DATA BUOY COOPERATION PANEL
TWENTY-SECOND SESSION

La Jolla, USA, 16-20 October 2006

FINAL REPORT

JCOMM Meeting Report No. 42

INTERGOVERNMENTAL OCEANOGRAPHIC COMMISSION (OF UNESCO

WORLD METEOROLOGICAL ORGANIZATION

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N O T E

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C O N T E N T S

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-XXII was opened at the Sumner Auditorium of the Scripps Institution of Oceanography (SIO), at 09.00 hours on Monday, 16 October 2006.

1.1.2 On behalf of the Panel, Mr David Meldrum, Chairperson of the Panel, commended NOAA and the local organisers at the Scripps for the excellence of the arrangements, and welcomed the return of the Panel sessions to La Jolla after an absence of 12 years. Scripps had always enjoyed a special place in the Panel's appreciation and affection, through the seminal scientific and technical work that had taken place there on both drifters and profiling floats, and the warm welcome that always greeted Panel members visiting the area. In addition to its scientific pre-eminence, the region boasted several companies involved in developing advanced solutions to the observational problems facing oceanographers, meteorologists and climatologists, and it was pleasing to the Panel to see several of them being represented both at the Scientific and Technical Workshop and at the Panel sessions themselves. Mr Meldrum reminded Panel participants that the Panel's sessions were indeed open forum, and that the participation of as wide a constituency as possible of data buoy interests was fundamental to the Panel's aims.

1.1.3 On behalf of the Secretary-General of WMO, Mr Michel Jarraud, and the Executive Secretary IOC, Dr Patricio Bernal, the Secretariat representative also indicated his special gratitude to NOAA, SIO and their staff for the excellent arrangements made to ensure the success of the session. He emphasized the importance of Panel's activity in the WMO and IOC efforts in various domains; for example, cooperation that is foreseen between the DBCP and the Tsunameter consortium was of direct importance to the IOC Intergovernmental Coordination Group for the Indian Ocean Tsunami Warning and Mitigation System (ICG/IOTWS) and to the WMO Natural Disaster Prevention and Mitigation Programme (DPM). The Secretariat representative then noted that JCOMM has been contributing to the efforts to establish a Global Earth Observation System of Systems (GEOSS), in providing technical guidance as well as international coordination and infrastructure such as WIS. 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 JCOMM.

1.1.4 On behalf of the Administrator of the National Oceanic and Atmospheric Administration, VADM (retired) Conrad C. Lautenbacher Jr., Dr Paul Moersdorf Director of NOAA National Data Buoy Center (NDBC), extended a warm welcome to all participants in the forthcoming workshop and session. He recalled that the original hosting proposal was made last year with the venue of NOAA's National Data Buoy Center in south Mississippi, but plans had to be changed after Hurricane Katrina on August 28, 2005 struck the surrounding area. Dr Moersdorf noted that such natural phenomena reminded us how important our work is and that we have the opportunity to save lives and protect property, and then expressed his appreciation to the Scripps Institution of Oceanography for making their facilities available for the meeting. He finally emphasized the importance of the Panel's coordination and cooperation for establishment of an effective and efficient worldwide ocean observing system, and wished attendees a fruitful session.

1.1.5 Dr John Orcutt, Director of SIO, welcomed participants to the meeting and to La Jolla and expressed his pleasure to host this workshop and session at SIO. He then noted the active role of SIO in leading scientific development of ocean observation toward operationalization and enhancement of global networks, for example, through the US/NSF Ocean Research Interactive

Observatory Networks (ORION) project. Dr Orcutt also noted that the research community was keen to promote a high-level commitment to global ocean observation through GEOSS, and emphasized the importance of scientific and technical development to ensure its success. He closed his remarks by wishing a pleasant stay for the participants.

1.1.6 Mr Mike Johnson, Director of the NOAA Office of Climate Observation and JCOMM Observations Programme Area Coordinator, added his welcome to DBCP-XXII on behalf of NOAA OCO as a co-sponsor of the meeting, along with NOAA NDBC. He noted with appreciation the work of Bill Burnett, NDBC, and Sid Thurston, OCO, as the sponsor organizing committee, and the work of Dana Dahlbo and Scripps Institution of Oceanography for providing the excellent local logistics.

1.1.7 Mr Johnson presented a keynote address titled "Data Buoys, a Cornerstone System of the Global Earth Observation System of Systems." Dr Richard Spinrad, NOAA Assistant Administrator for Research, and U.S. Representative to the IOC, was originally scheduled to provide a keynote address but due to a last minute schedule conflict, Dr Spinrad was not able to travel to the DBCP meeting. He sent his regrets via Mike Johnson, and asked Mr Johnson to convey three main sentiments to the Panel: 1) ocean observations are critical to NOAA's mission; NOAA cannot accomplish its scientific and forecast mission goals without a global ocean observing system; 2) international cooperation is crucial to success, and NOAA is committed to strengthening international partnerships; 3) ocean observations add value to society, and at least eight of the nine GEOSS societal benefits depend directly on GOOS.

1.1.8 Mr Johnson noted that the GOOS is a composite system depending on global coverage by the drifting and moored buoy arrays, profiling floats, tide gauge stations, and ship-based systems, plus continuous satellite missions, plus data and assimilation subsystems, plus system management and product delivery. The road map for global implementation that has been accepted by the JCOMM OPA is the GCOS-92 Implementation Plan: this plan has been endorsed internationally including endorsement of the ocean domain as the ocean baseline of GEOSS.

1.1.9 Six global *in situ* implementation programs are now linked through JCOMM coordination – the DBCP, the SOT, GLOSS, Argo, OceanSITES, and the International Ocean Carbon Coordination Project (IOCCP). This provides an excellent framework for organizing global implementation of GOOS in support of GEOSS.

1.1.10 Mr Johnson complimented and congratulated the DBCP as being a leader and a model for GOOS implementation. The successful DBCP model includes: 1) shared benefits; the individual national contributions result in a global data set for use by all; 2) shared responsibility; the DBCP has always been a self-supporting Panel with all members contributing to the necessary Panel logistics and infrastructure according to their nation's ability to contribute; 3) the concept of the DBCP regional Action Groups has been a model for implementation bodies such as the GOOS Regional Alliances; 4) the Technical Coordinator and platform support centre and JCOMMOPS are recognized as a successful and effective mechanism for coordinating national implementation efforts; 5) the DBCP actively promotes science, technology development and user feedback; and 6) the DBCP continues to look to the future to optimize the effectiveness of the Panel.

1.1.11 It was reported that the present status of implementation of the Global Ocean Observing System overall is 56% of the global coverage targets identified in GCOS-92. A total of 5635 platforms is being maintained globally. Of this total, 1660 platforms are data buoys. Some individual system advancements were highlighted by Mr Johnson, in particular the sustained global drifting buoy array of 1250 buoys, extensions of the topical moored buoys in the Atlantic and Indian Oceans, ocean reference stations, the addition of meteorological sensors to the Chilean tsunami buoy, and the addition of carbon sensors to coastal weather buoys. A new web-based observing system management tool that has been developed by NOAA was introduced; the tool – the Observing System Monitoring Center (OSMC) - is now available for test and evaluation by interested observing system managers, and will be accessible via the JCOMMOPS web site.

1.1.12 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-second session of the DBCP itself was opened by the Panel Chairperson, Mr David Meldrum, at 14.00 hours on Tuesday, 17 October 2006, in the conference room of the Sea Lodge Hotel. The Chairperson welcomed participants again to the session and once more thanked the NOAA and SIO for hosting it and providing such a congenial environment and facilities.

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

1.3. ADOPTION OF THE AGENDA

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

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

Period 1 September 2005 to 31 January 2006

2.1.1 The former Technical Coordinator, Mr Etienne Charpentier, reported on his activities during the period 1 September 2005 to 31 January 2006. During this period he 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 his time was spent on SOOP Time spent on JCOMM was either related to DBCP and SOOP or consisted of JCOMMOPS development and operations.

2.1.2 During the period, the following priorities had been addressed:

(i) user assistance;
(ii) working on the adoption of the proposed BUFR template for wave data by CBS and attending the ET/DRC meeting in Oman, 5-8 December 2005;
(iii) monitoring, improvement, and further development of the Argos GTS sub-system and follow up of current Argos issues (e.g. delays);
(iv) JCOMMOPS maintenance and development;
(v) finalizing the buoy life-time study that was presented at the DBCP-21 workshop;
(vi) assisting users of the buoy metadata collection scheme;
(vii) liaising with the DBCP Action Groups;
(viii) preparing the DBCP Data Users and Technology workshop and the SST and water temperature metadata workshop (Reading, March 2006);
(ix) participating in the POGO discussions for establishing a research cruise database and attending the associated meeting in Silver Spring, 13-15 December 2005;
(x) assisting with the recruitment process for a new Technical Coordinator, and
(xi) preparing documentation and the detailed work-plan for the new Technical Coordinator once recruited.

2.1.3 During the period, he participated in a number of events and meetings, including in particular the JCOMM-II session, Halifax, 19-23 Sept. 2005, where he represented JCOMMOPS. He attended the CLIVAR South Pacific Workshop, Concepcion, Chile, 13 October 2005 and made a presentation on the GDP. He attended the twenty first session of the DBCP, the twenty fifth meeting of the Argos JTA and represented the Panel at the NPDBAP and the IBPIO meetings in Buenos Aires, October 2005.

2.1.4 He gave three months advance notice of his resignation, which became effective on 31 January 2006. During these three months, he assisted the Panel in the recruitment process for the new Technical Coordinator. Mr Charpentier expressed considerable appreciation to the Panel Members for their ongoing support and trust since his recruitment in 1989.

2.1.5 The Chairperson welcomed Hester Viola, the new Technical Coordinator and wished her successful and fruitful time in her future work for the Panel.

Period 1 February to 30 June 2006

2.1.6 The incoming Technical Coordinator, Ms Hester Jane Viola, thanked the Panel members for their warm welcome and requested that anyone she had not had the chance to meet to date should feel free to approach her between sessions. During the period 1 February to 30 June 2006 the Position of Technical Coordinator was vacant. However support was provided by:

- WMO for technical support;
- Argo TC (Mathieu Belbeoch);
- Météo France (Pierre Blouch) for user assistance;
- IOC and selection committee for new TC recruitment;
- CLS

2.1.7 Thanks were given to all of those people who assisted during this time. The Panel also wished to thank WMO and CLS (formally Service Argos) for providing human resources in support of the Panel during this period.

2.1.8 The incoming TC stressed that the long period during which the TC role was vacant had many immediate impacts and would continue to impact on the DBCP and the JCOMMOPS information system well into the next intersessional period. Such impacts were:

- missing data (metadata) about buoys deployed during the time
- lack of user support
- lack of encouragement to put data onto the GTS
- lack of any manual quality checking or feedback
- lack of web developments
- delays in reporting, monitoring and creation of monthly maps.

The Panel was asked to appreciate that these issues had built up considerably during the period of vacancy and that the problems would now take a lot longer to solve than if they could have been addressed at the time they were first encountered. The negative impacts were cumulative.

Period 1 July to 31 August 2006

2.1.9 Ms Hester Jane Viola took up the position of TC on 1 July 2006 (see item 10.2). The Panel was asked to note that the percentage allocations of TC time spent on the DBCP were not as in previous intersessional periods due to the backlog of data loading and SOT reporting.

2.1.10 Ms Viola started her duties with:

- Visit to IOC;
- Training and handover from the former TC in Geneva, Switzerland and Toulouse, France;
- Familiarisation and meeting with the stakeholders for DBCP and JCOMM and wider community;
- Increasing familiarity with the organizational and technological tasks of the DBCP TC role;
- Producing reports and maps as required;
- Making some minor changes to DBCP and JCOMMOPS web pages;
- Preparing for DBCP-XXII.

2.1.11 The status of buoys reporting on the GTS in August 2006 was as follows:

Variable	Any	Air P	Tend.	SST	Air T	Hum.	Wind	Waves	Sub/T
Drifting Buoys	1237	331	305	1097	16	0	21	0	8
Moorings	183	121	104	174	170	97	158	109	64

2.1.12 The technical coordinator presented a map of the movement of buoy 1250 deployed in Halifax last year, showing how it had been drifting easterly in the last year.

2.1.13 In summary, the new TC was settling into the role and was working as part of JCOMMOPS. The Panel was encouraged to :

- Be aware of and allow for the affects of the prolonged vacancy on the function of JCOMMOPS Information System and on the TC's work load;
- To be proactive in requesting information and providing background/advice to the TC: in particular the Panel should assist in setting the priorities for the TCs future work;
- Provide further instruction and guidance to the TC during discussions on future work plans.

2.1.14 The TC posted a list of future plans for the next intersessional period, which were to be discussed later in the meeting in agenda item 7.2 (Information Exchange) and 8.5 (JCOMMOPS Developments and Operations).

2.1.15 The Technical Coordinator invited Panel members to provide her with guidance regarding Panel requirements for international technical coordination.

2.1.16 The full report of the Technical Coordinators is given in *Annex III*. The Panel thanked Mr Charpentier and Ms Viola for their work undertaken during the past intersessional period. It also thanked WMO for having provided substantial training for the new Technical Coordinator.

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

(ii) the Global Drifter Programme (GDP) (verbal presentation by Rick Lumpkin, GDP representative);

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

(iv) the WCRP-SCAR International Programme for Antarctic Buoys (IPAB) (verbal presentation by Dr Shuki Ushio, Chairperson of the IPAB)

(v) the International South Atlantic Buoy Programme (ISABP) (verbal presentation by Mr Mark Majodina, representing the ISABP);

(vi) the International Arctic Buoy Programme (IABP) (verbal presentation by Dr Ignatius Rigor, Coordinator of the IABP);

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

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

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

Summaries of the presentations are reproduced in *Annex IV*. As usual, the full reports of the action groups will be reproduced in the Panel's Annual Report.

2.2.1.2 Some comments and discussion followed the above presentations:

(i) The Panel noted with appreciation that GTS delays had substantially improved in the Indian Ocean thanks to the resumption of routine operations of the Argos LUT in La Réunion. Appreciation was also expressed to South Africa for its work on replacing Gough Island and Marion Island Argos Local User Terminals (LUTs). Nonetheless, more than 50% of the observations from the region were still not received within 120 minutes, and the Panel urged CLS to work with the Technical Coordinator to identify the reason for these delays, and to suggest ways for reducing them **[Action]**;

(ii) The Panel noted that the maintenance of the IPAB network was difficult due to the seasonal variability of sea-ice distribution. In this context, the Panel invited its Members to actively participate in the IPAB and/or to provide for deployment opportunities **[Recommendation]**;

(iii) The Panel asked the WMO and IOC Secretariats to write to members of Asian countries in order to seek their active participation in the NPDBAP **[Action]**;

(iv) The Panel invited its members to work at developing deployment strategies using the array dispersion tools that the GDP had developed, and encouraged the further development of such tools by the GDP and by others **[Recommendation]**;

(v) The Panel noted the study by AOML to show how accurately the diurnal cycle of SST could be resolved using statistical analysis. It recommended that the OOPC provide a clear and precise statement of its requirements in order for the GDP to ascertain whether new technological developments are required to meet these requirements (real time requirements, clarification of the definition of hourly SST value, i.e. sampling period, averaging period, averaging period ending on the hour or centred on the hour, timing accuracy, etc) **[Recommendation]**. Technical solutions included adding a temperature compensated crystal oscillator (TCXO) or using GPS. The DBCP Evaluation Group was asked to look at practical technical solutions in more detail and to work on cost impacts once the requirements became available **[Action].** Pacific Gyre explained that achieving a drift of less than 1 min/year was feasible using crystal clocks;

(vi) The Panel noted with concern that, at any given time, only about 63% of the drifter population had retained its drogue. The GDP reported that a drogue life time evaluation had been made and that improvements had been noticed in the last two years. The Panel urged the manufacturers to improve the drogue attachment design in order to make it more reliable **[Action]**.

(vii) The Panel agreed that the barometer upgrade opportunity offered through the GDC was of great value to the Panel and to NWP applications. It recommended its members to make use of the offer (details on DBCP web site) **[Recommendation]**;

(viii) The Panel noted with appreciation the plan to install salinity sensors on all TAO moorings by the end of 2007;

(ix) The Panel was pleased to note the development of the PIRATA network through the addition of new sites in the NE (2 moorings), SW (3 moorings), and the SE (1 mooring) Atlantic Ocean, thanks to commitments from Brazil, France, and USA. The network now consists of 16 sites;

(x) The Panel noted with appreciation the plan to eventually develop the Indian Ocean network of tropical moorings to 47 sites. 12 moorings are already in place and 3 more are planned for deployment by early 2007.

(xi) The Panel noted that the PICO design could be a long term solution for the TAO network but that the technology was presently lacking certain sensors, e.g. wind;

(xii) The Panel noted that obtaining additional ship time commitments from Member States/Countries was required in order to maintain the tropical moored buoy arrays. Recent experience had shown that Capacity Building initiatives such as organizing training workshops in developing countries could be used as an effective mechanism to encourage the active involvement of these countries in the observing programme operations and maintenance and recommended that such initiatives be repeated **[Recommendation]**. Relevant discussion is recorded under item 4.3;

(xiii) The Panel noted that the IABP and IPAB were contributing to the IPY (March 2007 to March 2009), e.g. through the DAMOCLES project. The Panel also noted that maintaining the IABP buoy array was a considerable challenge and that deployment opportunities were needed. The Panel also noted the development of an Ice Information Portal (http://www.polarview.org) by the JCOMM Expert Team on Sea Ice (ETSI), to be operational by March 2007;

(xiv) The Panel noted with concern the risk of accidents or injuries when drifter deployments from ships were not made properly. In particular, the paper tape that is present on some drogues should not be removed prior deployment as the drifter and its drogue might then behave as a kite. The Panel recommended the production of a short video for creating awareness and explaining deployment procedures in detail **[Recommendation]**;

(xv) The Panel noted that the Canadian Coastguard and the Tsunameter deployment and servicing missions by NDBC could provide excellent deployment opportunities for buoy deployments. It recommended to include information on such deployment opportunities on the JCOMMOPS web site **[Action]**;

(xvi) The Panel noted with serious concern the serious reduction of air deployment opportunities in the near future due to NAVOCEANO ceasing such activities. It invited its members to investigate whether they would be in a position to offer air deployment opportunities and at what cost, if any **[Action]**;

(xvii) The Panel recognized OceanSITES as both an Action Group and as a research-driven pilot project, since the observations were not yet made on an operational basis. A particular need for a project office and technical coordination was expressed. The Panel

considered this issue in conjunction with the future of JCOMMOPS (item 5.2) and the future management of the DBCP Trust Fund (item 10.3).

2.2.2 Scientific Implementation by the OceanSITES

2.2.2.1 The Panel received with interest the presentation made by Dr Uwe Send, co-chairperson of the OceanSITES, on the scientific achievement and future plans of OceanSITES. It was noted that, in most countries, the sites which contribute to the network were still supported and operated as part of research efforts and as research stations. Thus many sites were still focused on a single discipline, such as air-sea fluxes, circulation, physical oceanography, biogeochemistry, downward particle flux, benthic studies, or geophysics.

2.2.2.2 The Panel, however, was pleased to note that these timeseries have made great progress at a scientific level. For example, air-sea fluxes are now being measured in the important Kuroshio extension region (KEO), circulation/transport timeseries are collected across many Nordic straits and on sections in the subtropical North Atlantic, physical oceanography parameters are being monitored in the Weddell Sea, and particle flux/biogeochemical moorings have been maintained southwest of Tasmania. These are unique long timeseries being built for scientific studies of specific regimes or processes.

2.2.2.3 It was emphasized that, when building a global observatory network and planning sustained sites for scientific studies, a primary driver should be locations where the processes of interest are particularly pronounced or important for the global ocean system. OceanSITES has made efforts to introduce such guidance, for example by selecting prospective sites for the US/NSF ORION network.

2.2.2.4 While many science-driven timeseries observatories did not report data in real time, allowing data recovery only after instrument/mooring recovery, OceanSITES was pressing for data telemetry on as many moorings as possible. Dr Send noted that the sustained science-driven sites of the future would combine multi-disciplinary observations, (bi-directional) data telemetry, and state-of-the-art technologies. Examples were shown in the US ORION sites, and in the UK National Oceanography Centre Southampton (NOCS) observatory at its PAP site. Additionally, the European CIS site has recently started to telemeter physical data, CO_2, chlorophyll, and nutrient data from a mooring.

2.2.2.5 In conclusion, Dr Send introduced issues to be considered by JCOMM and DBCP, including:

(i) cooperation between OceanSITES and other communities (tsunami, waves, etc)

(ii) sharing of ships (including inter-agency, e.g. NOAA-UNOLS)

(iii) sharing of infrastructure, e.g. the possibility for ORION and NOAA to contribute to upgraded PAPA or Peru Stratus moorings

(iv) advocacy to GEO: role of JCOMM and IOC/WMO

(v) project office support

2.2.3 Tsunami warning systems

2.2.3.1 The Panel received a report by Mr Ken Jarrott on the tsunami warning systems and the issues arising from the development of sea level observation systems for the Indian Ocean Tsunami Warning and Mitigation System. These issues would apply to some degree to the development of other international tsunami warning systems. The full report is reproduced in *Annex V*.

2.2.3.2 Critical issues receiving current attention were:

- Development and promulgation of common instrument standards, data exchange formats and data quality control processes, with particular priority for deep ocean stations (over the next 6-12 months, the national deep ocean sea level networks of India, Indonesia, Malaysia, Thailand and Australia will draw on technology from all four present international suppliers);
- Development of communal acceptance processes for "core" stations on which many nations might depend, including demonstration of a capacity to ingest and use that data in countries other than the station's host country;
- Formulation of collective web-based tools to assist network progress tracking during system development and for subsequent operational status accounting;
- Development of an international data archive for high resolution data sets.

The Panel recognized that many of these activities related directly to the role that the DBCP has exercised since its inception, and to its current expertise base and communal data tools.

2.2.3.3 The Panel considered that ongoing communication and engagement should be made between DBCP and Tsunameter consortium, and encouraged Members to maintain their commitment in this regard. It was decided that the Panel should work with representatives of the Sea Level Working Groups of the IOC's Intergovernmental Coordination Group for the Indian Ocean Tsunami Warning and Mitigation System (ICG-IOTWS) and its Pacific Ocean counterpart, and in particular with the International Tsunameter Partnership group, to explore mechanisms for constructive engagement with global tsunami warning systems development **[Action].**

2.2.3.4 The Panel also recalled a meeting of JCOMM experts on possible JCOMM contributions to the development and maintenance of marine multi-hazard warning systems (1-3 February 2006, Geneva), which had proposed a set of actions that JCOMM could contribute to the development and maintenance of multi-hazard marine warning systems. One offer made by this meeting toward ocean-related hazard warning systems was that DBCP assist the DART Consortium with technical issues including real-time GTS data reporting, deployment, potential multi-purpose buoys, code format, quality control, etc. A summary report of this meeting is available on the WMO website at http://www.wmo.ch/web/aom/marprog/Wordpdfs/Jcomm-MR/JCOMM-MR37-MHAZ/JCOMM-MR37-MHAZ.doc.

2.3 NATIONAL REPORTS

2.3.1 The Panel received written and verbal reports on current and planned buoy programmes from Australia, Brazil, Canada, France, India, Kenya, The Netherlands, Nigeria, South Africa, United Kingdom, and USA. As usual, these written reports, as well as others submitted to the Secretariat before 30 November 2006, would be published in the Panel's Annual Report.

2.4 ARGO STEERING TEAM AND ARGO INFORMATION CENTRE

2.4.1 The Argo Technical Coordinator (TC), Mr Mathieu Belbéoch reported on the status of the Argo project on behalf of the Argo Steering team (AST). The Panel noted that Argo had maintained almost global coverage since 2004, and currently collected data from 2576 active floats. The Panel recalled that Argo was a truly international project, with 23 participating countries, and was pleased to note that a number of new countries from South America had joined the project in 2005-2006. Mr Belbéoch presented the progress achieved by Argo regarding float lifetime and recalled that there was still improvement to be made to reach an optimal survival rate.

2.4.2 The Argo Technical Coordinator concluded by noting that Argo was facing financial, technological and logistical challenges regarding its transition to a sustained ocean observing system. This transition would require continuous cooperation between research and operational communities.

2.4.3 Representatives from the Netherlands, UK, Australia and India then reported on their deployment plans for 2006 and 2007, advising the Panel that they would probably maintain or extend their level of contribution to the Argo project. The UK reminded the Panel that, nonetheless, the transition from research to sustained or operational funding remained a considerable challenge.

2.4.4 The Argo TC then reported on the developments achieved at the Argo Information Centre. He explained that each float was rigorously monitored on a daily basis using tools specifically developed for the purpose. He presented the data flow at the AIC and the various sources feeding the system routinely and manually. The Panel noted that the level of use of the AIC website was impressive with 11000 sessions per month. The new AIC web site, implemented in September 2006, was presented to the Panel. A number of new features had been added to the web site.

2.4.5 The Argo TC reported on progress regarding the Argo donor programmes and efforts toward seeking participation of new countries in Argo.

2.4.6 Mr Belbéoch finally reported on the AIC plans for the period 2006-2007, viz:

(i) To highlight Argo project progress and value on the new website;

(ii) To rationalize reporting (weekly, monthly, yearly) to the Argo community;

(iii) To develop tools to assist deployment planning;

(iv) To improve Argo portal, www.argo.net;

(v) To finalize donor programmes in cooperation with IOC and WMO secretariats;

(vi) To finalize the beached floats retrieval procedure;

(vii) To establish new contacts (e.g. research cruises);

(viii) To make modest improvements to Argo media coverage.

2.4.7 The Panel thanked Mr Belbéoch for the comprehensive overview of the Argo programme and AIC activities and applauded the work undertaken by AIC under JCOMMOPS in synergy with the Technical Coordinator of the DBCP.

2.4.8 Ms Elizabeth Horton reported that Mr Ariel Troisi (Chairperson, ISABP) apologized for not being able to attend the meeting, but had asked Ms Horton to report that Argentina had started an Argo programme with local schools and that the Argo Technical Coordinator's efforts had therefore borne fruit in Argentina.

