session
54	To look at practical solutions for hourly SST and work on cost impacts	DBCP-22 2.2.1.2 (v)	Evaluation Group		Panel/next Panel session
55	**To improve drogue attachment – members should review the recommendations from the GDP about its inter-comparisons of drifter lifetime and drogue attachment.**	**DBCP 23 2.3.2**	**Members**	**Manufacturers**	**Panel/next Panel session**
56	**To use Global Drifter Programme barometer upgrade offer – particularly in the Southern Ocean**	**DBCP-23 2.2.1.3 (xxviii)**	**Members**	**AOML**	**Panel/next Panel session**
57	To increase wave measurements	DBCP-22 4.2.3	Members		Panel/next Panel session
58	**To consider the development of a Pilot Project on wave observations** To address wave measurement technology	**DBCP-23 8.6.5.5** DBCP-22 4.2.3	**TT-TD**	**EB** ETWS, OOPC	**Panel/next Panel session**
59	To forward Panel's recommendations on waves to JCOMM/OCG	DBCP-22 4.2.3	Secretariats	ETWS	OCG/next OCG meetings
60	To put forward a more detailed set of requirements for high quality wave data	DBCP-22 4.2.4	ETWS	SCG	OCG/next OCG meeting
61	To investigate quality of drifter SST	DBCP-22 8.1.8	Rick Lumpkin		Panel/next Panel session
62	To provide advice on the best model to use for estimating quality of wind	DBCP-22	Members		TC/next Panel

	observations	8.1.12			session
63	**To continue to follow up on the GTS distribution of PDE wave data on GTS using new BUFR template**	**DBCP-23 8.2.1**	**TC, PDE**		**Panel/next Panel session**
64	To submit proposal to modify the BUOY code and BUFR template for buoy data – as required	DBCP-22 8.2.11	TC		Expert Team on Data Representation and Codes 2008
65	**To participate in Argos-3 test programme**	**DBCP-22 8.3.17**	**TC, Members, Manufacturers**	**CLS**	**Panel/next Panel session**
66	To react on the presented characteristics of Argos-4	DBCP-22 8.3.23	Argos users	CLS	Michel Faup/end of 2006
67	**To provide information to panel members or on its website, about where inventories of buoys are held, to aid in deployment planning.**	**DBCP-23 8.6.1.10**	**GDP**		**Panel/next Panel session**
68	**To implement JCOMMOPS work-plan – particularly with respect to Deployment opportunities.**	**DBCP-22 8.5.3 & DBCP 23 8.5.1.8 and 8.5.1.9**	**TC/DBCP, TC/Argo**	**CLS**	**Panel/next Panel session**
69	To design deployment packages for safe deployments from 20m height from 25 knots ships	DBCP-22 8.6.5.2	Manufacturers	Evaluation Group	Panel/next Panel session
70	**Liaise with the IOCCP and prepare a report of pCO2 measurement from drifters.**	**DBCP-23 8.6.5.4**	**Task Team on Technology developments**	**IOCCP**	**Panel/Next session**
71	**to assist in the proper distribution of information on data buoy vandalism to the fishing fleets**	**DBCP-23 8.6.3.7**	**CLS**	**JTA**	**Next Panel Session**