2.5 EVALUATION SUBGROUP

2.5.1 The Chairperson of the Evaluation Group, Ms Elizabeth Horton, reported on the activities of the Group. During the intersessional period, the GDC had continued performance tests of SVP drifters manufactured by Clearwater, Pacific Gyre, MetOcean and Technocean. The results showed much improvement over last year, and GDC had decided that no further testing was needed at this time. In general, Panel members were happy with the performance of the surface drifters, although there were sporadic instances of high failure rates that would repay further investigation. Similarly, high rates of wind sensor failure had been noted. The pressure spiking problem had reappeared in the Southern Ocean, although Panel members had not yet had sufficient time to analyze the data collected. The Evaluation Group Chairperson remarked that an analysis of pressure spiking or wind sensor performance might form a suitable student research project, and invited recommendations from the Panel in this regard **[Action]**. Technocean and

Pacific Gyre had reworked their submergence sensors, and Pacific Gyre had redesigned their antenna with good results for location performance.

2.5.2 Recommendations from the DBCP Data Users and Technology workshop held in Reading, UK were being implemented. The GDC evaluation of strain gauges for detection of drogue on/off had been completed. The study to see if submergence sensors might be used to calculate wave energy had yielded positive results. Work had been done on a low power GPS receiver. The Panel needed clarification on the hourly requirement expressed by OOPC, so that drifter operators might determine whether their platforms were already capable of resolving the diurnal and semi-diurnal SST signals. Other recommendations from the drifter technology workshop were to be pursued during the intersessional period, and buoy operators and manufactures were encouraged to maintain their good work in this regard.

2.5.3 It was clear that buoy operators needed to maintain close communication with manufacturers so that problems might be quickly identified and resolved. In this regard, the usefulness of a dedicated evaluation team to produce high quality diagnostic data had been well demonstrated.

2.5.4 The Panel expressed its appreciation to the Evaluation Group for excellent work undertaken so far on its behalf. The Panel also paid a special tribute to Ms Horton, the outgoing Chairperson of the Group, for her dedicated service to the Panel and its activities over many years.

2.5.5 The Panel accepted with appreciation the offer of Dr Bill Burnett (USA) to act as new Chairperson of the Evaluation Group.

3. NEW ACTION GROUPS

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

4. REVIEW OF THE DBCP IMPLEMENTATION STRATEGY

4.1 REPORT OF THE AD HOC TASK TEAM ON THE FUTURE STRATEGY OF THE DBCP

4.1.1 At its previous session, the Panel had enjoyed an extensive debate on its future mission, and the ways in which this might best be realised, taking account of the extensive resources at its disposal in terms of finance, manpower, experience, goodwill and reputation. The Panel was held in high regard by many bodies, at all levels, and it was felt that the Panel should use this good office to exert as beneficial influence as possible for the benefit of the wider community, as well as in the fulfilment of its own aims. Accordingly it had approved the creation of a Task Team, led by its Chairperson, to examine the future role of the Panel within this wider context.

4.1.2 The task team had met at the previous session, and had identified a number of strengths, weaknesses, opportunities and threats. It was immediately clear that a major strength for the Panel, and a feature which had earned its wider reputation, was the appointment of an effective Technical Coordinator, both to pursue the Panel's immediate aims, and to be proactive in the wider debate regarding the support of ocean observing systems. It was also clear that the overarching JCOMM structure (JCOMMOPS), that had been created to support the technical coordination activities of the Panel, the SOT and Argo, was about to embark on a process of growth and change, and that the Panel must be both proactive and flexible in the debate regarding the future of JCOMMOPS. Accordingly, the Panel Chairperson was tasked with taking this issue forward, and both he and the secretariats were asked to be mindful of the need to retain flexibility for the Panel, particularly with regard to the employment arrangements for its Technical Coordinator.

4.1.3 A first step was an early meeting with the Argo Steering Team (AST), who themselves enjoyed the services of a Technical Coordinator, co-sited with the DBCP/SOT Technical Coordinator, and who also had a number of issues to resolve regarding their continued technical support and where it might be located. The meeting quickly arrived at a consensus position which recognised the essential nature of specialised technical support with intergovernmental status, the need for such support to be absolved of mundane duties, and a preference for a location within an operational agency such as a national meteorological or oceanographic service. Such a location would potentially confer a number of advantages, such as the provision of 24/7 cover for routine activities, and a closer relationship with end users. The host agency might also be expected to offer significant contributions in kind in exchange for the kudos of hosting JCOMMOPS, which would release resources to the parent bodies for other activities, particularly in the development of wider and more progressive initiatives.

4.1.4 The ease with which this consensus position was achieved immediately suggested an early engagement with all other observing system groupings and stakeholders who might wish to enter the debate regarding the future of JCOMMOPS. Accordingly, the secretariat acted swiftly to convene a 'round-table' discussion of these issues in Washington in May 2006, the object being to informally brainstorm, within a rather small number of participants, all options available for observing system coordination and technical support. Once again, an excellent consensus was reached that the DBCP/SOT/Argo/JCOMMOPS model for technical support was particularly effective, that its future needed to be protected, and that other observing systems and stakeholders should be actively encouraged to participate, using freely-provided 'pump-priming' support from existing participants if required. In this regard, the Panel Chairperson indicated on behalf of the Panel its willingness to extend support to other observing systems, within the limits of available resources. The full report of the 'round table' meeting is attached as *Annex VI*.

4.1.5 The outcome of this meeting was conveyed to the JCOMM Management Committee (JCOMM-MAN) meeting in October 2006. JCOMM-MAN fully endorsed the meetings findings and its positive spirit, and tasked the Panel and the secretariat with drawing up a specification for the future JCOMMOPS mission and its support requirements **[Action]** (see also item 5).

4.1.6 The DBCP Task Team met again just prior to the current session, to consider the above intersessional meetings, the actions that had fallen to it, and the ways in which it might again assert a proactive role in observing system support. In so doing, it was aware that a recent accounting review by Panel member Mr Frank Grooters might reveal that it had unexpected financial resources at its disposal. The Team was unanimous in suggesting the following general actions to the Panel:

- To exploit the Panel's experience and resources in the development of training materials and the active participation in Capacity Building in developing nations;
- To actively pursue technology evaluation initiatives, e.g. the establishment of pilot projects for the assessment of satellite communication options such as Iridium;
- To engage with other observing systems and assist 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;
- To promote the mission of the Panel through wider engagement both with the general public and with decision makers.

4.1.7 In the discussion that followed, the Panel was fully supportive of the recommendations of the Task Team, and recognised that most of them would entail the expenditure of Panel resources. It also recognised that the Panel would have to act relatively swiftly in these matters so that it might retain its initiative, and that the current practice of referring all planned expenditure to the plenary Panel session would potentially be counterproductive to its aims. 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 **[Action]**. The composition of the Executive Board, modelled on the effective AMDAR Board, is described more fully in *Annex VII*.

4.2 REQUIREMENT FOR WAVE OBSERVATIONS

4.2.1 Mr Val Swail, Chairperson of the JCOMM Expert Team on Wind Waves and Storm Surge (ETWS), a component of the JCOMM Services Programme Area (SPA), made a presentation to the Panel on the requirement of the SPA for enhanced high-quality, long-term wave measurements in the global oceans in support of Maritime Safety Services.

4.2.2 It was noted that the vast majority of existing wave measurements were made in the coastal margins of North America and western Europe, with a huge data void in most of the rest of the global ocean, particularly in the southern ocean and the tropics, while other existing observational systems have often considerable coverage in these areas. The primary requirement identified was for additional wave measurements comprising, at a minimum, significant wave height, peak period and 1-D spectra, hourly in real-time, for assimilation into coupled atmosphere-ocean wave models for real-time forecasting activities, and subsequent verification. In particular, the present wave forecast verification exchange activity carried out under ETWS guidance by eight national centres, in support of maritime safety services, provided a mechanism for quality assurance of the national wave forecast models contributing to safety of life at sea, ship routing, Global Maritime Distress and Safety System (GMDSS), etc. Other requirements expressed for additional wave measurements included:

(i) calibration/validation of satellite wave sensors;

(ii) description of the ocean wave climate and its variability on seasonal to decadal time scales;

(iii) the role of waves in the coupled ocean-atmosphere system, and their inclusion in weather and climate models.

4.2.3 The Panel recognised the requirement for additional high-quality wave measurements in under-sampled areas of the world oceans in support of the SPA's activities in the area of Maritime Safety Services, and agreed to:

(i) recommend adding wave measurements to the DBCP Implementation Strategy **[Action]**;

(ii) invite buoy operators and Panel Members to increase wave measurements, particularly from open ocean areas, in the Southern Ocean, and the tropics **[Recommendation]**;

(iii) invite the DBCP Evaluation Group to address wave measurement technology issues and to communicate with the ETWS and OOPC on user requirements **[Recommendation]**;

(iv) make recommendations to the JCOMM/OCG (a) to address the broader issues in terms of technological development and implementation, including wave measurements from Ocean Sites, Argo, drifters, Triton/TAO/PIRATA and shipboard systems, and (b) to liaise with the ETWS and OOPC on wave data requirement issues **[Recommendation].**

4.2.4 The Panel urged the ETWS to work with the JCOMM Observations Programme Area, through its component groups and sub-groups including DBCP, to put forward a more detailed set of requirements for additional high-quality wave measurements as soon as possible, and to transmit those requirements through the SPA Coordination Group to the OCG for further action **[Action]**.

4.3 CAPACITY BUILDING

4.3.1 The Panel considered that it was timely to extend its remit to Capacity Building (CB) activities, as the technology and global coordination for operational activities were now considered to be sufficiently mature. It noted that there were number of relevant initiatives under way such as;

(i) the recent participation of Tristan da Cunha in the ISABP, with agreement to deploy drifters in exchange for access to the data. In response to this initiative, a workshop is planned prior to the next ISABP meeting to be held in Cape Town, South Africa, in 2008, to encourage participation of African Countries. ISABP also seeks further participation from countries in the region, including Tanzania, Namibia, and Angola;

(ii) the IBPIO support for CB activities in the African region, in the light of expressions of interest from Mozambique and Tanzania for providing buoy deployment opportunities in the Indian Ocean;

(iii) the recent Training and Capacity Building Workshop for the Eastern Indian Ocean (7-10 June 2006 in Bali, Indonesia), organized by the Republic of Indonesia South East Asia Center for Ocean Research and Monitoring (SEACORM) and the NOAA Office of Climate Observation (OCO). This had been convened within the framework of *PArtnerships with Noaa for GEoss Applications (PANGEA)*, with the aim of strengthening partnerships with regional institutes in order to share resources such as shiptime for mooring deployments;

(iv) the Ship Observations Team (SOT) Third International Port Meteorological Officers workshop (PMO-III) at Hamburg, Germany, 23-24 March 2006, to which representatives from developing countries had been invited and financially supported by WMO. Major aims for the workshop had been to convey important recent developments (e.g. regarding WMO publication No. 47, enhanced PMO communications), as well as promoting global standards of service. The workshop had made a few recommendations related to capacity building;

(v) the collaboration of Kenya with NOAA for buoy deployments in the Indian Ocean region.

4.3.2 The Panel again emphasized the importance of extending developing nations' participation to the Panel's activity, not only to fill spatial/technical gaps in implementation but also to improve the quality of observations. In doing so, the Panel warmly welcomed the participants from Kenya and acknowledged Kenya's efforts made so far in this domain.

4.3.3 The Panel noted that such exercises would ultimately improve the sharing of resources (e.g. buoy donations, ship-time, deployment technology) on a global scale, as the case of the Bali workshop in June 2006. The Panel therefore decided to devote appropriate resources to capacity building activities, including the development of training materials, subject to agreement and approval for each proposed activity **[Action]**.

4.3.4 The Panel also noted that such CB efforts – including training workshops – should be supported on a sustained basis. In doing so, standard documents including training materials should be developed and kept updated in parallel with the organization of training programmes.

4.3.5 The Panel also noted that CB activities should run in coordination with other JCOMM programmes and Panels, for maximum synergy and efficiency. Accordingly, the Panel and its Action Groups were encouraged to keep the JCOMM Capacity Building Rapporteur to the OPA (Ms Miriam Andrioli) informed regarding ongoing and planned CB activities **[Action]**.

4.3.6 The Panel considered that some external resources should be sought, including those of the WMO and IOC capacity building programmes. It therefore requested the Secretariat to

investigate possible cooperation with relevant CB programmes in WMO and IOC, and on appropriate ways to submit proposals for training initiatives that might elicit their support and participation **[Action]**. It also considered that collaboration with national/regional institutions and universities would be important in developing plans and relevant training materials. In particular, a series of technical training workshops in the regions would serve this purpose, which would also raise the interest of the nations/regions and encourage their active participation. The Panel agreed to reflect it in future planning for the Panel's CB work plans **[Action]**.

4.3.7 As one possible initiative within the Panel's CB efforts, a proposal for "a training course on buoy and fixed-platform data management" was introduced to the Panel. This proposal had been developed as an outcome from the DBCP data users and technology workshop, held at ECMWF in March 2006, which recognised the usefulness of the exercise for delegates from developing countries (See also the item 8.6.5). The proposal writers had worked in close cooperation with the Ocean Data and Information Network for Africa (ODINAFRICA), for training buoy operators and researchers in African nations on application and management of data from *in situ* oceanographic and marine meteorological platforms. A proposed programme for a training course (in June 2007, at the IODE Project Office, Oostende, Belgium) is given in the *Annex VIII*. The Panel was pleased to note that this plan to the goals and objectives of the Panel's CB activities, and coordinated well with existing IOC/IODE and Capacity Building programmes. The Panel approved this proposal, and agreed on its commitment to develop training materials and identify lecturers **[Action]**.

4.4 REVIEW AND UPDATE OF THE IMPLEMENTATION STRATEGY

4.4.1 Regarding the Panel's implementation strategy, Mr Meldrum reminded the Panel that this was a dynamic document, which needed suggestions from Panel members to keep it up to date. The work of the task team and new issues and priorities should be reflected in this process, accordingly. The Panel was invited to convey any suggestions to Mr Meldrum before 30 November 2006 so that an updated version of the strategy might be published on the Panel's website **[Action].**

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-XXI 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:

(i) The 5th meeting of the WCRP-SCOR International Programme for Antarctic Buoys (IPAB) (Dunedin, New Zealand, 3 December 2005);

(ii) The CBS Expert Team on Data Representation and Codes (Muscat, Oman, 5-8 December 2005). A new template for buoy directional and non-directional wave data had been approved by the team;

(iii) The 2006 meeting of the Presidents of the Technical Commissions (Geneva, Switzerland, 25-27 January 2006);

(iv) The Expert meeting on Possible JCOMM Contributions to the Development and Maintenance of Marine Multi-Hazard Systems (Geneva, 1-3 February 2006). In view of its existing expertise and facilities in waves and storm surges, maritime safety service formulation and delivery, and deployment and maintenance of ocean observing platforms, the Meeting had set up an action plan to support system developments already underway, under the two categories of:

- Can and will be implemented immediately, within existing resources and in response to identified requirements;
- Could be implemented, when requirements are clarified and resources made available.

(v) The Expert Meeting on the Development of the JCOMM Guide for Storm Surge Forecasting (Geneva, Switzerland, 8-10 February 2006);

(vi) A joint JCOMM/Industry/GOOS Task Team meeting (Paris, 3-4 March 2006). This meeting had been convened to develop a set of proposals to promote involvement of both JCOMM and GOOS with the private sector;

(vii) The 4th session of the CBS/IOS Expert Team on Requirements for Data from Automatic Weather Stations (ET-AWS, Geneva, Switzerland, 20-24 March 2006). The need for an integrated approach with regard to metadata had been stressed;

(viii) The E-SURFMAR VOS Technical Advisory Group and European PMO workshop (Hamburg, 20-22 March 2006), and the 3rd International Workshop for Port Meteorological Officers (Hamburg, 23-24 March 2006). Attended by 39 participants from 24 countries, the workshop had made a number of recommendations dealing with ship security, updating procedures for WMO publication 47, codes and table forms/reporting, etc. These recommendations would be discussed during the next SOT and JCOMM Management Committee meetings;

(ix) The DBCP data users and technology workshop (Reading, 27-28 March 2006). The Panel discussion and decisions for a follow-up to this workshop are reported under item 8.6.5;

(x) The JCOMM/OCG workshop for establishing a pilot project for the real-time collection of metadata for SST and temperature profile data (Reading, 28-29 March 2006). The Panel discussion and decisions regarding the outcome of this workshop are under item 8.6.4 of this report;

(xi) The 16th meeting of the International Arctic Buoy Programme (Bremerhaven, Germany, 24-26 April 2006);

(xii) The Inter-Commission Task Team on Quality Management Framework (Geneva, Switzerland, 25-27 April 2006). The meeting had agreed that the representative of each Commission would provide to the WMO Secretariat a list of those Commission documents which were used in current operations and considered by the Commissions as technical guidance documentation to be used by Members. The list should be reviewed on an annual basis and posted on the WMO QMF-website;

(xiii) The GLOSS training courses in sea level observation and interpretation (Tokyo, 15-26 May 2006), hosted by the Japan Meteorological Agency with 11 participants from 8 countries, covering topics such as tides and tidal theory; data reduction of sea level observations; tidal prediction; geodetic fixing of tide gauge benchmarks (including information on GPS collocation); uses of sea level data in scientific analysis and practical coastal applications, including storm surge and tsunami monitoring, and satellite altimetry;

(xiv) The 11th meeting of the International South Atlantic Buoy Programme (Buenos Aires, 30 May-2 June 2006);

(xv) The E-SURFMAR Data Buoy Technical Advisory Group (Galway, Ireland, 13-14 June 2006);

(xvi) The 6th meeting of the WCRP-SCAR International Programme for Antarctic Buoys (IPAB) (Hobart, Australia, 11 July 2006);

(xvii) The 2nd meeting of the CBS/IOS Expert Team on the Evolution of the Global Observing System (ET-EGOS, Geneva, Switzerland, 11-14 July 2006). In reviewing the outcomes of this meeting, the Panel decided that the Technical Coordinator should participate in ET-EGOS activities providing estimates of in situ instrument performance **[Action];**

(xviii) The 4th session of the CBS/IOS Implementation/Coordination Team on Integrated Observing Systems (ICT/IOS, Geneva, Switzerland, 11-15 September 2006);

(xix) The Inter-Commission Coordination Group on the WMO Information System (Beijing, China, 5-8 September 2006);

(xx) The 4th Regional Workshop on Storm Surges and Wave Forecasting (Manila, 11-15 September 2006), organized by JCOMM with the support of WMO's Tropical Cyclone Programme and the IOC Tsunami programme, with the aim of enhancing capabilities in the field of natural disaster prevention and mitigation;

(xxi) The 9th International Workshop on Wave Hindcasting and Forecasting (Victoria, 24-29 September 2006). This had been jointly organized with the Tropical Cyclone Programme (TCP) of WMO to provide trainees with open source and transferable numerical models for waves/storm surges connected with tropical cyclones, and to guide them in operational experiments with these models. Tsunami simulating tools had been included for educational purposes;

(xxii) The 5th session of the JCOMM Management Committee (Geneva, 5-7 September 2006);

(xxiii) The 2nd session of the JCOMM Data Management Programme Area Coordination Group (Geneva, 10-12 September 2006);

(xxiv) The 9th meeting of the International Buoy Programme for the Indian Ocean (IBPIO, La Jolla, 14 October 2006);

(xxv) The 5th meeting of the DBCP-PICES North Pacific Data Buoy Advisory Panel (NPDBAP, La Jolla, 15 October 2006).

5.1.3 The Secretariat reported on those outcomes of the fifth JCOMM Management Committee, Geneva, 5-7 October 2006, that were of direct interest to the Panel's activities. The JCOMM Management Committee (MAN) had undertaken a detailed review of work plans and strategies for each of its three Programme Areas (PAs) and for the cross-cutting teams on Capacity Building (CB) and Satellite Data Requirements (SDR). It had recognized that in most cases major activities were already underway, and that the forthcoming meetings of all the Programme Area Coordination Groups would provide a further impetus to this process. The Committee had also agreed that there was a need to better define cross-PA issues and urged the PA coordinators to define a strategic and implementation plan for PA cross-cutting activities and interactions, also addressing WMO cross-cutting programmes and activities, such as DPM, LDCs and WIS, and IOC programmes. The Committee had further agreed that there was a need to re-arrange the SPA structure focusing on information to be provided to Maritime Safety Services (MSS) and Search and Rescue (SAR). The Committee had also proposed to establish a JCOMM Technical Coordinator's position.

5.1.4 The Panel noted that the JCOMM Observations Programme Area had drafted a strategic workplan which had been presented to the Management Committee. The Panel was pleased to hear that the addition of barometers on all drifters had been included in the workplan.

The Panel noted that the Management Committee had stressed that the Panel needed to focus on achieving optimal spatial distribution on the drifter array **[Recommendation]**.

5.1.5 A Systematic Observation Requirements for Satellite-based Products for Climate had been published in September 2006 as GCOS report No. 107. In addition, the cross-cutting team on Satellite Data Requirements had been asked to review and develop requirements for use of satellite technology for enhanced climatology and real-time detection of ocean-related hazards.

5.1.6 The Panel then received the report on the outcome of the second meeting of the Data Management Coordination Group, Geneva, 10-12 October 2006. Decisions from the Group that are relevant to the DBCP are reported under agenda items 2.2.2 (CREX template for sea level data) and 8.2 (codes).

5.1.7 The Panel noted that the JCOMM Management Committee had agreed to develop a JCOMM Implementation Plan (IP) to support the JCOMM strategy document adopted by the Commission, and to develop and implement a performance monitoring system within JCOMM. The Committee had adopted an outline for the IP and had agreed that this would need to fit within the general umbrella of, and directly support, the overall WMO Strategic Plan 2008-2011 and the IOC Medium Term Strategy (2008-2011), including their Top Level Objectives and Expected Results. The plan should also reflect the overall JCOMM implementation strategy, covering all three Programme Areas and include JCOMM expected results, drivers, constraints, performance indicators and risks. The draft IP would be reviewed by the Management Committee prior to the WMO Congress and IOC Assembly in May/June 2007; and, subsequently, it should be distributed to Members/Member States for their review and input, prior to its finalization in late 2007.

5.1.8 For effective and frequent communication, a JCOMM newsletter had been published since JCOMM-II in electronic form, basically 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/newsletter2.php.

5.1.9 The JCOMM web site had been re-designed and somewhat upgraded, and the access address had been simplified to URL: http://www.jcommweb.net. It was planned to integrate both IOC and WMO JCOMM related web sites into one single web site managed in coordination between both Organizations. In addition, a new web site for the JCOMM Services Programme Area is under development (http://www.jcomm-services.org/index_new.asp).

5.2 DISCUSSION ON FUTURE JCOMMOPS

5.2.1 Mr Mike Johnson, the JCOMM OPA Coordinator, reported on the outcome of the informal JCOMMOPS Strategy Roundtable meeting which was held on 9 May 2006 in Silver Spring, USA. The purpose of the meeting was to bring together representatives of the programmes that are presently using JCOMMOPS, and other global programmes that could potentially benefit from using JCOMMOPS, to do some strategic long-range brainstorming. Participating were representatives from the OCG, DBCP, SOT, GLOSS, Argo, OceanSITES, IOCCP, and POGO.

5.2.2 The group generally agreed that the implementation of GOOS could be enhanced by evolving JCOMMOPS into a global observation programme support centre servicing all systems. System-wide coordination, cooperation, and efficiency could be improved by all systems working together to manage global implementation issues. The group had discussed JCOMMOPS' possible future staffing (up to seven people required), and hosting requirements (within an operational agency preferably). The Roundtable recommended that the OCG should develop a specification of requirements for the short-term and long-term, anticipating that JCOMMOPS might evolve over the next few years into a global system centre. A call for proposals would then be circulated based on that specification of requirements, and proposals from National Centres solicited. At its last meeting (Geneva, 5-7 October 2006) the JCOMM Management Committee

agreed with the strategy proposed by the Roundtable and noted that the overall decision making process could take two years or more.

6. SCIENTIFIC AND TECHNICAL WORKSHOP

6.1 Under this agenda item, the Panel reviewed briefly the results of the preceding workshop, which was held from 0900 hours on 16 October to 1200 hours on 17 October, 2006. Twenty presentations had been delivered during the workshop, covering the evaluation and development of data buoy technology, the application of collected data to scientific research or operational services, and new programme initiatives. For the first time this year tsunami monitoring systems had been included as a specific theme within the program.

6.2 A number of presentations, including one on the IOOS programme illustrated a requirement for rapidly expanding the physical, geochemical and biological sampling of oceans, ocean coastal regions and ice-covered areas in polar regions. The related issues of new sensor qualification, data exchange formats, communications technologies, product maturity and platform maintenance costs were similar to those addressed by the DBCP since its inception.

6.3 Presentations on technology evaluation and product development included reports on the development of “smart” drifting buoy technology (Marlin), on low-ownership-cost PICO self-mooring buoys (PMEL), comparative evaluations of drifting buoy performance and drogue loss (Global Drifter Center), and satellite communications technologies (Argos and Iridium).

6.4 Other presentations (e.g. on the IOOS programme and tsunami warning systems) promoted an integrated or “systems” view, with the effective use of the data or its connectivity with other data sets being key outcomes.

6.5 Noting the relatively small number of presentations from outside the US, the Workshop co-ordinators urged a strong contribution from other parts of the world for 2007.

6.6 SAIC’s exhibit at the workshop of their DART-derivative deep ocean tsunami buoy had also attracted a lot of interest, as had an exhibition of lithium battery technologies by the Tadiran representative.

6.7 The Panel expressed its appreciation to the Workshop Chairpersons, Mr Ken Jarrott (Australia) and Mr William Scuba (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 also 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 2006 at the latest **[Action]**.

6.8 The Panel noted with appreciation that Mr Jarrott would continue to act as the Workshop Co-chairperson for 2007. The Panel also expressed its appreciation to Dr Bill Burnett (USA) on his volunteering also to act as a Co-chairperson for the Workshop.

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, operated by the Marine Environmental Data Service (MEDS) of Canada. The report was presented by Mr Joe Linguanti.

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 A summary of the reports is reproduced as *Annex IX*. As usual, the full reports of the data management centres will be published in the Panel's annual report.

7.1.4 The Panel noted that the JCOMM Data Management Coordination Group had proposed that the ODAS metadata centre should supersede the on-line Information Service Bulletin provided by MEDS, Canada. IOC will continue to collect ODAS metadata on a yearly basis from Member Countries and will submit the information to the ODAS metadata centre through data submissions to be discussed between the IOC and the ODAS metadata centre. MEDS will be providing its historical ODAS metadata to the ODAS metadata centre.

7.2 INFORMATION EXCHANGE

7.2.1 The technical coordinator presented the changes to the DBCP (http://www.jcommops.org/dbcp/) and JCOMMOPS (http://www.jcommops.org/) websites. The incorporation of the DBCP website into JCOMMOPS allowed for shared functionality and consistency within the panels of JCOMMOPS. Links from the old URLs were all still maintained. Only very minor changes had occurred on the DBCP website, but Panel members' feedback was sought on where updates or restructuring could be beneficial **[Action]**.

7.2.2 The TC detailed the requirement (left over from last year) for updating the DBCP brochure and suggested that a similar JCOMMOPS brochure/information sheet might be useful **[Action, TC]**. The Panel agreed that limited funds from its trust fund could be used to publish the brochure if necessary, subject to authorization by the Chairperson and the new Executive Board. The WMO Secretariat advised that the original digital version of the DBCP brochure might not be available, so that the whole document might need to be rewritten from scratch.

7.2.3 Panel members are encouraged to:

- Update their contact details on the JCOMMOPS website and add new people (e-mail details to viola@jcommops.org);
- Provide documents, particularly annual reports for reference within the DBCP website;
- Provide news items of relevance to all panel members;
- Review the existing brochure and provide comments on update requirements **[Action],**

7.2.4 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]**.

Mailing lists

7.2.5 The mailing lists maintained for use by the Panel are:

- dbcp@jcommops.org – DBCP communications and general information on the panel's activities;
- buoys@jcommops.org – Exchange of information on buoy technology;
- dbcpeval@jcommops.org – DBCP evaluation group communications;
- Buoy-qir@vedur.is – DBCP Quality Control guidelines for reporting monitoring statistics and systematic errors with GTS data.

7.2.6 Detailed information on the mailing lists and how to register can be found at http://www.jcommops.org/mailing_lists.html#DBCP.

Publications

7.2.7 The Panel noted that its Publication No.2, Argos GTS sub-system reference guide, had been revised in September 2005 (revision 1.6) to include all of the latest technical features that had been added to the Argos GTS sub-system.

7.2.8 The Panel noted that the Publication No. 3, Guide to Data collections and Location Services using Service Argos, required substantial updating (Argos 3, downlink) and urged CLS to work with the Technical Coordinator in updating it **[Action]**.

7.2.9 Following the Panel discussions regarding the DBCP Implementation Strategy, the Panel asked its Chairperson to revise Publication No. 15 by the end of 2006 **[Action]**.

7.2.10 The Panel noted with appreciation that the following DBCP publications had been or were being published on CD-ROM: (i) No. 26, DBCP Annual Report for 2004, (ii) No. 27, DBCP Annual Report for 2005, (iii) JCOMM TR 33, DBCP-20 Workshop Proceedings, Chennai, October 2004, and (iv) JCOMM TR No. 34, DBCP-21 Workshop Proceedings, Buenos Aires, October 2005.

7.2.11 The Panel noted with interest the publication of the JCOMM Technical Report No. 30, Verification of Operational Global and Regional Wave Forecasting Systems against Measurements from Moored Buoys, by J.-R. Bidlot and M.W. Holt.

7.2.12 The Panel noted that the DBCP Annual Report for 2006, as well as the proceedings of the DBCP scientific and technical workshop, La Jolla, October 2006, were still to be edited by the Secretariats, and that outstanding material for these reports needed to be submitted by 30 November 2006 **[Action].**

7.3 BEST PRACTICES AND STANDARDS

7.3.1 The Panel considered that it was essential to maintain information on best practices and to develop standards as necessary. Dr Bill Burnett reported on the task he had agreed to undertake at the last Panel session for compiling a guide to best practice and standards. Input had been provided to the Technical Coordinator by Dr Burnett, Julie Fletcher, and Sergey Mothyzev. In addition, E-SURFMAR had agreed the use of the EGOS minimum specifications and guidelines for the operations of EGOS drifting buoys (EGOS TD No. 88), and the specifications and guidelines for the operations of EGOS moored buoys (EGOS TD No. 257) documents as a basis.

7.3.2 The Panel requested its Technical Coordinator to work on these materials with Dr Burnett in order to compile one or more documents that could be proposed to the Panel as Best Practices documents and to report to the Panel at its next session **[Action].**

7.4 WMO INFORMATION SYSTEM

7.4.1 The WMO Secretariat representative presented an overview of the WMO Information System. He explained that the present GTS was efficient in interconnecting National Meteorological Hubs but that international programmes did not necessarily have easy access to the GTS for data submission or data access. The WIS concept, which had been endorsed by the WMO Congress, was to build an overarching system based not only on the GTS but also on new facilities that would permit other international programmes such as GOOS or GCOS to access the system. WIS was designed as an inter-disciplinary system that would provide common information exchange standards, metadata catalogues based on ISO standards (e.g. ISO 19100 series, geographical information standard), and other industry standards. Its functional structure was based on (i) National Centres (data generation and collection in the particular country; national portal to the WIS), (ii) Data Collection and Production Centres (DCPC, collecting and distributing data of interest for a larger community and data meant for international exchange; can be programme related, and provide for push and pull data access mechanisms and maintain metadata catalogues), (iii) Global Information System Centres (GISC, key global centres

synchronising the data with each other; receive information from the NCs, and the DCPCs, and provide for global pull mechanism for data access; generate and maintain catalogues of data and metadata, and are fully operational), and (iv) data telecommunication networks.

7.4.2 It was noted that WIS concerned only information exchange and data information. Interoperability was a key to WIS and active involvement from all of the Technical Commissions, including JCOMM was required. The WMO Core Metadata profile had been developed for data discovery, but needed further refinement. The WIS was intended to provide various types of services to meet different requirements, and the following fundamental types of service had been identified:

(i) Routine collection and dissemination service for time-critical and operation-critical data and products (push, multicast and broadcast, smooth evolution from the GTS, IGDDS);

(ii) Data Discovery, Access and Retrieval (DAR) service (pull), and (iii) Timely delivery service for data and products (push).

7.4.3 Two implementation phases were planned. Phase A would improve the GTS and provide support to other programmes than the WWW. Phase B would be an extension of the Information System through flexible data discovery, access, and retrieval. IGDDS, which was providing for space based observational data and products, would be further developed under both phases A and B.

7.4.4 A number of Pilot Projects had already started, including in particular the JCOMM E2EDM Pilot Project which would provide a DCPC function. Dr Nick Miklhailov, Chairperson of the ETDMP, would attend the upcoming TECO-WIS meeting in Seoul, Republic of Korea, 6-8 November 2006, to demonstrate the prototype.

8. TECHNICAL ISSUES

8.1. QUALITY CONTROL

8.1.1 The Technical Coordinator reported that complete information regarding the DBCP quality control guidelines could be found on the DBCP web site at http://www.jcommops.org/dbcp/0qc.html. Systematic errors noticed by Principal Meteorological or Oceanographic Centres (PMOC) responsible for deferred-time Quality Control of GTS buoy data (i.e. data users, mainly NWP centres) were reported either via a mailing list (buoy-qir@vedur.is), maintained by the Icelandic Meteorological Service, or via a dedicated web page at JCOMMOPS (http://wo.jcommops.org/cgi-bin/WebObjects/QCRelay). Such reports, e.g. bad sensor data, biased sensor, bad location or proposed remedial action (e.g. removing data from GTS, recalibration) were automatically forwarded to the buoy operators or persons responsible for GTS distribution of the data (PGC). Thanks to this system, PMOCs did not have to know who the PGCs were. The system worked because the Technical Coordinator, acting as a focal point, maintained a database of WMO numbers and associated PGCs at JCOMMOPS.

8.1.2 The following PMOCs had participated actively in the guidelines during the last intersessional period:

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

8.1.3 Other centres were encouraged to actively participate in the guidelines either for global data, regional data or specialized data. The Panel thanked the Icelandic Met Office for maintaining the mailing list service.

8.1.4 The Panel noted that 251 status change proposals were made by PMOCs during the period 1 August 2005 to 31 July 2006. Most of these proposals were made via the web page directly, rather than the mailing list. All proposals made via the web page had been automatically forwarded to both the mailing list and the appropriate Programme GTS Coordinator (PGC).

8.1.5 The Panel was reminded that the following quality monitoring products were available:

a) Semestrial (Global) and Quarterly (North Atlantic) Reports by the UK Met Office as Lead Centre for the Monitoring of Marine Surface Data
b) NCEP Quality Assessment Project web page http://www.ncep.noaa.gov/NCO/DMQAB/QAP/qcflags/. This included "manual surface marine QC flags" and "surface marine monthly statistics"
c) Graphical tools by the Centre de Météorologie Marine of Météo France:
http://www.shom.fr/meteo/qctools/ (direct)
http://www.jcommops.org/dbcp/0qc.html (via DBCP QC page)
d) Access to archived QC messages (product by MEDS)
http://www.meds-sdmm.dfo-mpo.gc.ca/meds/Databases/DRIBU/buoyqc/search_f.asp
e) QC charts from DBCP and JCOMMOPS web sites
http://www.jcommops.org/dbcp/0qc.html
http://wo.jcommops.org/cgi-bin/WebObjects/JCOMMOPS.woa/wa/histogram?prog=DBCP
http://wo.jcommops.org/cgi-bin/WebObjects/JCOMMOPS.woa/wa/statsSeries?prog=DBCP

Air Pressure

8.1.6 The Technical Coordinator reported that ECMWF buoy monitoring statistics for the period July 2003 to August 2006 showed that the RMS differences between the Observational and First Guess fields (Obs-FG) had dropped by 0.02 hPa to about 0.84 hPa. The distribution of (Obs-FG) RMS differences in the previous 6 months to August 2006 had shown that 76% of the RMS values were now lower than 1 hPa, another 18% between 1 and 2 hPa, 4% between 2 and 3 hPa, and less than about 2% above 3 hPa. This was a little worse than June last year (where percentages were of the the order of 75.9%, 20.8%, 1.8%, and less than 1% respectively) in that the proportion of RMS values above 2 hPa was almost double and there were fewer differences in the 1-2 hPa range. Nonetheless, the fact that the proportion under 1 hPa had continued to fall highlighted the improving quality of both the first guess surface pressure field and the observational pressure data from drifting buoys. These figures demonstrated that the Observational and First Guess fields had effectively converged to the extent that the noise in both fields was probably similar and that any remaining differences could be ascribed to noise rather than sensor error as in the past. It was also reported that the ECMWF percentage of 'gross' errors was usually less than 1%.

Sea Surface Temperature

8.1.7 According to NCEP statistics, the RMS (Obs-FG) for SST data from drifting buoys was now relatively stable at a level of about 0.65C. A low of about 0.40C was observed in July 2006. On the other hand, the percentage of gross errors, which lay below 0.5% during the previous intersessional period, had increased to above 0.67% in early to mid 2006, but had then fallen to about 0.28% in August 2006.

8.1.8 Dr Rick Lumpkin explained that using the RMS of differences between the NCEP model analysis and the drifter SST data for estimating the quality of the data had substantial

limitations. He suggested the analysis of the differences between SST data from drifters with those of TAO moorings and/or other types of platforms in order to better ascertain the quality of the data. He offered to conduct a preliminary study in this regard **[Action]**.

Wind

8.1.9 According to ECMWF statistics, the RMS (Obs-FG) differences for wind speed data had a mean monthly value of 2.01 ms^{-1} in August 2006. About 88% of the mean RMS (Obs-FG) differences were less than 3 ms^{-1}, about 6.5% between 3 and 4 ms^{-1}, and about 5% were larger than 4 ms^{-1}. Generally these RMS values were a small improvement on last year, when the figures were 83%, 12.5%, and 3.4% respectively.

8.1.10 The increase last year in the percentage of differences larger than 3 ms^{-1} had not continued into this year, with 11.7% in August 2006, 15.8% in June 2005, 12.1% in July 2004, and 11.1% in July 2003. The percentage less than 2 ms^{-1} had increased dramatically compared to the previous two years. Overall, however, there were no obvious patterns of change identifiable in the data from year to year.

8.1.11 Since August 2005, percentages of gross errors had varied greatly. A peak of about 3.8% was observed in early 2006, though gross errors have reduced in recent months. Together with the trend in RMS (Obs-FG) differences, this represents a steady improvement in buoy wind data.

8.1.12 The Technical Coordinator noted that the analysis of wind data was becoming increasingly difficult and rather inconclusive, and that there might be other analyses which could potentially be of more value. The Panel commented that comparison against other wind models might be more illuminating. The Panel was urged to provide advice to the Technical Coordinator on the best model to use for this task. **[Action].**

8.1.13 In general, the Panel was pleased to note that air pressure and SST data from data buoys, including the large SVP-B fleet, was largely of excellent quality, and it congratulated all of those involved in achieving this status (manufacturers, operators, CLS, the operational and quality control agencies, its Technical Coordinator and Evaluation Subgroup) for their valuable efforts in reaching and maintaining this key Panel objective.

8.2. CODES

DMCG codes group

8.2.1 The second meeting of the Data Management Coordination Group was held in Geneva from 10-12 October 2006. The meeting established a small Task Team of the DMCG, comprised of Bob Keeley (Chairperson), a metadata expert designated by NMDIS, Etienne Charpentier, Hester Viola, an expert designated by David Thomas, an IODE expert designated by Leslie Rickards, Scott Woodruff, and an E2EDM expert designated by Nick Mikhailov. The objectives of the Task Team were (i) to collect and compile requirements from JCOMM panels and expert teams and submit them to the CBS ET-DRC (one member of the team to attend ET-DRC meetings); (ii) to make MT10 compliant with WMO rules; (iii) to define a mechanism for updating and maintaining BUFR Master Table 10 on behalf of JCOMM in compliance with rules defined by the CBS ET/DRC, including coastal, biological and chemical variables; (iv) to review templates and draw up content mapping.

BUFR compression

8.2.2 The Panel noted that the BUFR compression problem had been fixed by CLS as of January 2006 and that compressed BUFR reports containing buoy data were able to be distributed on the GTS as of that date.

CREX template for tidal data

8.2.3 The WMO Secretariat reported that work was underway within the CBS ET/DRC to adopt a CREX template for sea level data. A small sub-group comprised of Atsushi Shimazaki (JMA, Japan), Charles Sanders (BOM, Australia), and Eva Cernena (CHMI, Czech Republic) had been established by the Expert Team to work on the issue in liaison with the ICG-IOTWS. The Panel was pleased to hear that a draft template was already available. Interested Panel Members were invited to contact the WMO Secretariat for details.

BUFR template for buoy wave data

8.2.4 The Panel was pleased to hear that the BUFR template it had proposed at its 21st session for directional and non-directional wave data had been approved by the CBS ET/DRC for validation at its meeting in Muscat, Oman, 5-8 December 2005. The template in particular had the potential to meet the needs of Puerto Del Estado (PDE), as well as those of PDE wave data users (PDE maintains a network of moored buoys around the Iberia Peninsula both in the Atlantic Ocean and the Mediterranean Sea). The Panel recommended that E-SURFMAR pursue the matter with PDE in order to eventually have PDE wave data distributed on the GTS using the new template, and to have the data validated. The new BUFR template is described in *Annex X.*

Extending the range of WMO numbers

8.2.5 The Panel reviewed the WMO numbering scheme in use for GTS distribution of buoy, Argo float, and OceanSITES data. This scheme is presently based on deployment area (first two digits). It noted with concern that certain areas have very few numbers left for allocation, e.g. 51 (none), 62 (26), 44 (36), 46 (105), and 61 (132), and that there was little prospect of WMO numbers already allocated to countries being returned to the WMO pool.

8.2.6 The Panel reviewed different options proposed by the former Technical Coordinator for addressing this problem, including (i) status quo, (ii) using relaxed rules as far as the deployment area is concerned while keeping 5 digit WMO numbers, and (iii) using extended WMO numbers of 7 digits.

8.2.7 The Panel noted that the third option had the following advantages and drawbacks:

Advantages:

1) No WMO number allocation problems in the longer term;
2) High compatibility with existing scheme;
3) Existing BUFR descriptor [001087] could be used for GTS distribution in BUFR.

Drawbacks:

1) Data users might be impacted by having to increase the size of the WMO identification number in their software and databases;
2) CBS is likely to be reluctant to modify traditional character code forms, even for a relatively minor change;
3) The BUFR template for buoy data would need to be slightly revised to provide for descriptor [001087] instead of the present sequence [001003], [001020], and [001005].

8.2.8 After discussion, while noting that the CBS might be reluctant to implement code changes to the FM-18 BUOY code, the Panel agreed to tentatively propose such a change and to suggest using extended WMO numbers in the general form of A_1b_wnnnnn. The Panel would seek adoption by CBS in two years from the present time. The Panel also noted that extended WMO

numbers could be used almost immediately provided that the data are being distributed in BUFR or CREX only.

8.2.9 The extended WMO numbers would be allocated as 7 digit numbers in the general form of A1bWnnnnn, retaining compatibility with the "+500 rule", viz:

- Moorings: nnnnn in the range xx000 to xx499
- Drifters: nnnnn in the range xx500 to xx999
- OceanSITES: $A_1$8nnnnn, with nnnnn in the range xx000 to xx499
- Argo: no change, i.e. $A_1$9nnnnn
- xx to take values in the range 00 to 99

8.2.10 Existing numbers A_1b_Wnnn would be considered equivalent to the new form A_1b_W00nnn. Numbers for moorings would be allocated independently from those for drifters: presently one number is allocated for both, with 500 being added for drifter use by the country receiving the allocation.

8.2.11 The Panel then asked the Technical Coordinator to submit a proposal for both (i) modifying the BUOY code as suggested above, and (ii) slightly changing the BUFR template for buoy data; the proposal to be submitted to the newly established DMCG codes group who would in turn seek adoption by CBS **[Action]**. It asked the Technical Coordinator to monitor implementation of the changes and to provide assistance as appropriate once/if any of those proposals are adopted by the CBS **[Action]**.

8.2.12 At the same time, the Panel agreed that gradually migrating from dual BUOY+BUFR distribution to BUFR-only distribution (starting with buoys reporting from regions of interest to developed countries only, and who have the capability of decoding BUFR reports) was an acceptable solution and that the proposed numbering scheme could therefore be adopted immediately. The Panel therefore made the following additional recommendations:

- Only one form of two equivalent numbers should be used for GTS distribution of the data originating from the same platform via different GTS insertion points (e.g. CLS and independent LUTs);
- CLS and Member States/Countries inserting the data on GTS using BUFR only should use the extended numbers as the preferred approach and convert relevant 5-digit numbers to their equivalent in the 7-digit numbering scheme;
- Reallocation of WMO numbers should be avoided as long as new numbers exist to be allocated;
- GTS data users would be encouraged to automatically convert any 5-digit number to its equivalent 7-digit number and to store the 7-digit numbers in the databases. Members providing information on data quality should do so using the 7-digit numbers form;
- When finally no new numbers exist for allocation, reallocation should take place starting with the numbers which have not been used for the longest time **[Recommendations]**.

8.3. ARGOS SYSTEM

POES Constellation Overview

8.3.1 Mr Chris O'Connors (NOAA) reported on the National Oceanic and Atmospheric Administration (NOAA) polar orbiting satellites. NOAA was currently maintaining a constellation of 6 satellites (NOAA 18, 17, 16, 15, 14, and 12) with Argos Data Collection and location System (DCS) instruments built by CNES. All DCS instruments were operating nominally with the exception of a Data Recorder Unit (DRU) on NOAA 18. The last NOAA satellite launched was

NOAA 18 in May 2005, replacing NOAA 16 as the operational afternoon spacecraft. The next NOAA launch would be NOAA N' in 2008. At the meeting the successful launch of MetOp-1 was announced and welcomed by the group. The MetOp-1 satellite would replace NOAA 17 in the morning mission after its checkout phase. With the launch of the MetOp satellite EUMETSAT had become a full participant in the Argos Operations Committee overseeing the operation and planning of the Argos DCS system.

8.3.2 Mr O'Connors updated the group on three specific issues of direct importance to the DBCP. Firstly, NOAA continued to work to collect blind orbit data from new stations in Svalbard and expected to resolve the remaining obstacles to data collection after the successful checkout of the MetOp satellite in the spring of 2007. Secondly, NOAA had updated Monterey CA, Oahu Hawaii, Anchorage AK, Wallops VA, and Fairbanks AK to receive direct broadcast data from MetOp satellites. In 2007 NOAA planned to add Miami FL to the sites that were MetOp ready. These upgrades ensured the continuity of real time data collection. Lastly, Mr O'Connors updated the Panel on the NPOESS program review that ended in June 2006. The results of the review had not impacted the Argos DCS planning and the first Argos launch within NPOESS was planned for 2013.

8.3.3 The Panel thanked NOAA for the progress report and for its continued efforts to work with the user community to find solutions for improving the Argos system and the timeliness and availability of data collected through it.

Global and Regional Network of Receiving Stations

8.3.4 The Panel noted with interest a presentation by Mr Bill Woodward, President of Service Argos (now renamed CLS America) on the present status of the Argos system. The two global ground stations at Gilmore Creek and Wallops Island continued to deliver STIP data from NOAA-12, NOAA-14, NOAA-15, NOAA-16, NOAA-17, and NOAA-18. Only two orbits per day were still delivered from NOAA-12, just sufficient to collect the minimum amount of orbitography beacon data that enabled location calculations to be made. TIP or real-time data were currently delivered to CLS immediately on reception from 49 stations around the globe.

8.3.5 The two global processing centres in Toulouse and Largo had functioned as expected. More than 800 data sets per day (100 STIP data sets, 700 Real-time data sets) were processed in each centre. The regional processing centre in Tokyo (Japan) had encountered hardware problems in late 2005. While this problem was being resolved, all services had been provided by the Toulouse and Largo centres. Lima (Peru) and Jakarta (Indonesia) centres were functioning normally.

8.3.6 The Internet link was still the main communication link used to distribute processed data to users and to retrieve data sets from receiving stations. Security functions had been implemented such as SSH and PGP. The X25 protocol was no longer supported at CLS America but continued to be used by the Toulouse centre to send data to a few users (less than 20) who faced security concerns. This X25 protocol will continue to be supported during 2006.

8.3.7 The Panel noted that, during 2005, 82% of real-time data was delivered to users within 30 minutes of it arriving at the satellite. 61% of the stored data was delivered to the users in 2.5 hours. Nonetheless, the Panel remained concerned that the timeliness of data received via the GTS showed little if any improvement, and urged CLS to work with its Technical Coordinator in addressing this critical issue (see Agenda item 8.6.2) **[Action]**.

8.3.8 The number of operating Argos platforms had continued to increase. In July 2006, more than 9,000 platforms were seen on average per day, and about 17,000 individual platforms during that month. Though the Argos service had been impacted by two electrical power problems at CLS and by the opening of ARGOS2001 Phase2, the average monthly availability during the past 12-month period had been 99.46%.

8.3.9 The Panel was also pleased to note that CLS America was processing the data from 30 Iridium-equipped Argo floats and relaying resulting TESAC bulletins onto the GTS. It explicitly urged CLS to continue to work with the expanding Iridium data buoy community to assure efficient dissemination of such buoy data via the GTS **[Action]**.

Argos developments

8.3.10 The Panel received a report by Mr Christian Ortega, representative of CLS, on technical enhancements to the Argos System. The hardware and software improvements for 2006 continued to be dedicated to the Argos2001 project – i.e. new user interface, added value services and rebuilding the processing system - and specifically featured a new computer architecture. This new architecture included development and validation components, all aimed at the highest level of reliability. Under the project "Disaster recovery plan", a second computing room, able to house a part of the CLS computing facilities, had been provided by CNES. The installation of this redundant processing centre was progressing well and should be completed at the beginning of 2007.

8.3.11 The service provided to the DBCP community was being enhanced by the implementation of expert software tools, useful to tune PTT format and transmission parameters with users and manufacturers, and the reinforcement of the science team at CLS to better address GTS declarations and follow-up. GTS related tasks included the listing and tuning of all the ARGO templates, the processing of Ice Mass Balance (IMB) buoys for the IABP program, and the tuning and testing of the Hurricane Buoy templates.

8.3.12 There remained ongoing actions – meetings, e-mailing, visits, manufacturer dedicated web pages - to improve coordination between users and manufacturers, and to ensure that users made the best of Argos capabilities. In this context, and also in view of the migration of the Argos programmes and declarations to the new processing system, CLS was building up with the manufacturers a nomenclature of their platform models and relating them to validated Argos templates.

8.3.13 The new data management and distribution tools, being implemented at CLS as the result of the Argos2001 developments, were recalled. These included:

- ArgosDirect (former ADS with new features): to receive automatically, via e-mail, SMS/GPRS, or FTP, all data from platforms, or simply alert messages;
- ArgosShare: to share observations with colleagues, filtered by programmes or platforms, by date windows or geographical areas;
- ArgosMonitor: to monitor the status of deployed platforms, their positions, the data collected and to be informed of any changes;
- ArgosWeb: to access data via the web and benefit from data being displayed and downloadable on new maps.

8.3.14 ArgosWeb, which remained to be opened, would be available to all users the following week.

Argos 3 and downlink capability

8.3.15 A substantial amount of work continued in support of the preparation of the new Argos-3 capabilities, and more especially to address all changes needed in the ground segment to decode, process, store and make available to users the new generation messages that would be delivered by this instrument. These included the high data rate messages, the “zero bit” messages and the two-way messaging. Master Beacons had been installed in Svalbard and Fairbanks in the third quarter of 2006. The new PTT/PMT test equipment, accepted last year by CNES, had been in use since September 2005 to certify new transmitter models.

8.3.16 Mr Ortega reported that 80 first generation PMTs had been delivered by Seimac Ltd to CLS in June 2006. These units included two-way capabilities, plus the 4.8 kbit high data rate

capability. In parallel, CLS had contracted Kenwood, Japan, and Elta, France, to develop the second generation PMT, aiming at a low cost, single board unit to be commonly used in Argos applications. The preliminary results had been quite encouraging and CLS would have prototype units in March 2007 for further testing prior to series production.

8.3.17 Further to the presentation of the Argos-3 test programme at the DBCP Workshop, participants and manufacturers willing to participate to the Argos-3 test programme were invited to make contact with the Argos team within the coming month. The goal of the test programme was to test new Argos-3 capabilities, define useful commands to users, and make available ready-to-deploy platforms by the end of 2007 **[Action]**.

Argos GTS sub-System and future GTS data processing capabilities

8.3.18 Mr Ortega expanded on the capabilities that would be provided by the new processing system, due to be operational by early 2007. This new system would integrate the current basic Argos data processing and the GTS processing subsystem into a single system, thus providing enhanced capabilities to all applications. The system would be able to process multiplexed messages, to concatenate them and apply several decoding formats, validate the data using compression techniques and checksum. Also, the data would be made available either as satellite-pass related messages - messages grouped by satellite pass, as per today – or as processed time-tagged observations, or both. This would positively address the “classical” need expressed by users and manufacturers to access both raw and fully processed data. This system was also designed to integrate and process observations collected by other satellite systems such as Iridium.