-2- ADMINISTRATIVE WORKPLAN

No.	Task		Carried out by	Supported/assisted by	Reported to/Due date
1	To maintain a list of national contact points for the DBCP & within other relevant bodies with potential for involvement in DBCP activities.	DBCP ToR	Secretariats	Members	Chair & Panel for information/Ongoing
2	To continue the arrangements (including finance) to secure the services of a technical coordinator.	DBCP-22 10.3	Chair	Secretariats	Secretariats/Ongoing
3	To review programme & establish working priorities of the technical coordinator.	DBCP-22 10.4	Panel, Chair		Panel/next Panel session
4	**To organize scientific & technical workshop at DBCP-XXIV. A second co-chair from the Host country should be identified**	**DBCP-23 6.8**	**Bill Burnett & a co-chair from the host country**	**Secretariats**	**Panel/next Panel session**
5	**Compile a CD-ROM of scientific & technical workshop at DBCP-XXIII**	**DBCP -23 6.7**	**Presenters at workshop, Ken Jarrott, Bill Burnett**	**Secretariats**	**November 2007**
6	To finalise & publish a new version of DBCP publication No. 3 (Argos guide) and DBCP Publication 2 – reference guide to Argos	DBCP-22 7.2.8	CLS (No. 2 & 3), TC (No. 3)	Secretariats, Members	Panel/next Panel session
7	**To consolidate and publish the Panel's session report (paper publication and web) and Annual Report (CD-ROM and web)**	**DBCP-23 4.1.4 and Annex III**	**Chair, Secretariat**	**TC**	**Executive councils of WMO & IOC/End of 2007**
8	**To finalise updates to the DBCP implementation strategy (DBCP TD 15) including reference to the Capacity Building efforts being undertaken by the Panel – feedback sought by members,**	**DBCP-23 4.2.5 & 4.3.10**	**Chair**	**Members**	**Panel/30 November 2007**
9	To design and produce JCOMMOPS brochure	DBCP-22 7.2.2	TC	Members, Secretariats	Panel/next Panel session
10	**To provide feedback revision on the DBCP brochure. A one page (double sided) flyer, designed with help from a graphic designer and in line with other JCOMM brochures.**	**DBCP-23 7.2.8 7.2.9**	**TC, NDBC Graphic Designer**	**Members, Secretariats**	**Panel/next Panel session**
11	**To investigate possibility of translation services for the DBCP brochure**	**DBCP-23 7.2.8**	**WMO Secretariat**		**Executive Board/January 2008**
12	To 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-21	Chair	JCOMM OCG Secretariat	Panel/ JCOMM 4-year intersessional period
13	**To send invoices to Participants**	**DBCP-23 10.3**	**Secretariats**		**Panel/November 2007**

14	**To pay their contributions upon receipt of invoices.**	**DBCP-23 10.3**	**Members**		**WMO and IOC Secretariat/upon invoice**
15	**To submit national reports & Action Group reports in electronic form**	**DBCP-23 2.2.1.2, 2.4, 4.1.4, Annex III**	**Members AG**		**Secretariats/End-2007**
16	**To prepare & distribute revised budget estimates for 2008-2009, and final financial statement**	**DBCP-23 10.1, 10.3**	**Frank Grooters**	**Secretariats, Chair**	**Panel/January 2008**
17	To prepare interim statement of the budget for the next DBCP session	DBCP-22 10.1.10	Frank Grooters	Secretariats	Panel/next Panel session
18	To convene an Executive Board	DBCP-22 4.1.7, 10.1.9	Chair	Secretariats	upon request/need
19	To identify necessary funding allowing for expansion of JCOMMOPS & AIC staffing & resources.	DBCP-21	Secretariats Members	JCOMM/OCG	Panel/next Panel session
20	**To inform chairman of her wish or otherwise to continue to work as TC/DBCP**	**DBCP-23 10.3.1**	**TC**		**Chair/1 Oct. 2008**
21	To make recommendations to JTA	DBCP-22 11.1	Chair		JTA
22	To actively communicate with national coordination for GEO to fully inform on the Panel's activities and capabilities in this regard.	DBCP-22	Members		Panel/On going
23	**To organize Capacity Building activities (training workshops, training materials, identifying lecturers) – to set up a Task Team on Capacity Building**	**DBCP-22 & DBCP- 23 4.3**	**Panel**	**Secretariats**	**Panel/Ongoing**
24	To work with representatives of sea level working groups to explore cooperation with Tsunami warning systems	DBCP-22 2.2.3.3	Members	Chair, Secretariats	Panel/next Panel session
25	To continue actions with other International Organizations for preventing vandalism.	DBCP-22 8.6.3.1	Secretariats		Panel/Ongoing
26	**Consider distributing information on vandalism nationally, also consider translations into national languages as offered by KMA for Korean vessels**	**DBCP -23 8.6.3.2**	**Members, KMA (Korean translation)**	**Secretariat**	**Panel/Ongoing**
27	To compile information on vandalism-proof designs	DBCP 22 8.6.3.3	Members	TC	Panel/Ongoing
28	To investigate ways for raising public awareness	DBCP-22 2.2.1.2 (xiv), 8.6.3.2	K. Premkumar		Panel/next Panel session
29	To insert information on vandalism into UN Atlas and submit article to relevant journals such as "Fishing News International	DBCP-20	Chair		Panel/next Panel session
30	**To request CLS and JTA to consider assisting with distribution of**	**DBCP-23**	**CLS**	**Secretariats**	**Panel/Ongoing**