8.3.19 Finally under this agenda item, the DBCP Vice-chairperson for North America expressed her thanks to CLS for their work in fixing the problems regarding GTS distribution of Argo float data.

Future Argos requirements (Argos-4)

8.3.20 Mr Michel Faup from CNES gave a presentation on CNES ideas concerning Argos instrument improvements for the 4th generation, to be launched on NPOESS.

8.3.21 Mr Faup thanked the DBCP for accepting his contribution and mentioned that CNES and NOAA are eager to receive user feedback regarding future system capabilities. Attention was drawn to the notion of amount of data transmitted per pass rather than on the bit rate. With increased onboard processing capacity and extended frequency bandwidth Argos-4 would allow a progression from the current 500 bits per satellite pass (Argos-2), through the 27 kbits per pass achievable with Argos-3, to reach 55 to 135 kbits per pass. In parallel, the PMT high-data rate transmission power could be decreased by a factor two (3 W instead of 5 W), enabling an increase in platform lifetime. Moving to issues affecting the downlink, it was pointed out that users should comment on 1) how frequently they would use it, 2) what volume of data would be transmitted per pass to the PMTs, and 3) whether, for high data volumes, they could consider splitting the data over several consecutive passes and what would be their acceptable notice period.

8.3.22 The Argos-4 instrument would be fully compatible with Argos-3 PMTs. However it was suitable to anticipate, in the Argos-3 PMT design, the Argos-4 PMT specific processing. With respect to this issue, users were asked to advise the renewal frequency of their platforms.

8.3.23 Users were recommended to react to the presented characteristics either during the meeting or during the next two months, bearing in mind that Argos-4 system study is presently running. Comments could be received at Mr Michel Faup at michel.faup@cnes.fr **[Action]**.

8.4. NEW COMMUNICATION TECHNIQUES AND FACILITIES

8.4.1 As had become customary, Mr David Meldrum presented the Panel with an update on satellite communication technologies. Key developments with regard to Argos had been the ongoing efforts to improve near-real-time coverage through an expanded LUT network, the near-readiness of the new Svalbard ground-station to feed much-needed blind-orbit data into the operational data flow, and the successful launch during the session of MetOp-A, carrying the 2-way Argos-3 payload. Iridium had continued to assert its commercial presence and technical capability, including the imminent launch of a 'near broadband' service using standard omni-directional antennae and data protocols. Efforts to promote a non-profit tariff and support structure for scientific users looked like being successful, with wide support for the idea from Iridium LLC, NOAA, the global community, and CLS. CLS have entered the arena as an Iridium Value Added Reseller (VAR), and will bring their data management and distribution expertise to the table, as long requested by the DBCP. Other players such as Orbcomm and Inmarsat had also reported developments during the intersessional period.

8.4.2 The Panel thanked Mr Meldrum for his report, and asked that it should be again updated at its next session **[Action]**.

8.4.3 The Chairperson presented the proposal to establish a DBCP drifter Iridium Pilot Project to evaluate and demonstrate the operational use of Iridium satellite data telecommunication technology for the real-time collection of drifter data in support of the WWW, GOOS, and GCOS applications, and the WMO Natural Disaster Prevention and Mitigation Programme (see *Annex XI*). The Panel noted that the proposal had been discussed informally with a few Panel Members who had agreed in principle to participate and to make a contribution. After discussion, the Panel approved this proposal to proceed the Pilot Project, and tasked the DBCP Chairperson and Executive Board to establish a steering team and to finalize the terms of reference for the Pilot Project **[Action]**.

8.5. JCOMMOPS OPERATIONS AND DEVELOPMENT

8.5.1 The Technical Coordinator presented the activity of JCOMMOPS and its future plans. It was noted that since the TC/DBCP&SOT position had been vacant during the period February to June 2006, developments directly relating to JCOMMOPS, as a whole, had slowed down during the last intersessional period. However, many of the required developments had already been realized during the previous years.

8.5.2 New developments implemented during the intersessional period included:

- Release of a new Argo Information Centre website;
- Creation of Upper Ocean Thermal data maps by country. These were produced on a semestrial basis;
- Upgrading of the platform life-time application;
- Making the dynamic web site more reliable;
- Importing BUFR tables into the JCOMMOPS database and providing for a web query form;
- Writing technical specifications for a research cruise database for POGO, such an application potentially being very useful for the management of deployment opportunities;
- Production of a daily ice edge layer for the GIS;
- Setting up of an initial operational procedure with CLS to monitor main web applications status with a view to safeguarding 24/7 service provision.

8.5.3 The Technical Coordinator suggested the following work plan for the period 2006-2007:

- Finalise JCOMMOPS website developments and integrate some new features available on the new AIC website;

- Finalise DBCP & SOT interactive maps;
- Become involved in testing and user support for the new Argos-3 functionality and processing;
- Improve JCOMMOPS website usability (navigation, structure, …);
- Routinely produce Google Earth files for drifters and moored buoys;
- Investigate the possibilities to extend ESRI map services to allow JCOMMOPS to provide "open" geospatial web services (see http://www.opengeospatial.org);
- Improve efficiency and accuracy of monthly map generation;
- Replace one of the three JCOMMOPS servers;
- Finalize operational procedures with CLS to provide 24/7 web services;
- Improve JCOMMOPS visibility and communication to a wider audience, e.g. through publication of a JCOMMOPS brochure, routine production of network status reports, provision of new mechanisms for handling deployment opportunities, etc;
- Investigate production of daily and monthly network density maps for DBCP and Argo;
- Support pilot projects, especially regarding capacity building;
- TC DBCP to attend the next Argo Steering Committee meeting (early 2007, IOC, Paris).

8.5.4 The Panel agreed with the proposed plan.

8.6. OTHER TECHNICAL ISSUES

8.6.1 Deployment opportunities and strategies

8.6.1.1 The Technical Coordinator invited Panel Members to provide updates concerning:

- Deployment opportunities for each member state: http://www.jcommops.org/depl_opport/depl_opport.html ;
- Include in http://www.jcommops.org/depl_opport/depl_opport.html conditions and costs of air deployments;
- National Focal Points for logistical facilities: http://wo.jcommops.org/cgi-bin/WebObjects/JCOMMOPS.woa/wa/usergroup?abbrev=NFP_LOGISTICS **[Action]**.

8.6.1.2 The Panel agreed that new information should be documented and shared with the TC as it arose for inclusion in JCOMMOPS web pages, and also as News items or via an e-mail list (JCOMM-II recommendation). The Panel commented that air deployments were extremely expensive and, if provided through military programmes, the location could not be advertised prior to the mission. With Navoceano (USA) no longer able to provide support beyond September 2007, it was difficult to know if the Panel would be able to benefit from air deployments in future. The Panel nonetheless invited its members to continue to submit their requirements for air deployment opportunities to Navoceano, who would then investigate feasibility **[Action]**.

8.6.1.3 The Technical Coordinator proposed some ideas for new ways to advertise deployment opportunities in order to allow sharing of information more effectively than in the past. The Panel asked the Technical Coordinator to pursue these ideas and to report at the next Panel session **[Action, TC]**.

8.6.1.4 The Technical Coordinator asked the Panel to comment on how deployment opportunities were communicated in reality. The Chairperson of the SOT reported that the SOT was working on a proposal for maintaining a global list of planned ship activity within each WMO Sub-Area for submission by Member Countries operating VOS programmes and inclusion in WMO Publication number 47. The Panel suggested that the Technical Coordinator also consider communication mechanisms for nations and action groups to communicate a requirement for deployments where it had been identified and where no deployment opportunity already existed **[Action, TC]**.

8.6.2 GTS delays

8.6.2.1 GTS delays for global BUOY reports received at Météo France in July 2006 were presented, showing that about 30% of the data are received within 1 hour and over 50% within 2 hours, representing a slight improvement since 2005.

8.6.2.2 Statistics on E-SURFMAR drifting buoys showed that the number of observations received at Meteo France within 30 minutes had decreased since July 2005. The number of observations received within 120 minutes had dropped considerably at the end of 2005 and start of 2006, but had since increased to nearly their 2005 levels.

8.6.2.3 Overall, delays had not improved this year compared to last year. The Technical Coordinator highlighted that in-depth analysis of GTS delay sources would be a very high priority for the next intersessional period **[Action].** She also noted improvements in coverage over the Asian Region, but noted that problems still existed in the South Atlantic and Pacific Oceans. Some improvement in the Atlantic was expected from a planned antenna in Gabon. A better option would be to site an antenna on St Helena Island, and the UK Met Office representative indicated that his organization was ready to operate and maintain one at this location **[Action, UK Met Office]**. As regards the Pacific, there was no current prospect of an antenna on Easter Island, as had previously been suggested.

8.6.3 Vandalism

8.6.3.1 Vandalism remained a serious concern for the Panel. A number of actions had been taken so far with limited success. However, the Panel agreed that such actions should continue to be pursued through ongoing communication with International Organizations such as the International Hydrographic Organization (IHO), the International Maritime Organization (IMO), and the Food and Agriculture Organization (FAO).

8.6.3.2 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, and might make good use of promotional material such as videos, t-shirts, and leaflets. The Vice-chairperson for Asia agreed to continue to work on the issue and to report at the next Panel session **[Action]**.

8.6.3.3 The Panel agreed that the development of vandalism resistant moorings might potentially improve the situation. It noted with interest the developments made by NOAA (e.g. the PICO design) and NIOT in this regard. The Panel asked the Technical Coordinator to compile information on such designs but recommended not to distribute the information outside of the Panel's scope **[Action]**.

8.6.3.4 The Panel noted with appreciation that the former Technical Coordinator had prepared a French-language article on the issue for publication in the March 2005 edition of the Météo-France marine meteorology magazine Met Mar (www.meteo.fr/marine). During the last intersessional period, the WMO Secretariat had updated the (i) the leaflet on vandalism, and (ii) the background information to reflect changes in the status of buoy programmes, new contact points (Chairpersons, Vice-chairpersons, Technical Coordinator), and changes with regard to web site URLs that appear in these documents. The WMO Secretariat had also translated the Met Mar article into English, Spanish, and Russian, and had prepared a specific web page on the issue for inclusion in the WMO's JCOMM web site of electronic versions (pdf), containing references to the leaflet and the background document, as well as the four translated versions of the Met Mar article, viz:

http://www.wmo.int/web/aom/marprog/Programme-Areas-and-Activities/DBCP/vandalism/vandalism.htm

8.6.3.5 Panel Members were invited to consider using the information provided in the leaflet as well as in the translated Met Mar article and to distribute them nationally as appropriate (e.g. to port authorities, fishermen, etc). The Panel thanked WMO for providing for the translation of the article, and for hosting the links on its website.

8.6.3.6 Finally, as required by the Panel, the WMO secretariat wrote letters to the International Maritime Organization (IMO), the International Hydrographic Organization (IHO), the Food and Agriculture Organization of the United Nations (FAO), the International Commission for the Conservation of Atlantic Tuna (ICCAT), the Inter-American Tropical Tuna Commission (IATTC), and the Indian Ocean Tuna Commission (IOTC), to bring this leaflet as well as the translated article to the attention of their respective Member States and institutions for further distribution, and to ask them to make reference to the above web page on their own websites.

8.6.3.7 In September 2006, WMO received a reply from IMO indicating that information on vandalism will be brought again to the attention of IMO Member States as part of an effort to ensure the safety of ships by improving the quality of WMO marine forecasts through collection of reliable data.

8.6.4 Buoy metadata collection scheme

8.6.4.1 Following previous discussions with the DBCP, the SOT, OCG, and the JCOMM Management Committee, the Water Temperature Metadata Pilot Project (META-T PP) was established by JCOMM/OCG workshop, Reading, United Kingdom, 28-29 March 2006. In line with the recommendations from the fifth JCOMM Management Committee meeting, the meeting agreed that META-T PP was an important activity to support and that it was essential for a number of applications including (i) Numerical Weather Prediction (NWP), (ii) SST analysis and the GODAE High Resolution SST Pilot Project (GHRSST), (iii) data assimilation and ocean field analysis, (iv) ocean modelling, (v) ocean modelling validation, (vi) climate forecast, (vii) seasonal to decadal climate variability, (viii) satellite calibration, (ix) satellite validation, (x) operational activities (e.g. weather forecasting, disaster response), (xi) quality assurance activities serving above applications, and (xii) diagnostics by platform manufacturers and operators.

8.6.4.2 The Pilot Project, chaired by Elanor Gowland, UK MetOffice, will aim to provide a standardized framework for collecting SST and temperature profile instrumental metadata from a number of observational systems, including those for which implementation or data management are being coordinated via the DBCP, the SOT, GLOSS, Argo, OceanSITES, GOSUD, GTSPP, and ODAS. To that end, the following categories of metadata had been drafted so far (i) metadata required for real time distribution along with the observational data, (ii) metadata required for real time use but not necessarily being transmitted along with the observational data (available via servers), and (ii) other metadata not required in real time. Possible types of instrumental metadata had been identified and cross checked with the user requirements so that an initial categorization could be drafted. Category definitions and categorization had then been refined by the META-T PP Steering Committee.

8.6.4.3 The second meeting of the JCOMM Data Management Coordination Group (DMCG), Geneva, 10-12 October 2006, noted with considerable appreciation the offer made by the National Marine Data & Information Service (NMDIS, China), to host metadata servers for the Pilot Project. The National Data Buoy Center (NDBC, NOAA) also expressed its interest to participate in this pilot project by hosting a mirror server, and was investigating feasibility. The DMCG agreed that META-T could eventually be used as a pilot for the collection of instrumental metadata related to other variables, and that instrumental metadata were essential for combining *in situ* and satellite observations.

8.6.5 Recommendations from the DBCP Data Users and Technology Workshop

8.6.5.1 The Panel discussed the outcome of the DBCP data users and technology workshop, held at ECMWF, Reading, UK, 27-28 March 2006. The Panel agreed that this had been a very

useful and productive exercised that should eventually be repeated. The Panel reviewed the action items and recommendations arising from the workshop. It noted in particular the following recommendations:

- *All drifting buoys should eventually be equipped with barometers*. The Panel noted with appreciation that the Observations Coordination Group had included such a recommendation in its implementation plan.

- *Data buoys should collect and distribute high temporal resolution SST data, i.e. hourly data, on the hour (OOPC recommendation)*. The Panel noted that four manufacturers had been contacted in order to assess the impact of this recommendation and that provision of such data implied slightly increasing the cost of each unit. Dr Rick Lumpkin then explained that the resolution of the diurnal cycle could be achieved with existing sampling and transmission schemes to an accuracy of about 0.2 to 0.4 C. The Panel therefore recommended that OOPC should clarify the requirements (SST accuracy, time accuracy, acceptable delays) in order to ascertain whether increased drifter cost might be acceptable and justifiable. The Panel also asked Dr Lumpkin to generate more precise estimates of what might be achieved with current technology.

8.6.5.2 The Panel agreed that the recommendations from the workshop should be added to the DBCP workplan and that priorities should be defined **[Action]**.

8.6.5.3 Mr Graeme Ball noted that the recommendation by the workshop to design deployment packages in such a way as to ensure for safe deployments from 20m above the sea from ships moving at up to 25 knots should also be included in the workplan as it was missing from the workshop's annex summarizing the workshop's recommendations and actions **[Action]**. At the workshop, he reported that the BOM had conducted successful deployments in similar conditions.

C. ADMINISTRATIVE COMPONENT

9. REPORTS

9.1 CHAIRPERSONS AND VICE-CHAIRPERSONS

Chairperson

9.1.1. The Chairperson reported on his activities during a particularly busy intersessional period. The main effort had been concentrated on the debate (and several meetings) regarding the future of JCOMMOPS, the recruitment of the new Technical Coordinator, participation in the DBCP workshops at ECMWF, and a considerable amount of work on assessing Argos system occupancy as a precursor to refining the Argos charging algorithm. The Chairperson's missions relevant to Panel activities are detailed below.

Date	Venue	Activity
17-19 Nov	IOC, Paris	TC recruitment, workshop planning, strategy
13 Jan	Frankfurt	Discuss JCOMMOPS with Argo Science Team
13-14 Feb	IOC, Paris	JCOMMOPS enlargement; TC recruitment - first sift of
25 Mar	ECMWF,	TC interviews
27-29 Mar	ECMWF,	DBCP workshops
26-28 Apr	Tempe, Arizona	Iridium training course
8 May	Washington, DC	JCOMMOPS round table meeting
9-11 May	Washington, DC	OCO annual review

5-6 Jul	CLS, Toulouse	Meeting with CLS science team and chief executive
31 Jul – 4 Aug	CLS, Toulouse	System occupancy study
7 Aug	IOC, Paris	Documentation preparation and review
24 Sep	EC, Brussels	Planning meeting for ECOOT

9.1.2. The Chairperson thanked the Panel's Vice-chairpersons, the Action Groups, Secretariat and Technical Coordinators, new and old, for their excellent support during the intersessional period.

Vice-chairpersons

9.1.3. Dr K. Premkumar, the Vice-chairperson from Asia had concentrated on developing Deep Ocean Tsunami buoy systems. He had taken an active part in the development of Deep Ocean Tsunami Detection Buoys with the surface buoy system already available from the National Institute of Ocean Technology, Chennai, India. In this context, Dr Premkumar informed that the NIOT had collaborated with three firms globally and had brought out a Bottom Pressure Recorder (BPR) system, which had undergone Site Acceptance Test (SAT) at the Acoustic Tank Facility (ATF) of NIOT. The BPR system handshaked with the data buoys of NIOT and provided a real time data link of water level variations.

9.1.4. Dr Premkumar had been elected Chairperson of the Working Group 2 on "Sea Level Data collection and Exchange including Deep Ocean Tsunami Detection Instruments" of the Indian Ocean Tsunami Warning System (IOTWS). Together with Mr Ken Jarrott, Vice-chairperson of DBCP from the Southern Hemisphere as well as the Vice-chairperson of WG2 of IOTWS, he had been working very closely with the Indian Ocean countries to bring out common standards to arrive at a consensus in locations and to share technology information on Deep Ocean Tsunami Detection buoys.

9.1.5. During the intersessional period, the Vice-chairperson for Southern Hemisphere, Mr Ken Jarrott:

a) visited PMEL (Seattle) in October 2005 for technical discussions on PMEL-developed tsunami detection buoys (DART buoys);

b) attended (as a member of the Australian delegation) the second meeting of the IOC's International Cooperation Group – Indian Ocean Tsunami Warning and Mitigation System (ICG-IOTWS), held in Hyderabad, India, in Dec 2005. He was appointed Vice-chairperson – Deep Ocean Stations in the Working Group on Sea Level Data Collection and Exchangel

c) attended the joint meeting of the ICG-IOTWS and its equivalent Pacific Ocean group (ICG-PTWS) in Melbourne, Australia in May 2006;

d) attended the third ICG-IOTWS meeting in Bali in July 2006 and chaired the Sea Level Working Group on behalf of K Premkumar;

e) participated in Australia in July 2006 in a national workshop framing proposals for a national Integrated Marine Research Infrastructure.

9.1.6. During the Intersessional Period the Vice-chairperson for North America chaired the Drifter Technology Workshop in Reading, UK, hosted by the ECMWF. The workshop had a good mixture of buoy operators, data users and manufacturers in attendance, along with representatives from countries just starting up national buoy programs.

9.1.7. From 28 May-3 June the Vice-chairperson for North America attended the ISABP annual meeting hosted by Ariel Troisi, the ISABP Chairperson at the Naval Hydrographic Office in

Buenos Aires on behalf of the Panel. At that meeting, the TC had been encouraged to recruit the Tristan de Cunha islanders for buoy deployments, a mission which he later successfully accomplished. The islanders' co-operation was warmly welcomed by ISABP participants.

9.1.8. The Vice-chairperson for North America regretfully reported that this would be her last year serving the Panel in this capacity, and that a replacement should be nominated during the next intersessional period. She thanked all Panel members for the rewarding associations over the past 12 years.

9.2 SECRETARIATS

9.2.1 The Panel noted with appreciation that the Secretariats had continued to undertake a number of activities on behalf or in support of the DBCP during the past intersessional period. These included continued management of the Panel's funds, as well as the employment and missions of the Technical Coordinator; close liaison with JCOMM, in particular in the development of coordination and integration procedures; liaison with CBS on codes and other matters; with other IOC and WMO technical commissions and regional associations (or equivalent bodies) on relevant issues; and with CLIVAR, GCOS, GOOS, and SCOR; presentations on the DBCP and other *in situ* marine observing activities to various fora; maintenance of the WMO buoy ID number register; and support for the DBCP Action Groups as required.

9.2.2 The Panel noted that the 39th Session of the IOC Executive Council had agreed on identified four high-level objectives as the IOC's fundamental contribution to UNESCO's Medium-term Strategy for 2008–2013, including:

(i) Prevention and reduction of the impacts of natural hazards;

(ii) Mitigation of the impacts of, and adaptation to, climate change and variability;

(iii) Safeguarding the health of ocean ecosystems;

(iv) Management procedures and policies leading to the sustainability of coastal and ocean environment and resources.

9.2.3 Dedicated efforts had been made for intergovernmental coordination for Tsunami Warning and Mitigation System (ICG), including those in the Indian Ocean region (see agenda item 2.2.2). In the global framework, the ad hoc Working Group on the Framework for a Global Tsunami and Other Ocean-related Hazards Early Warning System had been established by the IOC Assembly at its 23rd Session through Resolution XXIII-15, to consider a possible interaction between IOC bodies and the programmes that should be implemented to ensure sustainability of an operational ocean-generated hazard system. To concretize the group's efforts, it had been decided that the ad hoc Group prepare a framework document on the global architecture to ensure strong links and harmonization and to make it available for consultation at the forthcoming ICGs' meetings, and submit it to the IOC Assembly at its 24th Session. The IOC Executive Council had expressed its satisfaction with the contributions of JCOMM to a developing ocean-related hazard warning system, specifically the work of the Data Buoy Cooperation Panel (DBCP) in fostering the development and use of multipurpose platforms; and the work of GLOSS, in increasing the number of tide gauge stations reporting data via the GTS in real time.

9.2.4 The Panel was then informed about the outcome of the 57th WMO Executive Council. The Panel took particular note of Resolution 3.4.4/2 (EC-LVIII) adopted by the Council regarding ship owners' and masters' concerns regarding VOS ship data exchange. Members are henceforth authorized for a trial period of one year to mask the ship's identification from the VOS reports. The Council had also requested the Secretary-General, as a high priority issue, to establish a high level dialogue, involving affected Members, the International Maritime Organization, the International Chamber of Shipping, shipping companies, and relevant organizations and technical commissions (e.g. JCOMM, CBS), in order to determine whether there was a link between VOS data availability

on external Web sites and piracy and other ship security issues; to review the implementation and impact of masking; and to propose a general and universally acceptable solution to the issue that would address ship owners and masters' concerns as well as the data monitoring and quality information feedback requirements, for consideration by the 59th session of the Executive Council in 2007.

9.2.5 The WMO Executive Council supported the new priority areas to be addressed by JCOMM, in accordance to the work plan for JCOMM for the period 2006-2010. It urged Members to provide additional funding to support the implementation of the programme through voluntary contributions to the JCOMM Trust Fund, or to the DBCP/SOT and ASAP Trust Funds, within the context of the Data Buoy, SOOP and ASAP Panels.

9.2.6 The Panel was briefly updated regarding the coordination efforts of the ocean community toward GEO/GEOSS, through a discussion forum of experts. In a move towards better coordination of the ocean-related international bodies and the GEO, representatives of GOOS, JCOMM, POGO and IOC had decided during the Second Meeting of GEO (GEO II, Geneva, 13–5 December 2005), that IOC should act as the ocean voice in GEO. It had also been decided to conduct consultations to better coordinate inputs to GEO through an informal forum of experts and representatives of relevant agencies/programmes, named 'Ocean-United'. These consultations were open to any ocean experts and representatives active in GEO, and were being conducted by e-mail discussion (through a mailing list, ocean-united@jcommops.org). Currently, over 40 experts representing 19 programmes/organizations were represented in the Ocean-United forum.

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 1 August 2005 - 31 July 2006;

(ii) Interim WMO Statement of Account as at 31 July 2006;

(iii) WMO Final Statement of Account as at 31 December 2005.

These statements are reproduced in *Annex XII* to *Annex XIV*.

10.1.2 The Panel noted with appreciation that an additional late contribution of USD 20,000 from Canada to JCOMMOPS as a whole, in support of the DBCP and the SOT, was made in 2006 for the year 2005, and that this additional contribution did not yet appear in the WMO financial statements. It was also noted that the contribution from Japan appeared to have decreased by USD 3,000 in 2005, and that no contribution had been received for 2006. As in 2005, the contribution from the USA had been directly transferred to IOC, rather than to WMO, as had become the usual practice for most contributors. The Panel noted that direct contribution to IOC conferred a number of benefits to the Panel, not least the prompt payment of its TC's salary (technically an IOC/UNESCO employee), and asked contributing members to consider whether their future payments might be made by that route **[Action]**.

10.1.3 The Panel also expressed its appreciation to the USA for its contribution of USD 10,000 in support of the DBCP Data Users and Technology Workshop, Reading, 27-28 March 2006, and of the JCOMM/OCG workshop to establish a Pilot Project for the Collection of Real-Time metadata regarding SST and water temperature profiles, Reading, 28-29 March 2006. This contribution was made through the JCOMM trust fund within WMO, and therefore did not appear in the above statements.

10.1.4 The Panel had decided to provide financial support for the local organization of its twentieth Session in Buenos Aires (2005), through raising funds on an exceptional basis. Details

of those contributions are shown in the relevant Appendices. The Panel thanked Canada, France, UK, USA and WMO for their voluntary contribution to this purpose.

10.1.5 As reported to the Panel at its 20th and 21st sessions, a discrepancy of USD 13,527.27 in its UNESCO account had been rectified from within the IOC's regular JCOMM budget, by making a partial payment for the Technical Coordinator's logistical support to CLS for the year 2006. This would be included in the financial report to the next session.

10.1.6 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. Mr Grooters had tackled this daunting task with enthusiasm and had produced an excellent set of interim accounts, of a quality and lucidity to which the Panel had not been accustomed. The Panel expressed particular thanks to Mr Grooter for this monumental effort, which had for the first time elucidated in simple terms the Panel's financial footing. The report by Mr Grooters is reproduced in *Annex XV*.

10.1.7 The Panel was at once relieved to discover that its financial position was secure, that this position had been ratified both by IOC and WMO, and that it was now in a position to put into action the various additional activities that it had approved in principle during the session, e.g. Capacity Building, the Iridium Pilot Project, collaborative initiatives, JCOMMOPS infrastructure support, outreach and publication activities. Furthermore, it could now 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.