	materials about data buoy vandalism to its fishing fleet customers	**8.8.3.7**			
31	**To identify new vice-Chair for Asia**	**DBCP-23**	**Members**	**Chair, Secretariats**	**Panel/next Panel session**
32	**To identify new vice-Chair for North America**	**DBCP-23 2.3.7**	**USA**	**Chair, Secretariats**	**Panel/next Panel session**
33	**Asian Countries interested in participating in the DBCP-PICES NPDBAP to contact the NPDBAP Co-Chairperson, Al Wallace. To identify a co-chair from the Asian region, for the North pacific advisory panel (NPDBAP)**	**DBCP 23 2.2.1.3(xv)**	**Asian Members**	**NPDBAP Chair, Secretariats**	**Panel/next Panel session**
34	**Report on activity to PICES to provide an update on data sets and programme activities**	**DBCP 23 2.2.1.3(xv)**	**NPDBAP Chair**	**Members**	**PICES meeting**
35	**Encourage cooperation with OceanSITES and the Tsunameter network at a national level**	**DBCP 23 2.2.1.3 (xxiii) & 2.2.2.7**	**Members**	**Secretariats**	**Ongoing**
36	**To investigate whether the EuroSITES could participate in the overall OceanSITES management**	**DBCP-23 2.2.1.3 (xxi)**	**U. Send**		**Next Panel Session**
37	**JCOMM and IOC/WMO to play a role in OceanSITES advocacy with the GEO programme.**	**DBCP 23 2.2.1.3 (xxiv)**	**Secretariats**	**OceanSITES**	
38	**Invite NWP experts and Marine Forecasters to make presentations at the future technical workshops**	**DBCP-23 5.1.12**	**Chair/Secretariats**	**Co-chair of Technology workshops**	**Panel/October 2008**
39	**Report about impact studies on NWP models, of in-situ observations completed by the E-SURFMAR programme**	**DBCP – 23 5.1.12**	**J Rolland**		**Panel/October 2008**
40	**Consult with relevant parties about the possibility of incorporating OceanSITES into JCOMMOPS, coordinated by the DBCP TC and for the Argo TC to undertake duties for SOT. This would rely on an additional Technical resource being funded within JCOMMOPS (probably part-time)**	**DBCP-23 5.2.6 & 8.5 & 10.4.2**	**Secretariats**	**Chair (& Chair of SOT)**	**December 2007**
41	**The IODE and JCOMM buoy data archiving centres should liaise and work 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**	**DBCP-23 7.1.5**	**RNODC/DB and SOC**		**Ongoing**
42	**Attend the next meeting of the IODE/JCOMM forum on Oceanographic Data Management and Exchange standards (January 2008)**	**DBCP-23 7.3.11**	**Task Team on Quality**		**2008**

			Management		
43	**Provide financial support, in line with that agreed, for the Iridium Pilot Project**	**DBCP-23 8.4.1.9**	**Executive Board, Secretariat**		**Panel/ During the project**
44	**Oversee the expenditure for 2008 based on plans presented to the panel**	**DBCP-23 10.1.7**	**Executive Board**		**Panel/Next session**
45	**To investigate the best use of Trust fund monies in collaborative arrangements in support of action groups and related programmes, e.g. to buy ship time**	**DBCP-23 8.6.1.7 DBCP-23 10.3.8**	**TC, Executive Board, Task Team Capacity Building**	**Chair**	**Panel/Next session**
46	**Distribute the finalised account for 2007 by early 2008**	**DBCP-23 10.1.8**	**F Grooters, Secretariats**	**Executive Board**	**January 2008**
47	**To Investigate possibilities of extending the contract of the Technical Coordinator beyond the term of the existing ALD contract within IOC and that WMO investigate any longer term option**	**DBCP-23 10.3.4**	**Secretariats**		**Panel/Next session**
48	**To ensure the most efficient management of the DBCP Trust fund between IOC and WMO**	**DBCP-23 10.3.6**	**Secretariats**		**Panel/Next session**
49	**To send an email to Ms Horton to inform her of the Panel's appreciation and gratitude at this Panel Session**	**DBCP-23 9.1.12**	**Chair**	**Secretariat**	**ASAP**