10.1.8 It therefore asked Mr Grooters, its Chairperson and the Secretariats, to update the interim financial report to include additional line items and budgetary figures for these activities, with the clear understanding that any budgetary figures attributed should be regarded as upper limits **[Action]** (See *Annex XVI*).

10.1.9 In the interests of efficiency, it also instructed the Chairperson to convene an Executive Board to act on its behalf in these matters during the intersessional period, the Board to consist of the Chairperson (or his appointed deputy), the Technical Coordinator, the secretariats, and a member of the Panel. The Board should normally confer by e-mail, although opportunistic arrangements for face-to-face meetings should be exploited in the normal way. A quorum would consist of the Chairperson (or deputy) and at least two of the other four members **[Action]**.

10.1.10 The Panel also accepted Mr Grooter's proposal regarding 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 January as soon as the organizations' fiscal year accounting was finalized. The Panel requested Mr Grooters and the Secretariats to work together to meet such a schedule during the intersessional period **[Action]**.

10.2 CONTRACTS

10.2.1 The contract established by IOC/UNESCO for the employment of the Technical Coordinator was considered. The Panel noted a new arrangement 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 this agreement.

10.3 FUTURE COMMITMENTS

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 The Panel considered that this previous arrangement would continue for the new Technical Coordinator. According to that arrangement, Ms Viola addressed the Chairperson on 22 August 2006, to inform him of her intent to continue working as Technical Coordinator of the Panel for the period 1 July 2007 – 30 June 2008. The Panel therefore agreed to continue the employment of Ms Viola as its Technical Coordinator for the year 1 July 2007 to 30 June 2008, subject to the necessary contractual arrangements and the availability of funds for the purpose.

10.3.3 In doing so, the Panel noted that the current TC employment contract (ALD) was able to be extended to a maximum of 4 years but not further. The Panel then decided that it should in future carefully consider the future TC employment issue within the context of the future JCOMMOPS issue that had been discussed under item 5.2 **[Action]**.

10.3.4 The Panel reviewed the table of expenditures and income for the year 2007 as detailed in *Annex XVI*, 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. In this context, the Panel asked its Chairperson, assisted by Mr Grooters and the secretariats, to identify these new activities and assign budget lines to them, with indicative figures for upper limits of expenditure. A proposal suggesting these new indicative figures is attached as *Annex XVI*, including the following changes and proposed new actions;

(i) Allowable expenditure for outreach and publication is increased for 2007, in view of the need for a new DBCP brochure;

(ii) A contingency line item is proposed for both WMO and IOC accounts, to protect the Panel against USD/EUR exchange rate fluctuations and other unexpected expenditure;

(iii) Three new line items are introduced, including (a) Technical Evaluations, (b) Capacity Building, and (c) Collaborative Arrangements.

The Panel carefully reviewed this proposal, and finally agreed to the 2007 contributions and planned budget as proposed.

10.3.5 Even with 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. The Panel decided that these arrangements were suitable for the foreseeable future, subject to review at each Panel session.

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:

(i) Efforts should continue to identify and minimise delays affecting the timely distribution of data inserted by CLS on to the GTS;

(ii) In support of the above, additional LUT sites should be identified and brought on line to improve data flow from poorly served areas such as the South Atlantic and South Pacific;

(iii) Pressure should be maintained on NOAA/NESDIS to bring the Svalbard ground station on line as soon as possible in order to the address the blind orbit problem that had been identified in 2002 and still remained unresolved;

(iv) CLS should, if possible, continue to support the work of the JTA Chairperson, with the assistance of the DBCP as required.

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 XVII*.

13. ELECTION OF THE CHAIRPERSON AND THE 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 also re-elected Mr K Premkumar as its Vice-chairperson for Asia, and Mr Ken Jarrott as its Vice-chairperson for the Southern Hemisphere, for the same period.

13.2 The Panel expressed its sincere thanks to Ms Elizabeth Horton, the outgoing Vice-chairperson for North America, for her long and dedicated service for the Panel. Meanwhile, it called for the Members to identify a new Vice-chairperson to replace Ms Horton during the intersessional period **[Action]**.

14. DATE AND PLACE OF THE NEXT SESSION

14.1 The Panel accepted the offer from the IOC for hosting its 23rd session in Paris, France, and subject as always to a similar agreement by JTA-XXVII. Tentative dates for the session were agreed as 15-19 October 2007.

15. CLOSURE OF THE SESSION

15.1 In closing the session, the Chairperson particularly thanked NOAA and the local organisers from Scripps, who had done so much to make the session a success and a pleasure for all participants. The previous year had been a challenging one for the Panel, but thanks to the commitment and support of its members, its Technical Coordinators (both old and new), and the secretariats, the Panel had emerged even stronger and better equipped to discharge its duties towards the data buoy fraternity and the wider ocean observing community. The Panel was particularly pleased to welcome its new Technical Coordinator, Ms Hester Viola, to its session, and congratulated her on the significant preparation, orientation and effective work that she had achieved in a very short time.

15.2 The Panel had been particularly well served by its Vice-chairpersons during this period, a period which had seen them working tirelessly in areas as diverse as tsunami warning systems, drifter evaluation and metadata management. The foreshadowed loss of its Vice-chairperson for North America, Ms Elizabeth Horton, would be keenly felt, and the Chairperson echoed the sentiment of the entire Panel in expressing his heartfelt thanks to Ms Horton for many years of dedicated service, service characterised by a penetrating assessment of global issues and a total disregard for personal comfort and safety. Ms Horton had been an example to the entire Panel in the way in which she had set aside national and regional imperatives in pursuit of the global good. She would be very difficult to replace, but nonetheless a replacement would need to come forward at the next session, and Panel members were asked to reflect on this issue during the intersessional period.

15.3 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.

15.4 The twenty-second session of the Data Buoy Cooperation Panel closed at 1150 hours on Friday, 20 October 2006.

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ANNEX I

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ANNEX II

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 Tsunami warning systems
- 2.3 NATIONAL REPORTS
- 2.4 ARGO STEERING TEAM AND ARGO INFORMATION CENTRE
- 2.5 DBCP EVALUATION GROUP

3. NEW ACTION GROUPS

4. REVIEW OF THE DBCP IMPLEMENTATION STRATEGY

- 4.1 REPORT OF THE AD HOC TASK TEAM ON THE FUTURE STRATEGY OF THE DBCP
- 4.2 REQUIREMENT FOR WAVE OBSERVATIONS
- 4.3 CAPACITY BUILDING
- 4.4 REVIEW AND UPDATE OF IMPLEMENTATION STRATEGY

5. JCOMM ACTIVITIES RELEVANT TO THE DBCP

- 5.1 REPORT ON JCOMM ACTIVITIES
- 5.2 DISCUSSION ON FUTURE JCOMMOPS

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
- 7.4 WMO INFORMATION SYSTEM

8. TECHNICAL ISSUES

- 8.1 QUALITY CONTROL
- 8.2 CODES
- 8.3 ARGOS SYSTEM
  - 8.3.1 Argos constellation

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ANNEX III

REPORT OF THE TECHNICAL COORDINATOR

1) Introduction

This report covers the activities of the Technical Coordinator(s) of the DBCP (TC) for the period 1 September 2005 to 31 August 2006.

- Section 2 highlights recent DBCP activities.
- Specific TC tasks by month are given in Section 3.
- The regular or normal tasks undertaken by the Technical Coordinator(s) are listed in Section 4.

The TC normally spent about one third of the time on SOOPIP matters, about 10% on JCOMM & JCOMMOPS issues and about 3% on Argo. The remainder was spent on DBCP issues. Time spent on JCOMM was directly related to DBCP and SOOP activities. Work undertaken on Argo basically included team work with Argo Coordinator to develop JCOMMOPS and explore synergies between DBCP, SOOP and the Argo project.

Period 1 September 2005 to 31 January 2006

During this period, Mr Etienne Charpentier was the Technical Coordinator of the Data Buoy Cooperation Panel (DBCP), was based in Toulouse at CLS and was employed by the United Nations Educational, Scientific and Cultural Organisation (UNESCO). He gave 3 months advance notice of his resignation and finished on 31 January 2006. During these three months, he assisted the Panel in the recruitment process for the new Technical Coordinator.

The following issues were stressed upon during this period:

- User assistance
- BUFR template for wave data
- Argos GTS sub-system (BUFR compression bug fixing, GTS sub-system monitoring, BUFR template for wave data included in database, DBCP Technical Document update)
- JCOMMOPS (information system reliability, new map projections, new UOT maps by country, research cruise database)
- Finalization of buoy life-time study (presented at DBCP-21 workshop)
- JCOMMOPS information system operations & maintenance (database, web servers)
- Buoy metadata collection scheme (assistance to users of scheme)
- Liaison with DBCP Action Groups
- Prepare for DBCP Data Users and Technology workshop
- Prepare for SST and water temperature Metadata workshop
- Assistance with recruitment of new TC
- Prepare work for the new TC (action plan, configure tools, sort out historical documents)
- Argos related issues (delays, requirements for satellite covering orbit occupied by NOAA-K)

Period 1 February 2006 to 30 June 2006

During the period 1 February 2006 to 30 June 2006, there was no Technical Coordinator for the Panel. However, some limited support could continue to be provided thanks to:

- WMO (i.e. by former TC) for user assistance, liaison with DBCP Action Groups (and provision of materials for their annual meetings), Panel Members and CLS, maintenance of the dbcp@jcommops.org and buoys@jcommops.org mailing lists, assistance regarding recruitment of the new Technical Coordinator, coordination of SOBP commitments, propose new scheme for WMO numbers.
- IOC for assistance regarding recruitment of the new Technical Coordinator.
- Panel Chairperson for assistance regarding recruitment of the new Technical

Coordinator.

- Mathieu Belbeoch providing continued operations of JCOMMOPS Information System, routinely updating JCOMMOPS database with buoy related information, data tuning, producing monthly JCOMMOPS maps, writing specifications for cruise database and establishing new mailing lists (jcomm-new@jcommops.org, meta-t@jcommops,org).
- Météo-France (Pierre Blouch) for user assistance.
- CLS for user assistance, insertion of data on GTS, system monitoring.

Period 1 July 2006 to 31 August 2006

During the period 1 July 2006 to 31 August 2006, Ms Hester Viola was recruited and became the third Technical Coordinator of the Data Buoy Cooperation Panel (DBCP). She was based in Toulouse at CLS and was employed by the United Nations Educational, Scientific and Cultural Organisation (UNESCO).

Due to the urgency of producing the SOOP Semestrial Survey, during this period a smaller percentage of time was spent on DBCP matters than would usually be the case.

In these months, her time (relating to DBCP) was spent in the follow ways:

- Familiarisation with the technological tasks of the DBCP TC role
- Familiarisation with stakeholders in the DBCP and JCOMM and previous meetings/sessions
- Increasing familiarity with the organizational tasks of the DBCP TC role
- Training and handover from the former TC
- Introductions to members of the Panel and meeting individuals in Paris, Toulouse and Geneva
- Producing reports and maps as required
- Made some minor changes to DBCP and JCOMMOPS web pages.
- Preparing for DBCP 22

Comment on the Period 1 February 2006 to 30 June 2006

The long period of vacancy (1 February 2006 to 30 June 2006) in the TC role had many immediate impacts and will continue to impact on the DBCP and the JCOMMOPS information system well into the next intersessional period.
The main impacts for the buoy community have been:

- JCOMMOPS database is missing information (e.g. buoy monitoring statistics, buoys not reporting via Argo) hence limiting usefulness of some of the data entry tools, monitoring tools and reports produced (e.g. monthly maps).
- Limited user assistance – The DBCP community members have no doubt been negatively impacted by the lack of a TC for assisting with specific questions and the lack of utility within the monitoring and reporting tools previously available on the JCOMMOPS website.
- The missing data and periods where manual data processing was not completed has had a cumulatively negative impact on the manageability of the database and data loading processes, meaning that it will take many more working days (more resources overall) to return to a usable state, than it would have taken to maintain the data during those months.
- It is possible that the number of buoys reporting on GTS has been impacted or that there have been increased delays in filling in GTS technical files properly and inserting the buoy data on GTS. This relies largely on a proactive TC.
- Manual feedback of quality information could not be provided to buoy operators. Fortunately, since the WMO numbers table could be updated, most of the quality information reports could be forwarded thanks to the automatic feedback (web page,

mailing list).

- Apart from the Argo Information Centre site upgrade, development of JCOMMOPS web site was minimal.
- A few weeks delay in producing the monthly maps (some of them could not be produced at all because investigation of issues in the production processes could not be completed with the resources available).
- Delays in pursuing some of the DBCP issues (e.g. connection of new LUT to Argos, GTS distribution of wave data, metadata collection, data quality control and monitoring). Delays in implementing new initiatives.
- Limited follow up regarding implementation of the new Argos GTS data processing system (Argos 2001 phase 3) or support for DBCP members in developing new Argos communications templates or file formats.

2) DBCP highlights (As of August 2006)

2.1) Present status of buoy programmes

See graphics in Appendix B:

- Graph-1: Drifting buoys reporting via Argos and those on GTS by country.
- Graph-2: Moored buoys in the high seas (plus US and Canadian buoys and buoys reporting via Argos) and those on GTS by country.

These graphs are also available at http://wo.jcommops.org/cgi-bin/WebObjects/JCOMMOPS.woa/wa/ptfCountry. A dynamic monthly map is available from JCOMMOPS at http://w4.jcommops.org/WebSite/DBCP/.

Among the drifting and moored buoys which are reporting on GTS in BUOY and SHIP format, the following variables are being measured (valid for drifting and moored buoy data received from GTS at Météo France during the period 1 to 31 August 2006):

Table 2: Drifting Buoys and Moored Buoys in the high seas (including US and Canadian moorings) reporting on GTS in August 2006

Variable	Any	Air P	Tend.	SST	Air T	Hum.	Wind	Waves	Sub/T
Drifting Buoys	1237	331	305	1097	16	0	21	0	8
Moorings	183	121	104	174	170	97	158	109	64
Remarks									TAO, PIRATA, TRITON.

2.2) 21st DBCP session, Buenos Aires, 17-21 October 2005.

21st DBCP session was held in Buenos Aires, Argentina, 17-21 October 2005, at the kind invitation of the Servicio Meteorológico Nacional (SMN) and the Servicio de Hidrografía Naval (SHN). More than 50 people from 15 countries representing meteorological and oceanographic services or institutes attended the meeting. Buoy manufacturers and satellite data telecommunication providers were also represented. A Technical and Scientific workshop was held during the first day and a half of the main session addressing a large number of issues such as technical developments, instrument evaluation, network performance, operational

enhancements, data telecommunication and assimilation, best practices, research and operational applications. Ken Jarrott (K.Jarrott@bom.gov.au) will continue to act as workshop chairperson for 2006, assisted by Bill Scuba (wscuba@ucsd.edu).

The Panel encouraged its Member Countries to ensure that each national coordination mechanism for GEO/GEOSS is fully informed of and consistent with existing and planned activities of JCOMM. It noted that the Panel would potentially contribute to the GEO/GEOSS process for the Tsunami monitoring system, either through JCOMM or through national coordination within each member country and agreed to actively communicate with national coordinators of GEO to fully inform them about any related activities and capabilities of the Panel. It agreed that synergies could be capitalized on with the Ship Observations Team (SOT) and DBCP, especially in the deployment and use of multi-purpose deep ocean moorings for marine hazard detection. K. Premkumar was designated by the Panel as its focal point for information on Tsunami monitoring systems.

The future mission of the DBCP was discussed in depth, analysing past goals, current strengths and weaknesses of the Panel, future objectives and strategies to achieve them. A small Task Team was established including the Chairperson, Ariel Troisi, Ken Jarrott, Julie Fletcher, Jean Rolland, K. Premkumar, Elizabeth Horton, Sidney Thurston and the Technical Coordinator. The Task Team will report on its findings and recommendations at this Panel session.

2.3) Global Implementation

The graph below shows the changes in the number of operational drifting buoys reporting on GTS from March 2003 to August 2006 and those reporting air pressures.
The number of operational drifting buoys attained by the end of 2005 was not sustained throughout 2006, presumably caused by a combination of buoy life cycles and lower rates of distribution on the GTS. The number of operational drifting buoys measuring air pressure remained approximately constant during 2005/2006, at a level of about 330 with a barometer. The Panel is invited to discuss the causes and ramifications of this data.

Graph 1 : Monthly evolution of the number of operational drifting buoys reporting on GTS from March 2003 to August 2006 and those reporting air pressure.(Data derived by statistics computed from GTS *in situ* marine data provided by Météo France. NB data for this chart was derived differently to the charts from previous years)

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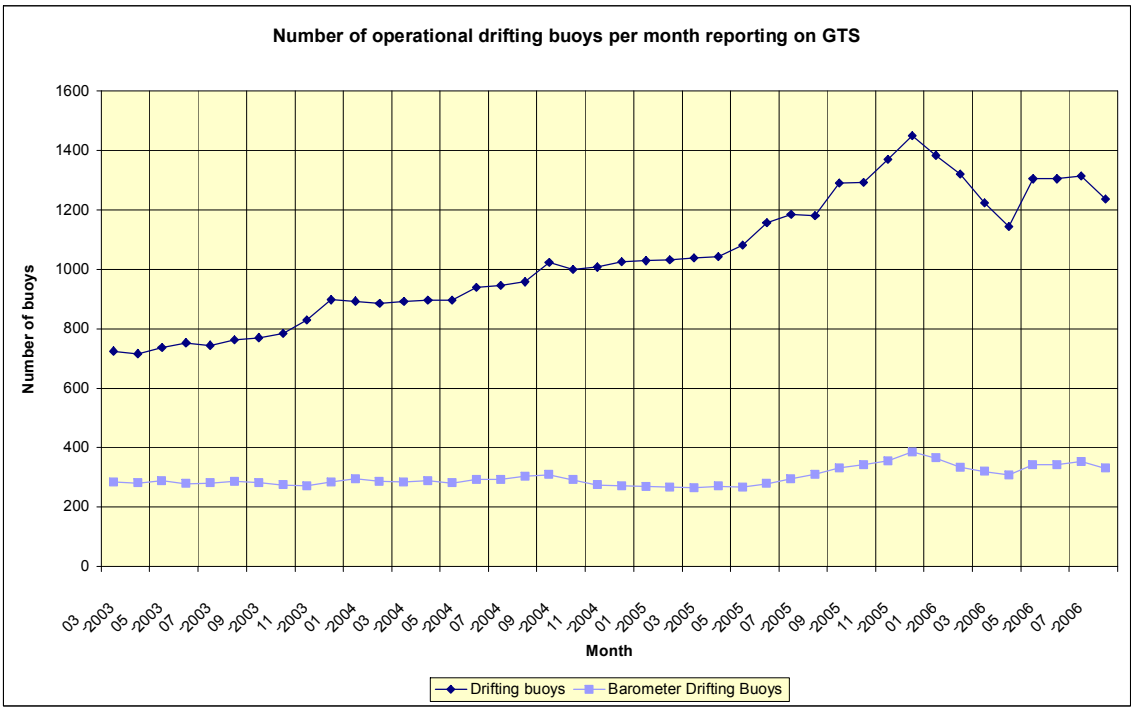
Number of operational drifting buoys per month reporting on GTS
Number of buoys
1600
1400
1200
1000
800
600
400
200
0
03 2003
05 2003
07 2003
09 2003
11 2003
01 2004
03 2004
05 2004
07 2004
09 2004
11 2004
01 2005
03 2005
05 2005
07 2005
09 2005
11 2005
01 2006
03 2006
05 2006
07 2006
Month
Drifting buoys
Barometer Drifting Buoys

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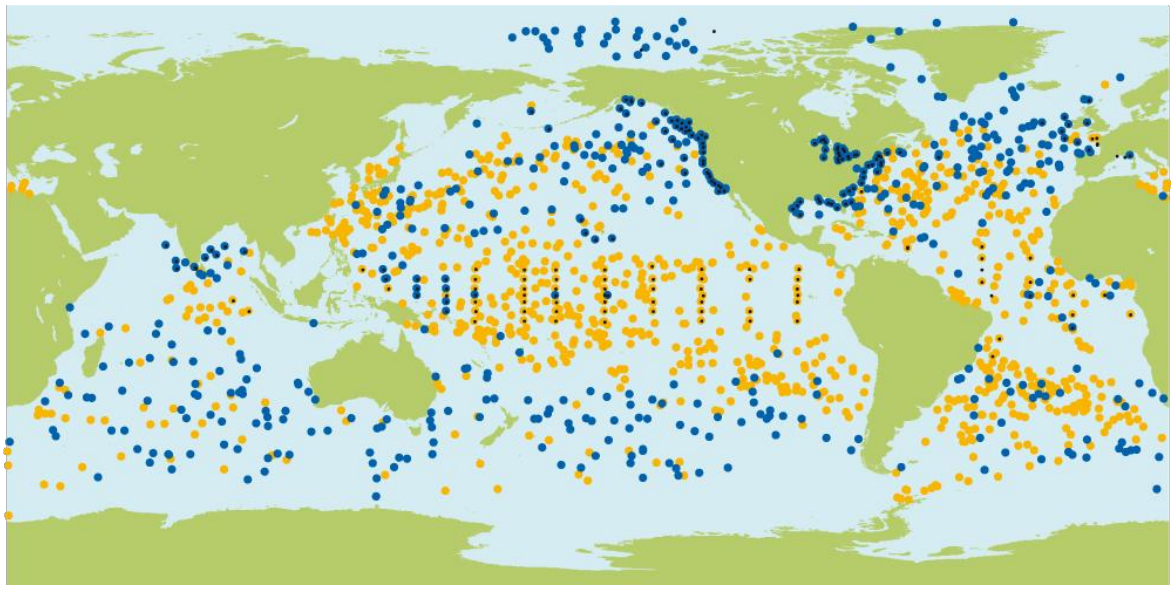
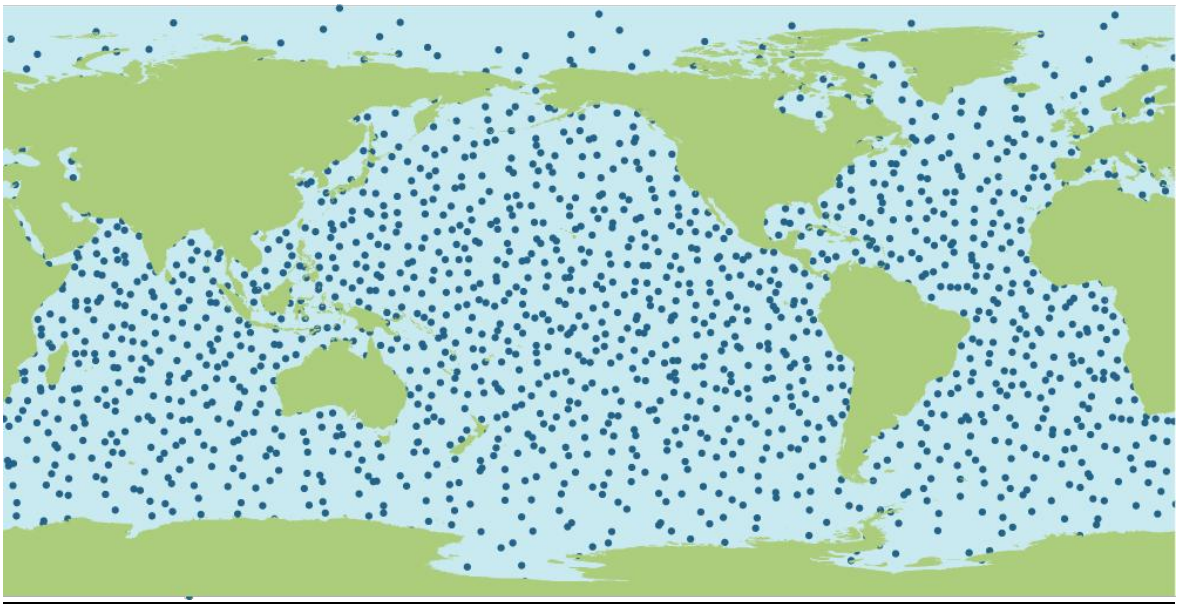
Map 1: Drifting and moored buoys reporting SST (orange dots) and air pressure (blue dots) in August 2006



Map 2 : Map showing a theoretical network of drifting buoys randomly distributed at a resolution of 500km x 500km



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2.3.1) DBCP implementation strategy

The Technical Coordinator discussed the DBCP implementation strategy with the OCG Chairperson and DBCP Chairperson allowing the following issues to be addressed:

(i) Funding to maintain the 1250 array and coordination of national contributions
(ii) Deployment opportunities to maintain the array
(iii) Barometer drifters and number of them to be deployed in 2007, including in tropical regions as recommended by the DBCP data users and technology workshop
(iv) Extending the tropical moored buoy array across the Indian Ocean
(v) Buoy technology workshop and smart buoy concept
(vi) Relationship and coordination with OceanSites

The strategy was reviewed and refined. Completion of the drifter array with 1250 operational units reporting from the world oceans was achieved on 18 September 2005 with deployment of drifter "1250" off Halifax shores (Appendix C). This had impacted substantially deployment strategy as increased deployment opportunities were needed (the drifter array doubled in the last 3 years). The Panel agreed that air deployment opportunities offered from Member States navies were limited, while these offered through other means were prohibitively expensive. The Panel is therefore increasingly depending upon ship deployment opportunities. It agreed that provided that dedicated commitments are made, its trust fund at WMO might be used for purchasing deployment opportunities, especially for the Southern Ocean.

JCOMM Observations Programme Area work plan for the next 4 years is suggesting eventually equipping all drifters with barometers. The Panel is invited to discuss how this target can be achieved based on commitment from Member Countries/Member States.

2.3.2) JCOMM

Most of the time spent by the Technical Coordinator on integrated JCOMM issues related to JCOMMOPS development and operations and attending the JCOMM meeting, Halifax, September 2005.

2.3.1.1) JCOMMOPS.

The proposal to revise the JCOMMOPS Terms Of Reference so that JCOMMOPS could eventually provide some coordination support to the JCOMM Ship Observations Team (SOT), as a whole, was discussed and approved by JCOMM-2, Halifax, 19-28 September 2005.

JCOMMOPS development is realized in participation with the Argo Technical Coordinator, Mathieu Belbéoch. During the period September 2005 to August 2006, JCOMMOPS was also assisted by following students:

- Marianne Barrailh, software developments, 3 years, ½ time as of September 2003, available for JCOMMOPS in February 2006 (Argo developments) and July to September 2006 (tasks not defined at the time of writing this report: cruise database or other software developments)
- Joan Fleur, April-June 2006, software developments on platform life-times graphics, as well as NetCDF decoding.

The following was achieved during the considered period:

- Information system operations and maintenance with assistance from CLS, Service Argos.
- Keeping JCOMMOPS database up to date (platform and programmes status, statistics, list of GTS observations, platform locations, etc.).

- New maps showing upper ocean thermal profiles by country (Argo, TIP, XBTs) and one showing all buoys and floats, updated monthly.
- Technical specifications for research cruise database drafted by Mathieu Belbeoch.
- Improved reliability of JCOMMOPS dynamic web site
- Implementation of BUFR tables in JCOMMOPS database and web query to access tables.

See DBCP session preparatory document dealing with JCOMMOPS development and operations for details.

2.3.2) Deployment opportunities

As part of JCOMMOPS activities, DBCP/SOOP and Argo Technical Coordinators are routinely collecting information on deployment opportunities. Such information is made available via the JCOMMOPS web site at http://www.jcommops.org/depl_opport/depl_opport.html . Information is useful for buoy operators (especially new participants) to make contacts in specific countries in order to seek new deployment opportunities. It can also be useful for buoy operators who are willing to deploy buoys in remote ocean areas, to quickly identify available opportunities and make appropriate contacts.

Panel Members are invited to regularly inform JCOMMOPS about any deployment opportunities that their country can offer.

2.3.3) Southern Hemisphere barometers

A Southern Ocean Buoy Programme (SOBP) is now part of the DBCP Implementation Strategy.

The target for the Southern Ocean (here defined as the open ocean south of 40S) used to be at any time, for 80 barometer drifting buoys to be maintained operationally. However, in the context of the JCOMM/OCG phased-in implementation plan, the global target is to eventually equip about 700 drifting buoys with barometers in extra-tropical regions. Considering the total area of the Southern Ocean South of 40S (76970000 km2) new targets would eventually need to be about 300 units (at 500km x 500km resolution). The Panel is invited to discuss the overall level of commitment required in the region.

147 drifting buoys were reporting air pressure from area south of 40S in August 2006.
The main stakeholders were:

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

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Proposed commitments for the period September 2006 to August 2007 are:

Country	Buoys purchased	Additional upgrades	Total	Deployment opportunities
Australia	5	8	13	*
France	0	9	9	
New Zealand	7	10	17	*
South Africa	0	33	33	*
UK	5	0	5	
USA*	42	0	42	*
Total	**59**	**60**	**119**	

*: For the period 9/2006 to 8/2007, USA plans to deploy 42 SVPBs in the region 40S-60S, i.e. 15 in the South Atlantic, 15 in the Pacific Ocean and 12 in the Indian Ocean.

AOML also offered to upgrade standard drifters (SST only) with barometers for about $US 1000 per unit (see http://www.dbcp.noaa.gov/dbcp/svpb_upgrade.html)

2.3.5) DBCP Action Groups

Ocean Sustained Interdisciplinary Time-series Environment observation System (OceanSites), has been accepted as a new DBCP Action Group. There are now nine Action Groups with the DBCP (i.e. E-SURFMAR, IABP, WCRP-SCAR IPAB, DBCP-PICES NPDBAP, TIP, GDP, ISABP, IBPIO and OceanSites).

2.3.5.1) E-SURFMAR

EUCOS Surface Marine Programme (E-SURFMAR)

Area of interest: Ocean areas potentially impacting NWP over European countries. This basically covers the North Atlantic Ocean and the Mediterranean Sea.
Manager, E-SURFMAR: Pierre Blouch, Météo-France
Chairperson, Data Buoy Technical Advisory Group (DB-TAG): Jon Turton, UK Met Office
Data Buoy Manager: Jean Rolland, Météo-France
Web site: http://esurfmar.meteo.fr (username/password required, ask Jean Rolland for details)
Status: Network of 70 drifting buoys in August 2006 (plus 11 drifters not belonging to E-SURFMAR). 4 moorings (UK, France, Spain, Ireland) under E-SURFMAR plus 12 EGOS moorings, 14 EGOS wave buoys and 14 moorings not belonging to E-SURFMAR Members.
Meetings: DB-TAG meets twice a year (December and June).

Financial recompense will be received by the countries deploying drifting buoys and maintaining moorings on behalf of E-SURFMAR.

Small non E-SURFMAR contributions by European countries are made which slightly increases the overall level of drifting buoys deployed by these countries compared to what it was with EGOS.

2.3.5.2) IABP

International Arctic Buoy Programme (IABP)

Chairperson: Tim Goos, Meteorological Services Canada
Coordinator: Ignatius Rigor, University of Washington

Web site: http://iabp.apl.washington.edu/
Area of Interest: Central Arctic Ocean and its marginal seas, excepting Exclusive Economic Zones where agreements of the Coastal States have not been obtained.
Status: 37 IABP buoys were operational in the Arctic basin in August 2006. Eurasian Arctic sector continues to be data sparse.
Meetings: 16th IABP meeting was held in Bremerhaven, 24-26 April 2006.

- WHITE TRIDENT exercise which provides for the programme backbone needs commitment for at least 7 ICEX AIR buoys from participating countries.
- Average spacing: Horizontal resolution targeted 250*250 km.
- Recommended measured data include: SLP, AT, ice motion, snow depth, ice thickness, ice temp, ocean temperatures and salinity.

2.3.5.3) ISABP

International South Atlantic Buoy Programme (ISABP)

Chairperson: Alaor Moacyr Dall'Antonia Jr., MHS, Brazil
Vice-chairperson: Ariel Troisi, Argentina
Coordinator: Johan Van der Merwe, SAWB, South Africa
Web site: http://www.dbcp.noaa.gov/dbcp/isabp/
Area of Interest: South Atlantic Ocean north of 55S plus Tropical Atlantic Ocean.
Status: 155 buoys reporting on GTS in August 2006, of these, 33 were reporting air pressure.
Meetings: The last meeting was held in Buenos Aires, 30 May – 2 June 2006. This meeting stressed the importance of filling data sparse areas, including in the Gulf of Guinea, Drake Passage and Angola Basin. Next meeting planned early May 2008 tentatively in Cape Town.

2.3.5.4) IBPIO

International Buoy Programme for the Indian Ocean (IBPIO)

Chairperson: Graeme Ball, BOM, Australia
Vice-chairperson: K. Premkumar, India
Coordinator: Pierre Blouch, Météo-France
Web site: http://www.shom.fr/meteo/ibpio
Status: 151 buoys were reporting from the Indian Ocean in August 2006, 85 with Barometers. IBPIO maintains a network of about 100 drifting buoys in the Indian Ocean. NIOT moorings also provide valuable data as well as four TRITON and ATLAS buoys from the TAO Array.
Meetings: 8th meeting was held in Buenos Aires, 14 October 2005. 9th meeting is planned in La Jolla, 13 October 2006.

2.3.5.5) IPAB

WCRP International Programme for Antarctic Buoys (IPAB)

Chairperson: Shuki Ushio
Coordinator: Christian Haas, AWI, Germany
Web site: http://www.ipab.aq/
Status: In August 2006, 28 drifting buoys were reporting on GTS in BUOY code from the Antarctic region (i.e. south of 55S). 8 of these buoys were reporting air pressure.
Meetings: 5th IPAB meeting was held in Dunedin, New Zealand, 3 December 2005. 6th meeting is planned in Hobart, Tasmania, 11 July 2006 (IPAB IPY meeting).

2.3.5.6) GDP

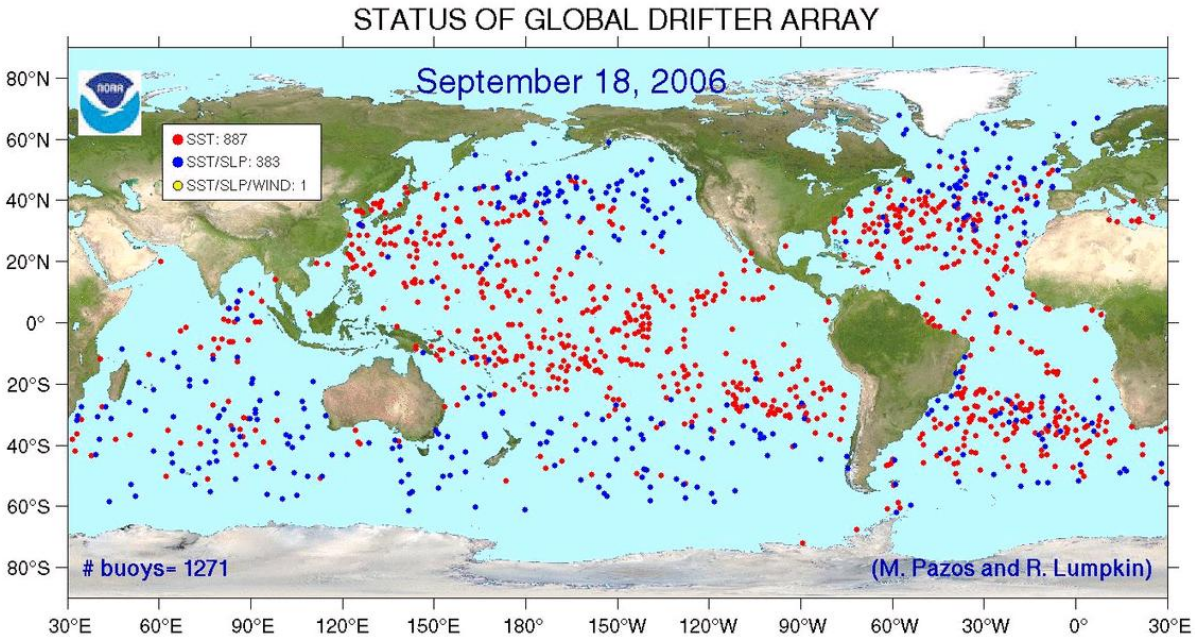
Global Drifter Programme (GDP)

Chairperson: Rick Lumpkin, NOAA/AOML, USA
Manager, GDC: Craig Engler, AOML, USA
Web site: http://www.aoml.noaa.gov/phod/dac/gdp.html
Status: The Global Drifter Center (GDC, http://www.aoml.noaa.gov/phod/dac/gdc.html) is part of the NOAA's Global Ocean Observing System (GOOS) Center in Miami, Florida. There were 1240 operational drifters in May 2006, 380 of those reporting air pressure.

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

The GDC and its related Data Assembly Center (DAC) provides products through the following web site: http://www.aoml.noaa.gov/phod/dac

The GDC encourages other drifter programs to contribute their data to the DAC if those data are collected by the SVP WOCE type drifter with drogues set between 10 and 15 meters.



2.3.5.7) TIP

Tropical Moored Buoy Implementation Panel (TIP)

Chairperson: Mike McPhaden, PMEL, USA
Coordinator: Paul Freitag, PMEL, USA
Status: Progress towards the establishment of an Indian Ocean moored buoy array was made with the deployment of an initial 4 surface ATLAS moorings and one subsurface ADCP mooring in October/November 2004. These moorings complement previously established JAMSTEC TRITON and ADCP moorings. Three to four additional ATLAS

mooring deployments are planned for late 2006 and early 2007. In addition to traditional wind and sub-surface temperature sensors, all Indian Ocean moorings have near-surface (10 m) current meters and subsurface salinity sensors. One ATLAS mooring has OceanSITES flux enhancements, which include long-wave radiation, barometric pressure and additional subsurface current meters; one other OceanSITES ATLAS mooring is planned as part of the 2006-07 expansion. Vandalism remains a concern. Enhancements to the PIRATA array in 2005 included the addition of 3 sites offshore of Brazil. Two additional PIRATA sites will be deployed off North Africa in 2006. Four sites in TAO and three in PIRATA will gain OceanSITES flux enhancements in 2006. Surface salinity will become a standard measurement on all TAO sites by 2007.

2.3.5.8) DBCP-PICES NPDBAP

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

Co-chairpersons: NE Pacific: Al Wallace, MSC, Canada
NW Pacific: To be proposed by PICES
Coordinator: Craig Engler, NOAA/AOML
Area of Interest: North Pacific Ocean and marginal seas generally north of 30°N.
Status: The NPDBAP aims an operational network of about 120 buoys north of 30N in the Pacific Ocean. In FY06, 27 GDP drifters have been deployed in the NPDBAP region. 25 have barometers. In August 2006, 145 drifting buoys were reporting on GTS from the region, including 42 reporting air pressure.
Web site at: http://npdbap.noaa.gov/
Meetings: Last meeting was held in conjunction with DBCP-21 meeting in Buenos Aires, October 2005. Next meeting is planned in La Jolla, 15 October 2006.

2.3.5.9) OceanSITES

OceanSITES is a global system of long-term, deepwater reference stations. The network now includes over 60 surface and subsurface arrays. The data from most sites are made available to the public in real-time or deferred mode. (See map below) Data are not public for a limited number of sites. OceanSITES data complement satellite imagery and ARGO float data by adding the dimensions of time and depth.
Co-chairpersons: Bob Weller and Uwe Send
Web site: http://www.oceansites.org/

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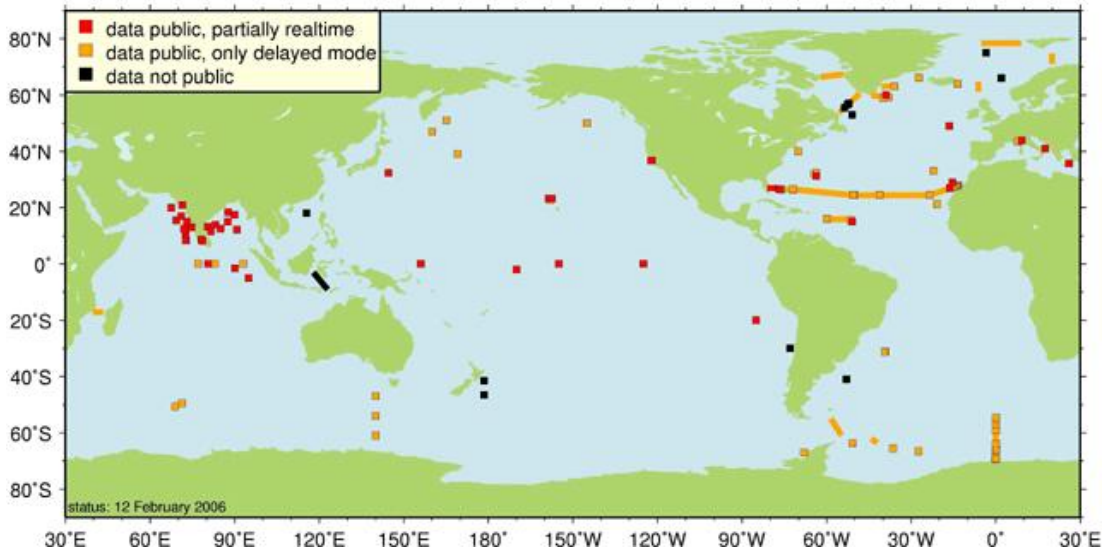
OceanSITES – current



2.4) Information exchange

The technical coordinators achieved the following tasks regarding information exchange:

- Maintained DBCP web site (http://www.dbcp.noaa.gov/dbcp/).
- Updated and maintained JCOMMOPS web site (see paragraph **Error! Reference source not found.** for details).
- Maintain DBCP news section on JCOMMOPS web site (http://wo.jcommops.org/cgi-bin/WebObjects/JCOMMOPS.woa/wa/news?prog=DBCP). Panel members are invited to provide input for the News section through the Technical Coordinator.
- Monitored the mailing lists. Mailing lists were routinely being used the Technical Coordinators and a few buoy operators to exchange information with the buoy community.
- Provided input, if needed, for DBCP publications (DBCP annual report, Implementation strategy)
- The TC updated the Argos GTS sub-system reference guide (Pub. No. 2)
- The Technical Coordinators provided DBCP publications upon request

2.5) Metadata

2.5.1) Buoy Metadata collection scheme

The buoy metadata collection scheme was implemented operationally at JCOMMOPS in January 2005. The community was informed and a few buoy operators received some training. Users and reference guides are available from the application web site (http://w4.jcommops.org/cgi-bin/WebObjects/meta). Collected metadata are extracted from JCOMMOPS database and exported in XML & CSV formats (ftp://ftp.jcommops.org/XML/). JCOMM ODAS metadata centre is accessing the metadata delivered by JCOMMOPS.

Manufacturers are required to enter information in the system upon buoy purchase, while buoy operators should enter information upon buoy deployment and during the buoy operational life-time. Only manufacturers and buoy operators are authorized to enter information in the system, so they are invited to contact the TC of the DBCP for registration or if there are any problems/issues with using the system. Panel Members, Action Groups and manufacturers are urged to browse data and make use of buoy metadata collection scheme developed by JCOMMOPS

2.5.2) META-T Pilot Project

The Water Temperature metadata Pilot Project (META-T) was established by JCOMM/OCG Workshop, Reading, United Kingdom, 28-29 March 2006. This followed recommendations by the DBCP, the SOT, JCOMM/OCG and the JCOMM Management Committee. The TC was involved in the preparation for the workshop.

2.6) GTS

2.6.1) GTS codes

BUFR compression was implemented by CLS in September 2005. However, a few problems with database tuning lead to practical distribution of compressed reports on a routine basis only a few weeks later.

The BUFR template for directional and non-directional wave data from buoys (which was approved by the Panel at its 22nd session) was finally adopted by the CBS Expert Team on Data Representation and Codes for experimental use as of May 2006.

BUOY: No changes. Buoy data continue to be distributed on GTS in BUOY code in parallel to BUFR.

2.6.2) GTS bulletin headers

A complete list of GTS bulletin headers used for GTS distribution of buoy data from CLS is given in Appendix A.

2.6.3) GTS distribution of buoy data

The Technical Coordinator identified buoy data which were not distributed on GTS and encouraged buoy operators to authorize GTS distribution of the data when this is feasible. He also provided technical assistance to buoy operators in this regard.

2.6.4) Argos & Argos GTS sub-system

The Technical Coordinator's work in this regard was related to the following issues:

- Followed implementation of BUFR compression within the GTS sub-system
- Followed developments, made suggestions, participated in tests and database upgrades for the new Argos data processing system which will eventually replace the Argos GTS sub-system and the existing Argos data processing system (i.e. the two functions will be merged) (2006).

Argos ground receiving stations

Recent development of the Argos network of regional receiving stations permitted to reduce data delivery times substantially. However, concerns remain regarding increased delays in certain regions such as the Indian Ocean, South Atlantic Ocean and South East Pacific Ocean.

The Panel therefore agreed to monitor data availability delays and to investigate technical solutions for improving them. For example, installing and/or connecting Argos local receiving stations at Easter Island and Saint Helenas (or Gough Island), to the Argos network of ground receiving stations will be investigated. Connection of existing LUT at Malvinas/Falkland will continue to be pursued by South Africa and UK. Blind orbit problem following loss of Lannion

global Argos receiving station is now about to be solved thanks to NOAA/NESDIS commitments for using Svalbard facilities.

At the time of writing this report, METOP was planned for launch in July 2006. METOP carries Argos downlink capability. CLS has plans to develop in collaboration with CNES, for mid-2007 and beyond, micro-satellites that would be equipped with Argos 3 and downlink capability. Cooperation with India is underway to eventually equip Indian Satellite Megha-Tropic (20° inclination) with Argos 3 and downlink capability by the end of 2009.

See related preparatory document for details.

2.7) Quality Management

2.7.1) QC guidelines.

The TC monitored buoy-qir@vedur.is mailing list. He forwarded messages that could not be forwarded automatically to appropriate buoy operators.

2.7.2) Buoy monitoring statistics

A comprehensive report describing algorithms and remaining discrepancies among statistics produced by UKMO, NCEP, Météo France, BOM and ECMWF is available via the DBCP web site at http://www.dbcp.noaa.gov/dbcp/monstats.html. This document needs to be updated.

2.7.3) Best practice and standards

The DBCP evaluation group urges buoy operators to review Best Practice prior to purchase of drifting, keeping in mind safety of people tasked to carry out the deployments (e.g. drogues adequately secured). For operational applications (e.g. Hurricane drifters), satellite transmission and proper GTS data processing should be tested prior to deployment. Manufacturers are urged to provide CLS with list of formats they operate.

NDBC will coordinate documentation of Best Practice and standards, in particular regarding calibration procedures. EGOS (now E-SURFMAR) existing documentation can be used as starting point.

2.8) Impact studies regarding data buoys:

A list of impact studies regarding data buoys is available through the DBCP web site (http://www.dbcp.noaa.gov/dbcp/impact.html). Panel Members with information on past, present or future studies, which are not listed in the web page, are invited to submit details to the Technical Coordinator.

2.9) Technological developments

The storm buoy concept was approved by the Panel (i.e. increasing resolutions in storm conditions). The Smart buoy concept (i.e. decreasing resolutions in less sensitive conditions) was discussed at DBCP-21 and then at the Data Users and Technology workshop, 27-28 March 2006, ECMWF, Reading, UK. Many recommendations were made by the workshop. See DBCP session agenda item 8.6.5 and related preparatory document for details.

2.10) Vandalism

Vandalism on data buoys (particularly moored buoys) remains a concern for the Panel. Actions to prevent vandalism should be on-going. These include

- distribution of vandalism leaflet (available via DBCP web site),

- provision of information to mariners and fishermen through other international organizations or commissions such as IMO, FAO, IHO, ITC.
- JCOMMOPS has offered to share vandalism proof designs through JCOMMOPS web site with protected access via username and password.

2.11) Buoy deployment notification scheme

Information on deployment opportunities is maintained by JCOMMOPS. See specific preparatory document regarding this issue for details.

2.12) DBCP evaluation group.

A Web page describing the group is available at http://www.dbcp.noaa.gov/dbcp/eval_group.html. The mailing list for the evaluation group is dbcpeval@jcommops.org.

Issues on which the Technical Coordinator was active during the intersessional period:
- Preparation for the DBCP data users and technology workshop
- Finalising drifter life-time web products.

See report by the Chairperson of the evaluation group for details concerning its activities during the intersessional period.

3) Specific, non-regular tasks, undertaken during the intersessional period by the TC DBCP

<u>September 2005</u>

1. 18 September: deployment of drifter “1250”. Specific news prepared for JCOMMOPS web site.
2. 19-23 September, Halifax, JCOMM-II meeting; 22 September, visit to Metocean.
3. Wrote document on life-time study for presentation at DBCP workshop
4. New version of Argos GTS sub-system with BUFR compression capability implemented 6 September 2005 and made effective 28 September 2005. Test reports made available via JCOMMOPS FTP site.
5. Develop dynamic maps available in Universal Polar Stereographic projections (North and South) in addition to existing flat square ones.
6. SOOP Semestrial survey, Jan-June 2005
7. Work on Argos GTS sub-system template for hurricane drifters (SIO)
8. Discuss GDP Chairperson nomination with Peter Niiler, David Meldrum.
9. Revision 1.6 of Argos GTS sub-system reference guide
10. Finalize document on GTS delays and Argos ground receiving network. Prepare presentations for DBCP-21.
11. Work on JCOMMOPS web site reliability
12. Lessons learned from Rita and hurricane drifters:
    (i) prototype Argos message formats must be validated beforehand and
    (ii) CLS must develop strong expertise for creating and debugging Argos GTS sub-system templates.

<u>October 2005</u>

1. Work on article on buoy vandalism to be published in METMAR.
2. Preparatory document on vandalism for DBCP session.
3. Preparation for CLIVAR, IBPIO, NPDBAP, DBCP, JTA meetings.
4. 13 October, Conception, Chile, CLIVAR South Pacific Workshop. Make presentation on Global Drifter Program.

5. 16-26 October, Buenos Aires, Argentina, IBPIO-8 (15 Oct), NPDBAP-4 (16 Oct), DBCP-21 (17-21 Oct.), JTA-25 (24-26 Oct.) meetings.
6. SOOP Semestrial Survey, Jan.-June 2005 (new inputs).

November 2005

1. 7-8 Nov., Ostend, IOC MLA2 meeting
2. 18 Nov., Paris, IOC, JCOMM issues, TC/DBCP recruitment, DBCP users and technology workshop preparation
3. Assist with recruitment of new TC/DBCP-SOOP Technical Coordinator. Draft recruitment notice, discussion, seek comments.
4. Preparation for ET on Data Representation on Codes meeting: IOC, JCOMM, Argo and DBCP requirements
5. CLS operational problems reported by users.
6. Analysis if why BUFR compression is causing performance problems
7. Argos GTS sub-system bug fixes and performance improvements
8. DBCP work plan for the next intersessional period
9. Prepare documents & PowerPoint presentation for Julie Fletcher and Graeme Ball on DBCP activities for IPAB meeting in Dunedin, NZ.
10. SAWS looking for buoy data in 2000. MEDS providing data.
11. Provide assistance to Norway regarding Bouvet Island AWS.
12. JCOMMOPS temporarily allocating WMO numbers on behalf of WMO
13. Preparation of workshop for establishment of Pilot Project to collect in real-time metadata concerning SST and profile data. Workshop to be held at ECMWF, 28-29 March 2006.
14. Discuss preparation of DBCP Users & Technology workshop with DBCP Chairperson.
15. Barometer upgrade issue: risk to countries other than USA, that fewer barometer upgrade opportunities would come up if USA deploys too many barometers in certain regions (e.g. North Atlantic, Indian Ocean).

December 2005

1. 5-8 Dec. Oman, ET on Data Representation and Codes. Represent IOC and JCOMM. Submit proposal by DBCP for BUFR template for buoy directional wave data; submit Argo proposal for new profiling float BUFR template.
2. 13-15 Dec., Washington-DC. Attend POGO Research cruise database workshop (useful for deployment opportunities). Meet with Mike Johnson, Steve Piotrowicz and Stan Wilson to discuss future of JCOMMOPS. Meet with Gary Soneira to discuss SOOPIP issues. Meet with Bill Woodward to discuss CLS issues.
3. Assessed DBCP financial situation.
4. New DBCP definitions uploaded on web site (new definitions of life-times according to E-SURFMAR)
5. 19-31 December, vacation

January 2006

16. Assist with recruitment of new TC/DBCP-SOOP TC in coordination with IOC.
17. Prepare transition for the next TC/DBCP&SOOP; prepare documentation and list of routine and non-routine tasks; configure new TC/DBCP portable computer and install appropriate tools; sort out DBCP & SOOP historical documents.
18. New JCOMMOPS quarterly map to show upper ocean thermal profile data by country.
19. Correct bug in Argos GTS sub-system regarding coding of WMO numbers (WMO region 7, Antarctica was coded 7 in BUFR, i.e. missing, instead of 0).
20. Problem in ECMWF monitoring statistics: bias was artificially removed before statistics computation. As ECMWF to change software.
21. Requirements for Argos satellite covering orbit presently occupied by NOAA-K

22. Performances problems at CLS regarding GTS sub-system. Database tuned, some of the BUFR temporary tables reduced in size to fix problem.
23. Add new BUFR descriptors and templates in Argos GTS sub-system database and JCOMMOPS database. This includes buoy wave template and new Argo template. Changes will be required in the Argos GTS sub-system in order to be able to process water pressure data as "level" data.
24. Information on NOAA-K potential lost impact on Argos constellation, delays and data return submitted to Météo France; requirement for Microsat expressed.
25. 31 January, end of Etienne Charpentier's contract as TC of the DBCP and SOOP, after many years of enjoyable work with DBCP and SOOP members and others. Thanks to all for your contributions, dedication, responsiveness and involvement in the work of the Panels.