-3- DBCP WORKPLAN FROM THE DATA USERS AND TECHNOLOGY WORKSHOP WORKPLAN - Reading, United Kingdom, 27-28 March 2006

(from JCOMM Meeting Report 40)

Paragraph	Item	Carried out by	Due date
5.1.8	To investigate different data assimilation schemes used by Member Countries and report recommended and acceptable delays to the Panel.	DBCP TC	Oct. 2008
5.1.9	To provide tools to address spatial density issue and provide statistics regarding probability of drifters remaining in certain regions. AOML and SAMS to collaborate	AOML & SAMS	Underway, Oct. 2008
5.1.11	To investigate the needs for variables derived from sensor data on-board the buoys.	NWP users	Ongoing
5.1.12	to reflect on what new observables might be desired	NWP	Oct. 2008
5.1.15	To investigate day to day variability in number of drifter data received by ECMWF	DBCP TC	Oct. 2008
5.2.10	To provide detailed rationale for the collection and transmission of hourly SST data (diurnal cycle resolution).	OOPC	Oct. 2008
5.2.10	To record and transmit hourly SST data on newly deployed drifters.	Buoy operators	ASAP
5.2.11	To investigate the Western Indian Ocean GTS transmission problem.	DBCP TC, Ali Mafimbo and Mohamudally Beebeejaun	ASAP
6.1.3.2	To provide a comparison of alkaline battery performance, cost and features compared to Lithium batteries in an SVP/BP buoy and an SVP/WSD buoy.	Tony Chedrawy	ASAP
6.2.13	To conduct electric power consumption impact study on sampling sea level pressure data more frequently (5 mn, 10 mn…).	Andy Sybrandy	Oct. 2008
6.1.5.1 6.1.5.2	To study standardization of drogue detector (e.g. tether strain).	Peter Niiler, Bill Scuba	Oct. 2008
6.1.12.1	To pursue development of new data transmission strategies maximizing value for money and impact of buoy data	DBCP	Ongoing
6.2.11 7.6	To conduct survey on the impact of drifter observations as a function of season and geographical locations.	DBCP TC, NWP	Oct. 2008
6.2.7	To design an SVP drifter power budget spreadsheet that would include information on sampling, data processing and transmission consumption.	Service Argos, manufacturers	Oct. 2008
6.2.10	To produce routinely maps showing recommended Argos frequencies.	Argos	ASAP

-4- DBCP WORKPLAN FROM THE JCOMM/OCG WORKSHOP TO ESTABLISH A PILOT PROJECT FOR THE COLLECTION OF REAL-TIME METADATA REGARDING SEA SURFACE TEMPERATURE AND WATER TEMPERATURE PROFILE DATA - Reading, United Kingdom, 28-29 March 2006

(from JCOMM Meeting Report 41)

Paragraph	Item	Carried out by	Due date
4.2.3	To work with WMO/CBS to seek possibilities to add metadata in BUFR tables	WMO Secretariat	ASAP
4.3.3	To discuss with buoy operators alternate solutions for routine submission of metadata (agree on formats, distribution FTP).	TC/DBCP/SOOPIP, buoy manufacturers	ASAP
4.3.4	To address the issue of using JCOMMOPS metadata collection system.	TC/DBCP	DBCP-24 (2008)
4.3.5	To refine its daily procedures for producing metadata files so that only updated buoy records appear in those files. Records creation and update dates must be included in the files.	TC	ASAP
4.6.5	To clarify the ODAS format, definition and requirements, and encourage Members/Member States to duly submit metadata and its catalogue (information)	Secretariat	ASAP
6.2.4	To refine types of metadata, the matrix, and categorization	Pilot Project Steering Team.	ASAP
8.2	To present a plan/proposal, including financial aspects, for participation in the pilot project as a host of metadata server	NDBC	ASAP
10.2	To consolidate the membership of the Pilot Project Steering Team	Secretariat	ASAP

ANNEX XIII

ACRONYM LIST

ABE-LOS	IOC Advisory Body on the Law of the Sea
ADOS	Autonomous Drifting Ocean Station
ADS	Automatic Distribution System (Argos)
AG	DBCP Action Groups
AIC	Argo Information Center
ALD	Appointment of Limited Duration
AMDAR	Aircraft Meteorological Data Relay (WWW)
ANIMATE	Atlantic Network of Interdisciplinary Moorings and Time-series for Europe
AOML	NOAA Atlantic Oceanographic and Meteorological Laboratory (USA)
Argo	Argo Profiling Float Pilot Project
AST	Argo Steering Team
ATF	Acoustic Tank Facility
BATS	Bermuda Atlantic Time-series Study
BOM	Bureau of Meteorology (Australia)
BPPT	Agency for the Assessment and Application of Technology (Indonesia)
BUFR	Binary Universal Form for Representation of meteorological data
CB	Capacity Building
CBS	Commission for Basic Systems (WMO)
CIS	Central Irminger Sea
CLIMODE	CLIVAR Mode Water Dynamics Experiment
CLIVAR	Climate Variability and Predictability (WCRP)
CLS	Collecte Localisation Satellites (France)
CNES	Centre national d'études spatiales (France)
CORC	Consortium on the Oceans Role in Climate
DAMOCLES	Developing Arctic Modelling and Observing Capabilities for Long-term Environmental Studies (European joint project)
DAR	Data Discovery, Access and Retrieval service (WMO WIS)
DART	Deep-ocean Assessment and Reporting of Tsunami (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)
DPM	Natural Disaster Prevention and Mitigation Programme (WMO)
E2EDM	End-to-End Data Management (JCOMM Pilot Project)
EB	DBCP Executive Board
EBD	Equivalent Buoy Density
ECMWF	European Centre for Medium-Range Weather Forecasts
EEZ	Exclusive Economic Zone
EMC	NOAA’s Environmental Modelling Center (USA)
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)
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
FAO	Food and Agriculture Organization
FOAM	Forecast Ocean Assimilation Model (UK)
GCN	GLOSS Global Core Network
GCOS	Global Climate Observing System
GDAC	Global Data Access 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)
GLOSS-GE	GLOSS Group of Experts
GMDSS	Global Maritime Distress and Safety System (IMO)
GODAE	Global Ocean Data Assimilation Experiment (GOOS)
GOHWMS	Working Group on the Framework for a Global Tsunami and other Ocean-Related Hazards Early Warning System
GOOS	Global Ocean Observing System
GOSUD	Global Ocean Surface Underway Data
GPS	Global Positioning System
GSSC	GOOS Scientific Steering Committee
GTOS	Global Terrestrial Observing System (WMO, UNESCO, FAO, UNEP, ICSU)
GTS	Global Telecommunication System (WWW)
GTSPP	Global Temperature-Salinity Pilot Project / Profile Programme
HOT	Hawaii Ocean Timeseries
HWRF	Hurricane Weather Research and Forecast model system (USA)
IABP	International Arctic Buoy Programme
IATTC	Inter-American Tropical Tuna Commission (IATTC)
IBPIO	International Buoy Programme for the Indian Ocean
ICCAT	International Commission for the Conservation of Atlantic Tuna
ICG/IOTWS	Intergovernmental Coordination Group for the Indian Ocean Tsunami Warning and Mitigation System (IOC)
ICG/PTWS	Intergovernmental Coordination Group for the Pacific Ocean Tsunami Warning and Mitigation System (IOC)
ICSU	International Council for Science
ICTT-QMF	Inter Commission Task Team on Quality Management Framework
IFREMER	French Research Institute for Exploitation of the Sea
IGDDS	Integrated Global Data Dissemination Service (satellite)
I-GOOS	The intergovernmental IOC-WMO-UNEP Committee for GOOS
IHO	International Hydrographic Organization
IJPS	Initial Joint Polar-Orbiting Operational Satellite System (NOAA, EUMETSAT)
IMB	Ice Mass Balance
IMO	International Maritime Organization
INPE	Instituto Nacional de Pesquisas Espaciais (Brazil)
IOC	Intergovernmental Oceanographic Commission (of UNESCO)
IOCCP	International Ocean Carbon Coordination Project
IODE	International Oceanographic Data and Information Exchange (IOC)
IOOS	Integrated Ocean Observing System (USA)
IOTC	Indian Ocean Tuna Commission
IPAB	WCRP-SCAR International Programme for Antarctic Buoys
IPY	International Polar Year (2007-2008)
IRD	Institut de recherche pour le développement (France)
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
JCOMM	Joint WMO-IOC Technical Commission for Oceanography and Marine Meteorology
JCOMMOPS	JCOMM in situ Observing Platform Support Centre
JCOPE	Japanese Coastal Ocean Predictability Experiment
JTA	Joint Tariff Agreement (Argos)
KEO	Kuroshio extension region
KMA	Korea Meteorological Administration
KML	Keyhole Mark-up Language (GoogleEarth file format)
LUT	Local User Terminal (Argos)
MAN	JCOMM Management Committee
MCSS	Marine Climatological Summaries Scheme
MEDS	Marine Environmental Data Service (Canada, now ISDM)
MERSEA	Marine Environment and Security for the European Area
META-T	Pilot Project for the Collection of Real-time Metadata regarding Sea Surface Temperature and Water Temperature Profile data (JCOMM)
METOP	Meteorological Operational satellites of the EUMETSAT Polar System (EPS)
MFS	Mediterranean ocean Forecasting System
MOU	Memorandum of Understanding
MSS	Maritime Safety Services
NAVOCEANO	Naval Oceanographic Office (USA)
NC	National Centres (WMO WIS)
NCDC	NOAA's National Climate Data Center (USA)
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)
NFRDI	National Fisheries Research and Development Institute
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)
NOCS	National Oceanography Center Southampton (UK)
NORI	National Oceanographic Research Institute (Rep. Korea)
NPDBAP	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
ODINAFRICA	Ocean Data and Information Network for Africa (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
OPSCOMM	Argos Operations Committee
ORION	US/NSF Ocean Research Interactive Observatory Networks project
OSMC	NOAA Observing System Monitoring Center (USA)
PA	Programme Area (JCOMM)
PANGEA	Partnerships for New GEOSS Applications
PAP	Porcupine Abyssal Plain
PAPA	Programme for a Baltic network to assess and upgrade an operational observing and forecasting System in the region (EU project)
PDE	Puertos Del Estado (Spain)

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
POPS	Polar Ocean Profiling System
PTT	Platform Transmitter Terminal (Argos)
QA	Quality Assurance
QC	Quality Control
QMF	WMO Quality Management Framework
RMS	Root Mean Square
RNODC	Responsible Oceanographic Data Centre (IODE)
RNODC/DB	RNODC for Drifting Buoys
ROOS	Regional Ocean Observing Systems
RRR	Rolling Review of Requirements
SAMS	Scottish Association for Marine Science
SAT	Site Acceptance Test
SAWS	South African Weather Service
SBD	Short Burst Data
SCD	Satélite de Coleta de Dados (Data Collection Satellite, Brazil)
SCG	Services Coordination Group (JCOMM)
SCOR	Scientific Committee on Oceanic Research (ICSU)
SEACORM	South East Asia Center for Ocean Research and Monitoring (Republic of Indonesia)
SeaDataNET	Pan-European infrastructure for Ocean & Marine Data Management
SHOM	Service Hydrographique et Océanographique de la Marine (France)
SIMORC	System of Industry Metocean data for the Offshore and Research Communities
SIO	Scripps Institution of Oceanography (University of California, USA)
SOBP	Southern Ocean Buoy Programme
SOC	Specialized Oceanographic Centre (JCOMM)
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 Abarometer at a 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 Coordinator
TIP	Tiros Information Processing
TIP	Tropical Moored Buoys Implementation Panel
TOWS-WG	Working Group on Tsunamis and Other Hazards related to Sea Level Warning and Mitigation Systems
TRITON	Triangle Trans-Ocean buoy network
TSG	ThermoSalinoGraph
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/QM	DBCP Task Team on Quality Management
TT/TD	DBCP Task Team on Technological Development
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNOLS	University National Oceanographic Laboratory System (USA)
URL	Uniform Resource Locator
VOS	Voluntary Observing Ship (JCOMM)
WCRP	World Climate Research Programme
WIS	WMO Information System
WMO	World Meteorological Organization (UN)
WMS	Open Geospatial Consortium Web Map Services
WWW	World Weather Watch (WMO)
XBT	Expendable BathyThermograph