February 2006

1. TC/DBCP Position vacant

March 2006

1. TC/DBCP Position vacant
2. 27-28 March, Reading, UK, DBCP data users and Technology workshop with participation from Chairperson, Vice-chairperson, Panel Members and the former Technical Coordinator.
3. 28-29 March, Reading, UK, meeting for the establishment of META-T Pilot Project, with participation from Chairperson, Vice-chairperson, Panel Members and former Technical Coordinator.

April 2006

1. TC/DBCP Position vacant
2. 24-26 April, Bremerhaven, Germany, 16th meeting of the IABP

May 2006

1. TC/DBCP Position vacant
2. 30 May – 2 June, Buenos Aires, Argentina, 11th meeting of the ISABP.

June 2006

1. TC/DBCP Position vacant
2. 13-14 June, Galway, Ireland, E-SURFMAR DB-TAG meeting
3. Coordination of SOBP commitments
4. New WMO numbering scheme drafted

July 2006

1. Visited IOC, Paris for two days. Met with many colleagues and discussed expectations of the TC role and the role of IOC.
2. Met key people at CLS.
3. Familiarisation with JCOMMOPS web site, read past reports and presentations, JCOMMOPS operations manual, reviewed documentation and priorities of former TC, assimilated e-mail communications between Panel members.
4. Contacted mailing list members and individuals by way of introduction.
5. Training and hand over for one week, with the former Technical Coordinator, Etienne Charpentier at JCOMMOPS, to learn the technologies and processes behind the JCOMMOPS information system. Solved some technical problems with computer and

software set up. Went through
   a. Database structure,
   b. Server configurations
   c. Various data loading processes (routine and manual),
   d. Argos GTS Subsystem,
   e. JCOMMOPS online query and monitoring applications
6. Training and hand over for one week, with Etienne Charpentier at WMO, to learn the organizational aspects of DBCP and JCOMM.
   a. Discussed the role of the TC and reporting mechanisms
   b. Familiarisation with:
      i. The DBCP, its implementation strategy and priorities
      ii. The DBCP Action Groups and their priorities
      iii. The SOT, its structure, the sub-Panels (VOSP, ASAPP, SOOPIP) and their current issues and priorities. VOSClim.
      iv. Applications of buoy and ship data (NWP, climate variability and predictability, GODAE, satellite, operational and research)
      v. Conclusions from the Upper Ocean Thermal review (1999)
      vi. Status of in situ marine observing networks, data sparse areas, potential for further developing the networks to better meet user requirements
      vii. Data management and distribution including the GTS and WIS, migration to table driven code forms, collection of metadata
      viii. Requirements for standardisation (documentation, best practices, metadata, instrumentation)
      ix. Satellite data telecommunication requirements
      x. WMO Publication 47
      xi. WMO identification numbers for buoys
   c. Reviewed documents from previous DBCP sessions and looked at documentation for DBCP 22.
   d. Met with many people, to become more familiar with WMO, particularly World Weather Watch and the Applications Programme Department but also the various Climate and Oceanographic collaborative programs.
   e. Went through the DBCP web site structure and development principles and the Metadata Entry Web pages.
   f. Discussed future issues for DBCP.

August 2006

1. Familiarisation with JCOMMOPS web site, read past reports and presentations, JCOMMOPS operations manual, reviewed documentation and priorities of former TC, assimilated e-mail communications between Panel members.
2. Discussed delays in satellite telecommunications with DBCP Chairperson.
3. Updated contact details on (most) websites. Made some minor changes to DBCP web pages.
4. Organised several visits within the USA following DBCP 22.
5. Discussed delays in satellite telecommunications with DBCP Chairperson.
6. Preparation for DBCP 22 and Action Group meetings, documents and presentations.
7. Confirmed with DBCP Chairperson of intent to continue in the role for 2007 under the same conditions (Depending on contract).
8. Maintained mailing lists – updating erroneous addresses (which were bouncing) and added new recipients

4. Regular or normal tasks

4.1) Monitoring

ANNEX III

Below are detailed the different monitoring activities that the TC DBCP undertook during this intersessional period:

4.1.1) Quality Control Guidelines

4.1.1.1) Reading QC messages

To read the QC messages from the BUOY-QC Internet mailing list as posted by the Principal Meteorological or Oceanographic Centres responsible for GTS buoy data quality control (PMOC). For rationalization purposes, all the proposals are stored and archived in a data base.

4.1.1.2) Contacting PGCs

To contact_the PGCs: The QC guidelines have been automated, so most of the time status change proposals are automatically forwarded to the Principal GTS Coordinator (PGC) provided that he has an e-mail address. In case the PGC has no e-mail address, the TC DBCP contacts the PGC directly and suggests him to implement the proposed change. The PGC should normally contact CLS and/or Local User Terminal (LUT) operators and request implementation of the proposed change. In case the PGC disagrees, the TC DBCP immediately sends a denial message on the mailing list.

4.1.1.3) Checking Argos files

To check Argos files and/or GTS data, in order to ascertain whether suggested modifications had actually been implemented or not.

4.1.1.4) Feed back.

To provide feed back information onto the mailing list, for sensors actually recalibrated, on behalf of CLS.

4.1.2) Specific problems.

To resolve specific problems related to GTS for given buoys, such as looking carefully at the data and the transfer functions. For example, the TC could have investigated why no or only a few messages are received at Meteorological Centres...

4.1.3) JCOMMOPS database.

Updating JCOMMOPS database in terms of content and consistency: list of the operational platforms and programs (on GTS or not), new programs, WMO numbers, monitoring statistics, etc.
The monthly data upload processes were run to produce monthly JCOMMOPS maps.

4.2) User assistance

The Technical Coordinators replied to and resolved specific problems, as needed or requested by users.

4.2.1) Principal Investigators (PI) or buoy programme managers:

PIs regularly request the TC DBCP to look at specific problems regarding their buoy data or request assistance for GTS distribution of the data. For example, the TC may have been studying Argos message formats and sensor transfer functions in detail or perhaps could obtain WMO numbers on their behalf. He also simulated satellite orbits in order to estimate orbital delays.

4.2.2) Local User Terminals (LUT):

From time to time, LUT operators asked the TC to provide them with the transfer functions used with specific platforms so that they could also report to the GTS via their LUT.

4.2.3) Meteorological Centres

Meteorological Centres contacted the TC when they need information on given platforms drifting in an area of interest.

4.2.4) Secretariats:

Upon request, the Technical Coordinators provided WMO or IOC secretariats with data, graphs and documentation.

4.2.5) Buoy manufacturers.

Buoy manufacturers regularly contacted the TC to be included in the DBCP list of drifting buoy manufacturers (http://www.dbcp.noaa.gov/dbcp/1lobm.html). He also sometimes discussed technical issues with them.

4.2.6) Individual users

Individual users contacted the TC to obtain buoy information and/or seek information on how to obtain buoy data. He usually redirected them to adequate institution(s) (e.g. RNODC/DB).

4.2.7) Acting as a Principal GTS Coordinator

When the regular PGC is on vacation, for example, the TC could fill in for him/her and act as a PGC.

4.2.8) Focal point.

Directly or through the BUOY-QC Internet mailing list, the TC acted as a focal point between the Meteorological Centres and the Principal Investigators when a specific action was required for a buoy reporting onto the GTS (e.g. remove the data from the GTS, recalibrate a sensor...).

4.2.9) Investigate various data loss problems.

4.3) Drifting Buoy Quarterly Report

Check the Drifting Buoy Quarterly Report which is issued and distributed by CLS.

4.4) Global Telecommunication System (GTS)

4.4.1) Status for drifting buoys reporting onto the GTS:

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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%

See also graphs, tables and maps in Appendix B
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).

4.4.2) GTS bulletin headers:

All Local User Terminal sources comply with WMO regulations regarding GTS bulletin headers.

See Appendix A for a complete list of GTS bulletin headers used to date.

4.4.3) Quality Control.

The Technical Coordinator's work, concerning Buoy data Quality Control, was related to the following topics:

- Actually monitoring the Internet Mailing List and contact PGCs accordingly when those cannot be reached automatically.
- Act as a PGC upon request.

Refer to the related DBCP session agenda item (Quality Control of buoy data) for details.

4.4.4) New buoys on GTS

The TC regularly contacted buoy programme managers of new programmes in order
(i) to convince them to authorise GTS distribution of their buoy data and
(ii) to offer assistance for that purpose.
Programme managers who spontaneously authorise GTS distribution of their buoy data, sometimes contacted him for assistance.

The new GTS sub-system permits the data to be processed, provided that adequate information is precisely implemented in the system. The TC was studying in detail CLS technical files for

buoys, with complicated Argos message formats. In some instances the TC obtained WMO numbers from National Focal Points or WMO secretariat on behalf of the programme managers.

4.5) Argos GTS Sub-System

The Technical Coordinator's regular work concerning the Argos GTS Sub-System was mostly related to the following topics:

- Monitoring the system and looking for possible problems.
- Making sure the problems were corrected.
- Training of the Argos Users' Guidance Office and working in conjunction with it regarding complex problems.
- Referring to related DBCP session agenda items (Argos) for details.

4.6) DBCP web server

For the DBCP web site, the Technical Coordinators' work concerned the following topics:

- Keeping regular files on the web server up-to-date (transfer files).
- Tentatively keeping links to other servers up-to-date.

Refer to related DBCP session agenda item (Information exchange) for details.

4.7) Technical Coordination - statistics and graphs.

4.7.1) Maps

The technical Coordinators produced monthly maps (JCOMMOPS), including:

Dynamic maps:

- Maintained monthly dynamic map: http://w3.jcommops.org/WebSite/DBCP
- Maintained daily dynamic map (drifter trajectories): http://w3.jcommops.org/WebSite/DBCP_RT

Static maps:

- Distribution by country of drifting and moored buoys in the high seas networks: http://wo.jcommops.org/cgi-bin/WebObjects/JCOMMOPS.woa/wa/map?type=DBM_CNTRY
- Distribution by country of drifting buoys measuring air pressure: http://wo.jcommops.org/cgi-bin/WebObjects/JCOMMOPS.woa/wa/map?type=DBPM_CNTRY
- Drifting and moored buoys in the high seas reporting SST and air pressure: http://wo.jcommops.org/cgi-bin/WebObjects/JCOMMOPS.woa/wa/map?type=DBM_SPW
- Drifting and moored buoys in the high seas reporting SST, air pressure and wind: http://wo.jcommops.org/cgi-bin/WebObjects/JCOMMOPS.woa/wa/map?type=DBM_SP

4.7.2) Active drifting buoys

Using Argos files and data provided by LUT operators the TC computed, on a monthly basis by country and by organisation, graphs showing the distribution of active GTS and non-GTS drifting buoys. It is particularly useful to see the evolution of the total number of drifting buoys deployed by the various countries involved and the percentage of these reporting to the GTS.

See Graph-1 in Appendix B (distribution of active drifting buoys by country), Graph-2 (distribution of active moored buoys in the high seas by country) and Graph-3 (Evolution of number of air pressure observations distributed on GTS per month (from ECMWF monitoring statistics)).

4.7.3) Quality of air pressure.

The TC computed, on a monthly basis, the graph showing the distribution of the RMS (of Observation minus First Guess Field) of Air Pressure data according to ECMWF monthly monitoring statistics. This graph, which uses 6 months of data, gives a good estimate of the quality of the drifting buoy Air Pressure data.
See Graph-4 in Appendix B (evolution of mean RMS (Obs.-First guess) per month for global GTS air pressure data (from ECMWF monitoring statistics)) and Graph-5 (histogram of distribution of RMS (Obs. - First Guess).

4.7.4) Air pressure from drifting buoy life-time.

The TC computed the graphs showing the distribution of life times of Air Pressure measurements, using the ECMWF monitoring statistics.

4.8) Action Groups, Regional actions.

4.8.1) Action Groups.

The TC liaised with DBCP Action Group coordinators and replied to questions from them, prepared DBCP reports for AG meetings (to be presented by the DBCP representative at the meeting) and attended those meetings on behalf of the DBCP.

4.9) Miscellaneous

4.9.1) Drifting Buoy Quarterly Report.

The TC reviewed and approved the Quarterly Report on Drifting Buoys and before CLS sent it to WMO and IOC.

4.9.2) Argos monthly status report.

The TC checked the Argos monthly status report which was prepared by CLS for WMO.

4.9.3) WMO/Argos number cross reference list and PGC list.

Monthly list of active buoy WMO numbers is available via JCOMMOPS through

(i) a dynamic web page which permits to query the JCOMMOPS database (http://wo.jcommops.org/cgi-bin/WebObjects/JCOMMOPS.woa/wa/wmo)

(ii) a file updated daily which can be downloaded from the JCOMMOPS ftp site.(ftp://ftp.jcommops.org/JCOMMOPS/GTS/wmo/wmo_list.txt).

The database includes WMO numbers for buoys transmitting on GTS via Argos and Local User Terminals (LUT). For each WMO number, one can obtain the Argos or platform number, the drifting buoy owner and the dates the WMO numbers have been introduced or removed from the system (Argos or LUT).

4.9.4) TC DBCP bi-monthly report.

The TC provided the Chairperson, Vice-chairperson of the DBCP as well as the WMO and IOC Secretariats with a bi-monthly report.

4.9.5) List of buoy user requirements.

The TC kept this list up-to-date, according to comments or information from buoy users.

4.9.6) Documentation, Assistance.

The TC provided users with documentation or status reports concerning specific programs or experiments. He also answered specific questions regarding the Argos System.

4.9.7) TC DBCP missions.

The Technical Coordinators prepared for the various missions or meetings they had to attend.

4.9.8) Preparation of the DBCP session.

The Technical Coordinators prepared specific documents, presentations and the TC report for the DBCP annual session.

ANNEX III

APPENDIX A

GTS bulletin headers being used for GTS distrib. of buoy data in BUOY code

- Table 1: The headers for data distributed by the US Argos Global Processing Centre, Largo, USA

Bulletin header (BUOY)	Bulletin header (BUFR)	Deployment area	Remark
SSVX02 KARS	IOZX02 KARS	GDP	New
SSVX04 KARS	IOZX04 KARS	North Atlantic and EGOS	Same
SSVX06 KARS	IOZX06 KARS	Northern Hemisphere	Same
SSVX08 KARS	IOZX08 KARS	TAO, PIRATA	Was SSVX40 for TAO
SSVX10 KARS	IOZX10 KARS	Southern Hemisphere and ISABP	Same
SSVX12 KARS	IOZX12 KARS	Arctic, Antarctic, sea ice	Arctic, Antarctic merged
SSVX14 KARS	IOZX14 KARS	Indian Ocean and IBPIO	New
SSVX16 KARS	IOZX16 KARS	Navoceano	Same
SSVX18 KARS	IOZX18 KARS	Pacific Ocean	New
SSVX20 KARS	IOZX20 KARS	Navoceano	Same
SSVX22 KARS	IOZX22 KARS	Mediterranean sea	New
SSVX42 KARS	IOZX42 KARS	NOAA/NDBC, Southern Hemisphere	Was SSVX02
SSVX44 KARS	IOZX44 KARS	NE Pacific Ocean (USA and Canada)	Was SSVX18
SSVX48 KARS	IOZX48 KARS	NOAA/NDBC, Northern Hemisphere	Was SSVX08
SSVX96 KARS	IOZX96 KARS	NDBC	Same

- Table 2: Headers for data distributed by the French Argos Global Processing Centre, Toulouse, France

Bulletin header (BUOY)	Bulletin header (BUFR)	Deployment area	Remark
SSVX01 LFVW	IOZX01 LFVW	North Atlantic and EGOS	Same
SSVX03 LFVW	IOZX03 LFVW	Southern Hemisphere and ISABP	Same
SSVX05 LFVW	IOZX05 LFVW	Northern Hemisphere	Same
SSVX07 LFVW	IOZX07 LFVW	Arctic, Antarctic and sea ice	Arctic, Antarctic merged
SSVX09 LFVW	IOZX09 LFVW	Indian Ocean and IBPIO	New
SSVX11 LFVW	IOZX11 LFVW	TRITON	New
SSVX13 LFVW	IOZX13 LFVW	GDP	New
SSVX15 LFVW	IOZX15 LFVW	Pacific	New
SSVX21 LFVW	IOZX21 LFVW	Mediterranean Sea	New
SSVX39 LFVW	IOZX39 LFVW	French West Indies	Was SSVX19

Backup procedure:

The backup procedure in case one of the two Argos global processing centres fails has not changed. If one centre fails, the other centre processes all of the data, i.e. the data it normally processed plus the data the other centre normally processes. Hence, when an Argos centre is in “backup mode”, it will generate bulletins with even and odd numbers (in normal mode, only even numbers are used by Largo and odd numbers by Toulouse). For Example:

- In the case where the French Argos Global Processing Center, in Toulouse, fails, the US Argos Processing Center in Largo is switched to “backup mode”. In that case, GTS

bulletins normally distributed from Toulouse (under TTAAii LFVW bulletin headers) are distributed from Largo (under TTAAii KARS bulletin headers so, SSVX01 LFVW becomes SSVX01 KARS) and vice versa.

A remark concerning GDP:

Since all GDP drifters deployed world-wide may also participate in a DBCP regional action groups (e.g. ISABP, if deployed in the South Atlantic), the data users have to agree on a policy on which GTS bulletin header to choose. Considering that a GDP header was created basically for tracking Lagrangian drifters, it would be reasonable to recommend having all Lagrangian drifters participating in GDP report under the GDP bulletin header and not under the other DBCP Action Groups' headers. For example, a Lagrangian drifter participating in both GDP and ISABP (South Atlantic) and which data are distributed from the French Argos Global Processing Center would report under SSVX13 LFVW (i.e. GDP) bulletin header and not under SSVX03 LFVW (i.e. Southern Hemisphere).

- Table 3: Data routed from the National Data Buoy Center (NDBC),Mississippi, USA, based on data received from CSL America, Largo, MD, USA

Bulletin header	Deployment area
SSVX42 KWBC	NOAA/NDBC, Southern Hemisphere
SSVX48 KWBC	NOAA/NDBC, Northern Hemisphere

- Table 4: Data routed from the NOAA, Washington DC, USA, based on data received from CLS America, Largo, MD, USA

Bulletin header	Deployment area
SSVX12 KWBC	Arctic Ocean

- Table 5: Data routed from Edmonton Local User Terminal (LUT)

Bulletin header	Deployment area
SSVX02 CWEG	Arctic Ocean
SSVX03 CWEG	Hudson Bay
SSVX04 CWEG	NorthEast Pacific Ocean

- Table 6: Data routed from Halifax Local User Terminal (LUT)

Bulletin header	Deployment area
SSVX01 CWHX	NorthWest Atlantic Ocean

- Table 7: Data routed from the Sondre Stromfjord Local User Terminal (LUT)

Bulletin header	Deployment area
SSVX01 BGSF	North Atlantic Ocean (EGOS)

- Table 8: Data routed from Indian Meteorological Department

Bulletin header	Deployment area
SSVX01 DEMS	North Indian Ocean

- Table 9: Data routed from the Japan Meteorological Agency

Bulletin header	Deployment area
SSVB01 RJTD	Marine stations and buoys
…	…
SSVB19 RJTD	Marine stations and buoys

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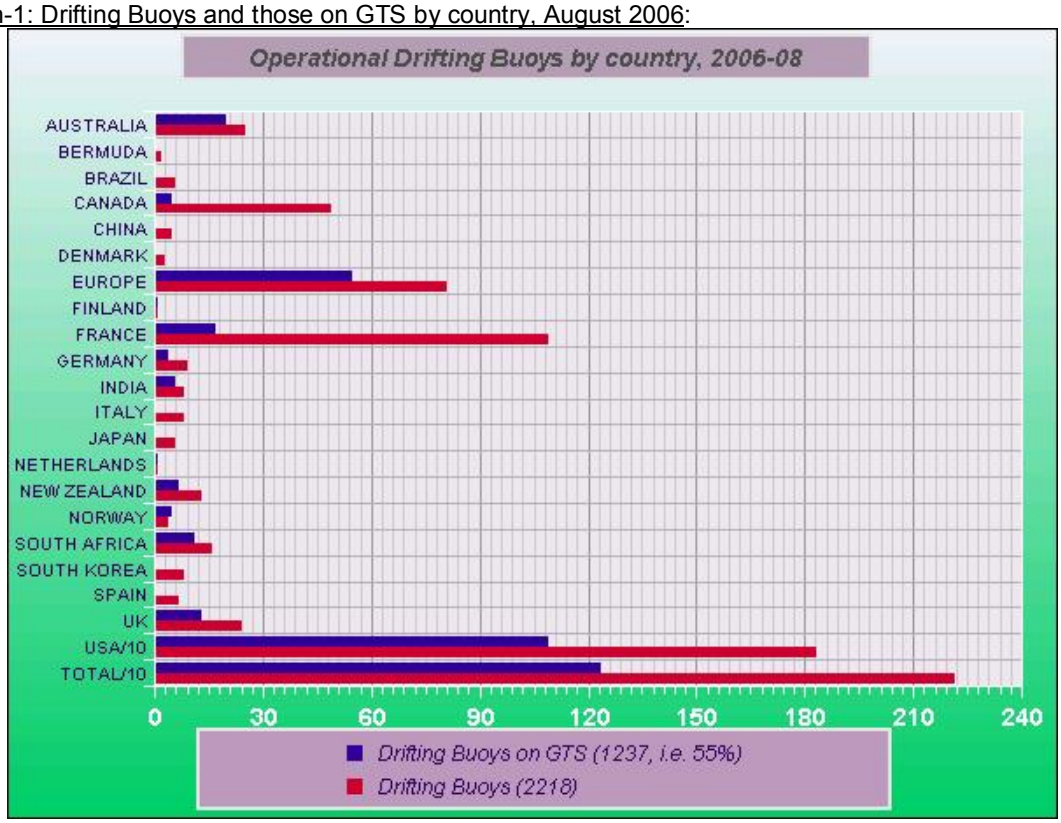
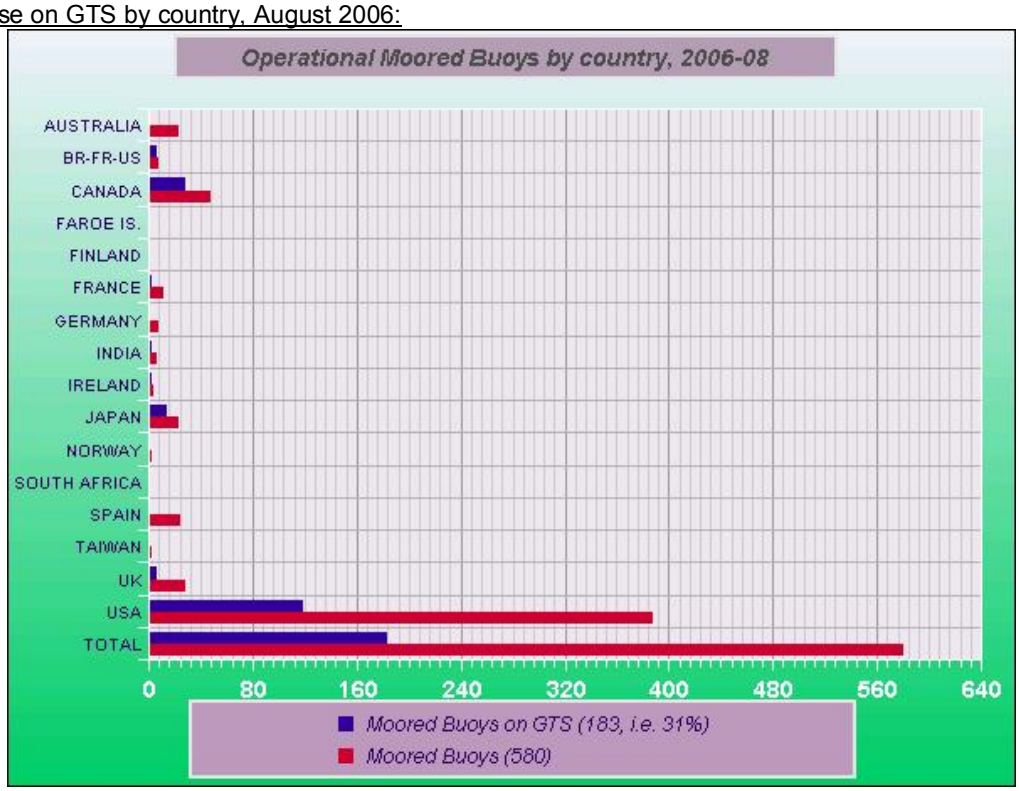
APPENDIX B: Graphs

Graph-1: Drifting Buoys and those on GTS by country, August 2006:



Graph-2: Moored Buoys in the high seas (plus US and Canadian buoys and moorings reporting via Argos) and those on GTS by country, August 2006:



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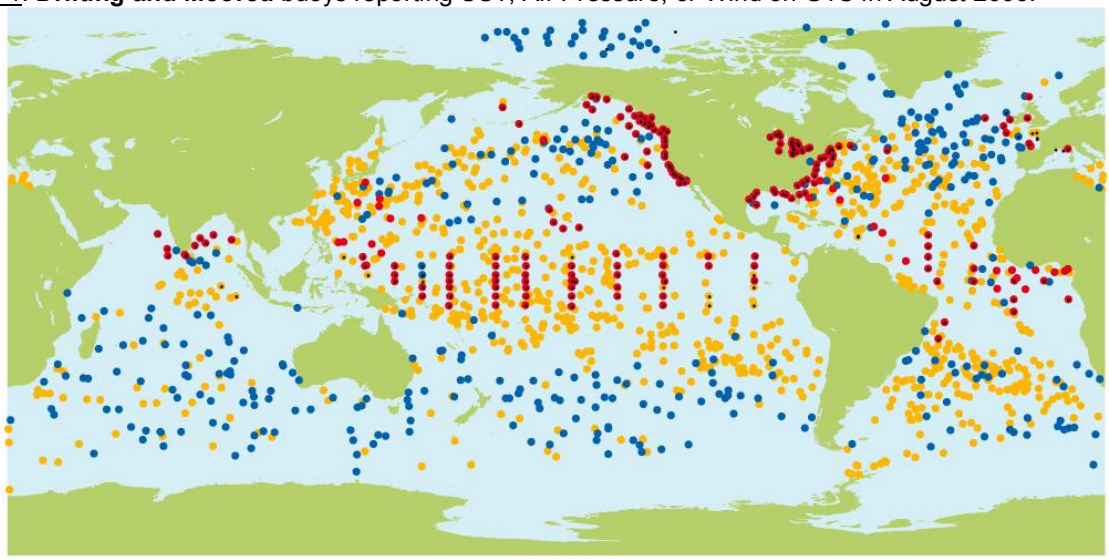
Map 1: **Drifting and Moored** buoys reporting SST, Air Pressure, or Wind on GTS in August 2006:

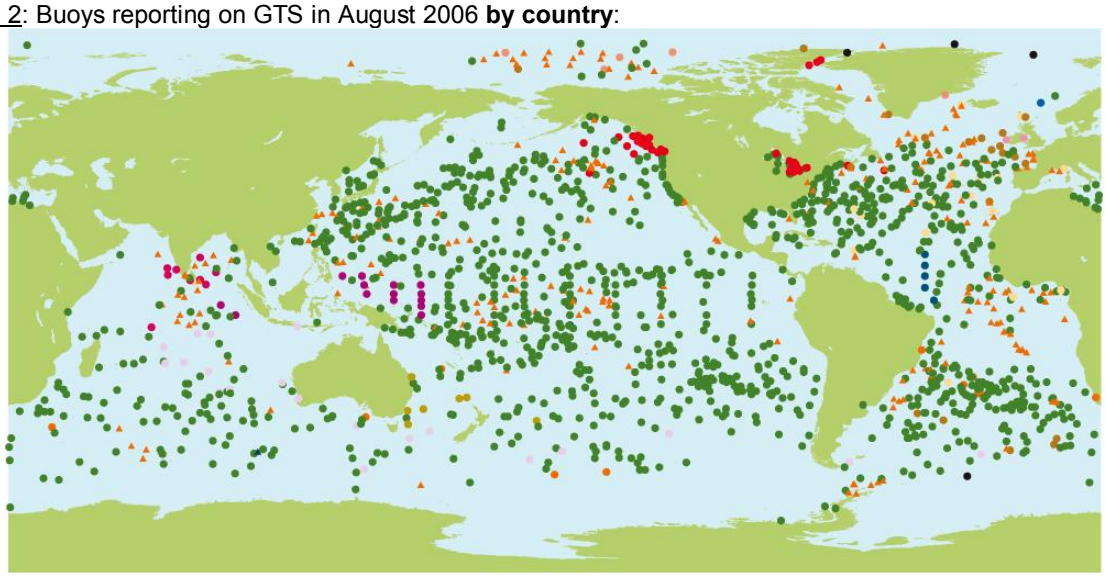


DBCP status (SST, P, Wind), August 2006 (data buoys reporting on GTS)

Air pressure
SST
Wind
Moorings

Note: Data received from GTS at JCOMMOPS via Météo-France

Map 2: Buoys reporting on GTS in August 2006 **by country**:



DBCP status by country, August 2006 (data buoys reporting on GTS)

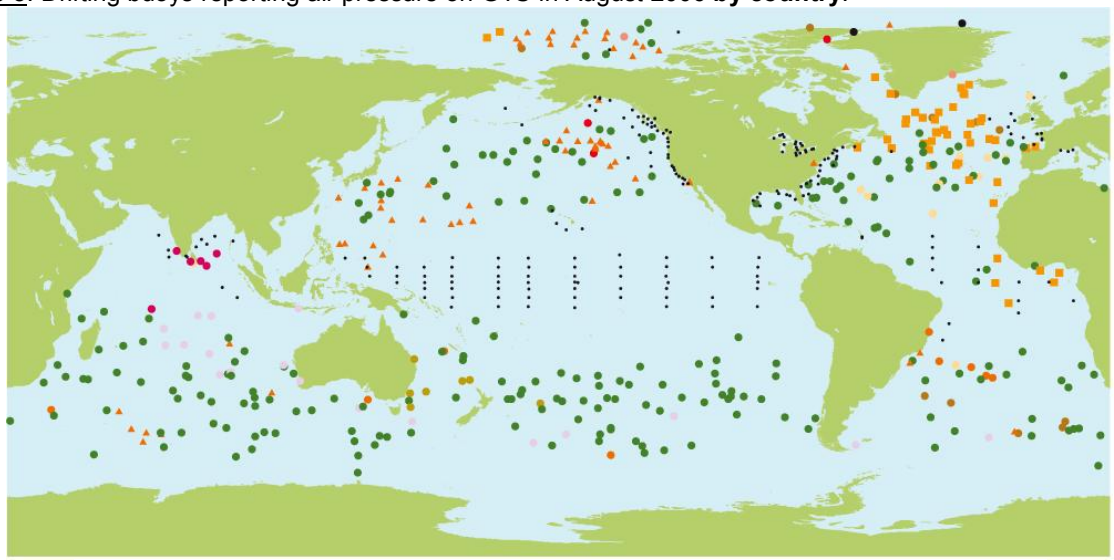
Drifting buoys: 1237 Moored buoys: 183

AUSTRALIA (20)
BRAZIL/FRANCE/USA (6)
CANADA (5, 28)
EUROPEAN UNION (55)
FINLAND (1)
FRANCE (17, 2)
GERMANY (4)
INDIA (6, 3)
IRELAND (2)
JAPAN (14)
NETHERLANDS (1)
NEW ZEALAND (7)
NORWAY (5, 1)
SOUTH AFRICA (11, 1)
UNITED KINGDOM (13, 7)
UNITED STATES (1092, 119)
MOORINGS
UNKNOWN

Note: Data received from GTS at JCOMMOPS via Météo-France; number of drifting and moored buoys in brackets respectively

ANNEX III

Map 3: Drifting buoys reporting air pressure on GTS in August 2006 **by country**:



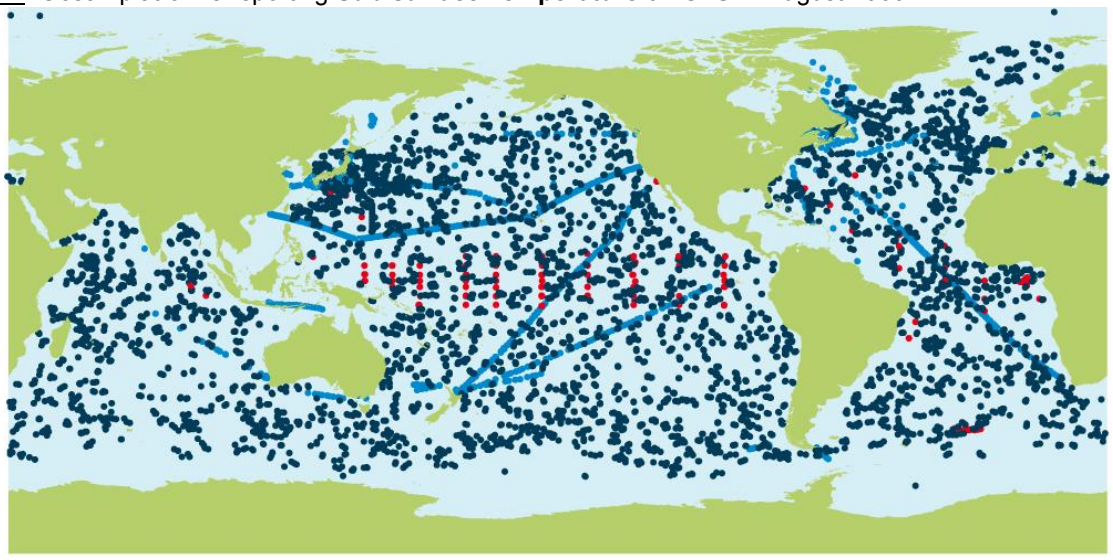
Barometer Drifting Buoy status by country, August 2006 (data buoys reporting on GTS)

Drifting buoys: 331

AUSTRALIA (18)	CANADA (3)	EUROPEAN UNION (0)
FRANCE (59)	GERMANY (2)	INDIA (6)
NEW ZEALAND (7)	NORWAY (1)	SOUTH AFRICA (9)
UNITED KINGDOM (1)	UNITED STATES (225)	UNKNOWN

Note: Data received from GTS at JCOMMOPS via Météo-France; number of drifting buoys in brackets

Map 4: Ocean platforms reporting **Sub-surface Temperature** on GTS in August 2006



Sub-surface temperature profiles, August 2006 (profile data distributed on GTS)

Total stations: 2365 Total profiles: 29685

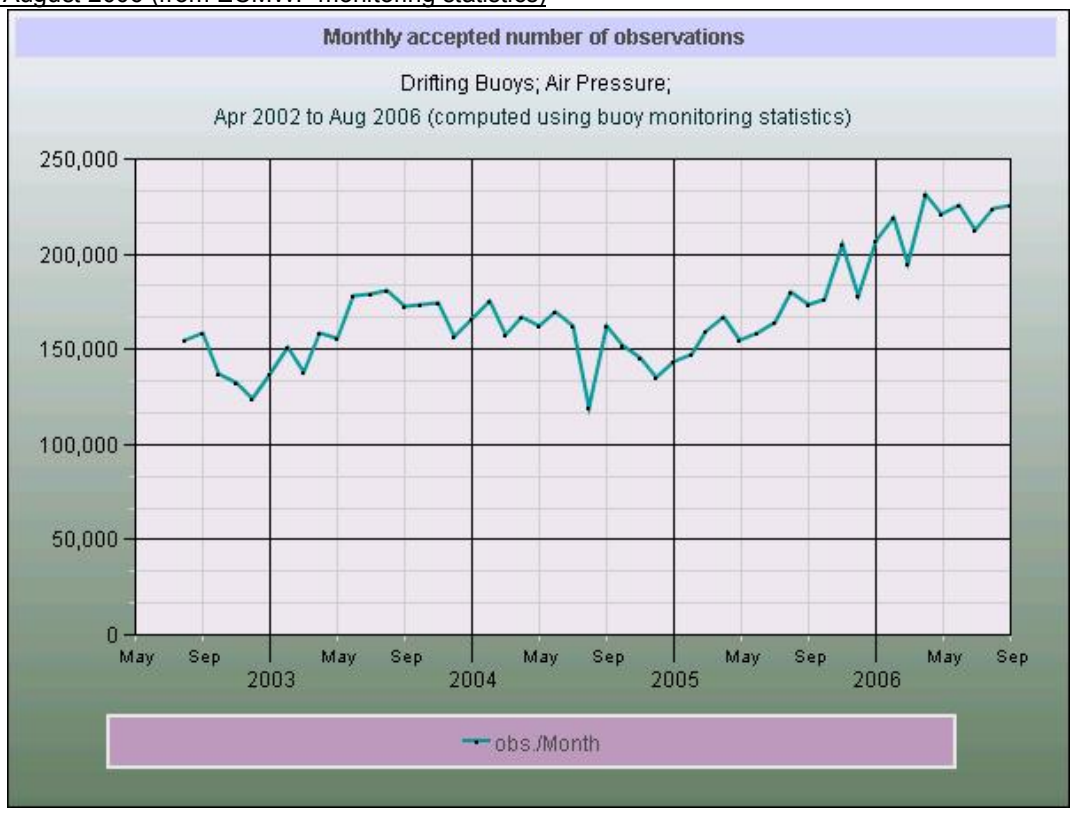
BATHY (mainly XBTs) (26, 1555)	BUOY (drifting & moored buoys) (82, 10851)
TESAC (mainly Argo floats) (2257, 17279)	

GTS data received at JCOMMOPS via Météo-France.

Note: figures in bracket are number of platforms and number of profiles respectively

ANNEX III

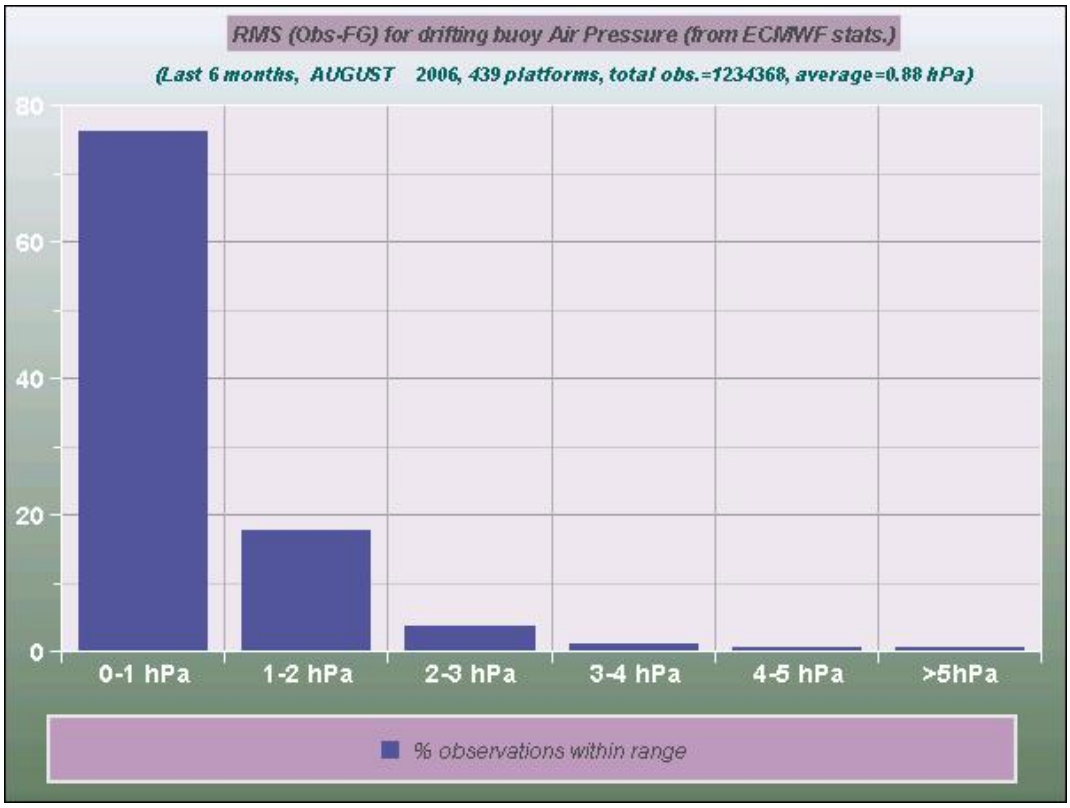
Graph 3: Evolution of number of air pressure observations distributed on GTS per month for the period April 2002-August 2006 (from ECMWF monitoring statistics)



Graph 4: Evolution of mean RMS (Obs.-First guess) per month for the period April 2002 to August 2006 for global GTS air pressure data (from ECMWF monitoring statistics)

ANNEX III

Graph 5: Histogram of distribution of RMS (Obs. - First Guess) for the period 02/2006 to 08/2006.



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ANNEX IV

ACTION GROUP REPORT SUMMARIES

THE SURFACE MARINE PROGRAMME OF THE NETWORK OF EUROPEAN METEOROLOGICAL SERVICES, EUMETNET (E-SURFMAR)

The EUMETNET Composite Observing System (EUCOS) surface marine (E-SURFMAR) programme is an optional programme involving 15 out of the 21 EUMETNET members, who fund the activity on a GNI basis. Its main objectives are to co-ordinate, optimise and progressively integrate the European meteorological services activities for surface observations over the sea – including drifting and moored buoys, and voluntary observing ships. Since mid-January 2005 E-SURFMAR has been 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 E-SURFMAR Data Buoy Technical Advisory Group (DB-TAG) which has superseded the European Group on Ocean Stations (EGOS) as an action group of the DBCP.

Drifting buoys

E-SURFMAR aims to increase 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 15 contributing members). In the year to 31st August 2006 59 drifting buoys were deployed, with 65 drifters operating at end August. Most (50) of these operating buoys are SVP-B drifters plus 15 barometer upgrades provided through the Global Drifter Programme.

The mean lifetime of the SVP drifters was 372 days (excluding 8 drifters that failed on deployment), an increase from the previous year. At the end of August the average age of the network was 323 days. Around 1,600 observations are reported daily, with around 80-85% being received within 2 hours 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 maintain a set of web-based QC monitoring tools used by the programme (and other buoy operators).

In 2006 E-SURFMAR provided 2 IcexAir buoys which were deployed in the Arctic in June as a contribution to the International Polar Year (IPY), a further 8 ICE Beacons will be deployed in 2007.

Moored buoys

E-SURFMAR has also taken on from EGOS the monitoring of the 15 K-series moored buoys operated by the UK Met Office, Meteo-France and Met Eireann/Irish Marine Institute, plus 10 SeaWatch buoys operated by the Spanish Puertos del Estado. In September 2006 a new Irish buoy (M6) was deployed to the west of Ireland. 4 of these buoys K5, M6 (previously M1), Lion and Cabo Silleiro are designated as E-SURFMAR 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 E-SURFMAR K-series buoys (K5, M1 (prior to M5) and Lion) about 70 observations have been reported each day to January 2006 (when K5 went adrift, not having been redeployed until August). Timeliness of data from the K-series buoys is generally very good with over 95% of data received

within 30 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 E-SURFMAR 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.

Future developments

At present E-SURFMAR is an optional programme within EUCOS, but it is hoped it will in time become a core programme supported by all 21 EUMETNET members. Subject to budget approvals it is expected that E-SURFMAR will lead to a substantial increase in the number of drifters operating in the North Atlantic and Mediterranean, and full funding for the 4 E-SURFMAR moored buoys.

THE GLOBAL DRIFTER PROGRAM (GDP)

Directors: Rick Lumpkin (NOAA/AOML); Peter Niiler (NOAA/JIMO)
Data Assembly Center Manager: Mayra Pazos (NOAA/AOML)
Operations Manager: Craig Engler (NOAA/AOML)
Web page: http://www.aoml.noaa.gov/phod/dac/gdp.html

The Global Drifter Program (GDP) is the principle component of the Global Surface Drifting Buoy Array, a branch of NOAA's Global Ocean Observing System (GOOS) and a scientific project of the Data Buoy Cooperation Panel (DBCP). Its objectives are to maintain a global 5ºx5º array of 1250 satellite-tracked surface drifting buoys to meet the need for an accurate and globally dense set of in-situ observations of mixed layer currents, sea surface temperature, atmospheric pressure, and winds, and to provide a data processing system for scientific use of these data. These data support short-term (seasonal to interannual) climate predictions as well as climate research and monitoring.

During the intersessional year, the GDP deployed a total of 891 drifters:

North Pacific	36 drifters
North Atlantic	31 drifters
Tropical Oceans	407 drifters
Southern Oceans	178 drifters
Consortium Research	239 drifters

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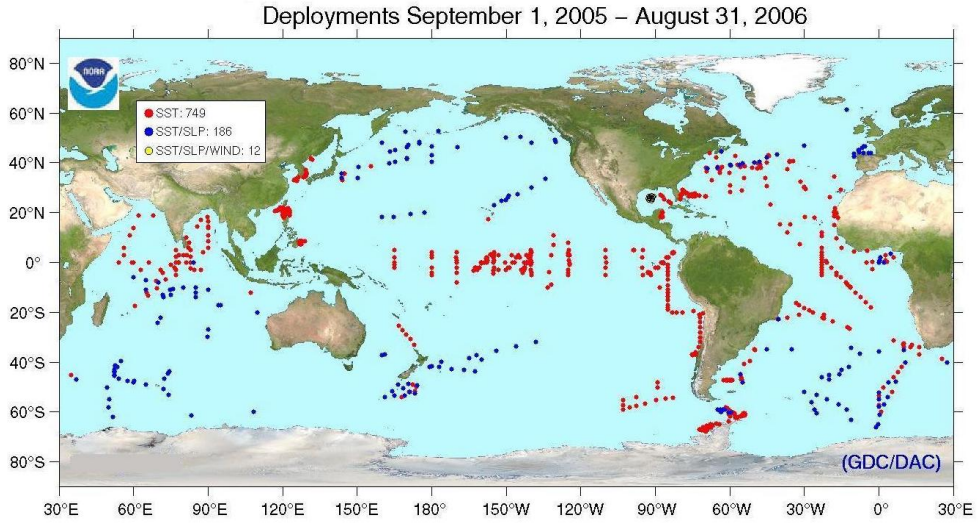

The GDP supports the upgrading of standard SVP's to SVP-B's (drifters with barometer) by any country which desires to do so, and it is working closely with those countries coordinating the shipping and deployments those upgraded drifters.

THE INTERNATIONAL ARCTIC BUOY PROGRAMME (IABP)

The 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.

The annual business meeting was hosted by Christian Hass at the Alfred Wegener Institute in Bremerhaven, Germany. Some highlights of this meeting include: 1.) the IABP was delighted to welcome EUMETNET as a new Participant of the IABP; and 2.) many of the discussions and presentations revolved around how the IABP will contribute to the International Polar Year (IPY).

Some issues that were discussed include: 1.) ensuring the release of "research" data to the GTS. This will be especially important during IPY; and 2.) The decline of Arctic sea ice making it more difficult to maintain the Arctic buoy network which traditionally has deployed its buoys primarily on thicker multi-year sea ice. To address these issues, the Coordinator of the IABP will facilitate the release of the Arctic observations by the research community, and many of the Participants presented their efforts to maintain the buoy array in the seasonal ice zone.

During the past year the IABP network was reduced to 22 buoys by April, 2006, but during the spring and summer deployment season, over 40 buoys were deployed. As of October, 2006, 52 buoys were reporting from the Arctic. It was noted that many of these buoys are collocated to form "Automated Drifting Stations", which monitor a myriad of geophysical variables such as surface pressure, air temperature, ocean temperatures, and salinity, snow depth, sea ice thickness and ice temperatures every 10-cm through the sea ice. However, despite having a good year of deployments, it was noted that there were still a few spots across the Arctic where it has been a

challenge to maintain the network. As such, the Participants of the IABP are actively seeking more support for the program from both operational and research agencies.

THE INTERNATIONAL BUOY PROGRAMME FOR THE INDIAN OCEAN (IBPIO)

The International Buoy Programme for the Indian Ocean (IBPIO) was formally established in 1996. The primary objective of the IBPIO is to establish and maintain a network of platforms in the Indian Ocean to provide meteorological and oceanographic data for both real time and research purposes.

The programme is self-sustaining, supported by voluntary contributions from the seven participants in the form of equipment and services (such as communications, deployment, storage, data archival and coordination). The ninth meeting of the IBPIO Programme Committee was held in conjunction with DBCP-XXII.

During the period September 2005 – August 2006, 129 buoys were deployed comprising mostly of SVP-B and SVP buoys. This number of deployments was just marginally less than the record number of 136 deployments achieved in 1998/99.

Planned buoy deployments by IBPIO members in the period September 2006 – August 2007 total 167 buoys comprising: 28 moored; 55 SVP; 83 SVP-B; and 1 SVP-BW. In addition, PMEL will deploy 3 moored buoys.

Data availability remains a major concern with less than 5% of reports available within 30 minutes and only about 50% available within 120 minutes (September 2006). In comparison, data availability for E-SURFMAR within 30 minutes and 120 minutes are about 52% and 79% respectively.

INTERNATIONAL PROGRAMME FOR ANTARCTIC BUOYS (IPAB)

Objectives and recent activities

The WCRP/SCAR International Programme for Antarctic Buoys (IPAB) is one of the Action Groups with the DBCP. The IPAB objectives are as follows;

- Support research in the region related to global climate processes and to global change, and in particular, to meet research data requirements specified by the WCRP and other relevant international programmes such as SCAR;

- Contribute real-time operational meteorological data supporting the requirements of the WMO/World Weather Watch (WWW) and WMO/IOC JCOMM;

- Establish a basis for on-going monitoring of atmospheric and oceanic climate in the Antarctic sea-ice zone, in particular contributing to the aims of GCOS and GOOS.

The programme will build upon co-operation among agencies and institutions with Antarctic and Southern Ocean interests.

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The IPAB participants (including more than 20 representatives from research institutes, universities and operational services etc.) work together to maintain a network of drifting buoys in the Southern Ocean, particularly over sea ice. The buoys provide meteorological and oceanographic data for real-time operational requirements and scientific research purposes, such as:

- research in Antarctic climate and climate change
- forecasting weather and ice conditions
- validation of satellite measurements
- forcing, validation and assimilation of sea ice into numerical climate models
- tracking the source and fate of ice floes

IPAB encourages participants to transmit their data in real-time to the meteorological Global Telecommunication System (GTS). IPAB's most recent activities include the compilation of the Atlas of Antarctic Sea Ice Drift by University of Karlsruhe, Germany. In this study, compilation of drift tracks of all IPAB buoys 1979 to 1997 has been shown. And the enhanced deployment of 23 buoys for a meso-scale ice dynamics experiment during the international Ice Station POLarstern project (ISPOL) made in the Weddell Sea in 2004-2005 season. Drift tracks of the buoys array from 28 November 2004 to 1 January 2005 have been indicated to understand deformation processes in pack ice region.

The major challenges of buoy operations in the Southern Ocean are seasonal freezing and melting of the ice. Most buoys are destroyed when they either sink when the ice melts, or when they become coerced in ice during freezing periods. The development of buoys designed to withstand these seasonal change are therefore of fundamental importance. A project to construct such seasonal buoys was recently initiated by the National Ice Center and the Cold Regions Research and Engineering Laboratory in USA.

On December 3, 2005, IPAB met in Dunedin, New Zealand, for its 5th bi-annual session, in association with the ASPeCt meeting on Antarctic Sea Ice in IPY and the IGS Sea Ice Symposium. Sixteen participants from eight countries discussed recent issues and future plans, particularly activities during the International Polar Year (IPY2007-2008).

Future plans

During the International Polar Year to be held in 2007-2008 (IPY2007-2008), IPAB will coordinate an enhanced network of Antarctic sea-ice buoys (IPY proposal No. 108) as outlined in its BEARDS proposal (Buoys Encompassing the AntaRctic: and enhanced Deployment Strategy). This is part of the Antarctic Sea Ice and Climate of the Antarctic & Southern Ocean (CASO) lead projects (IPY proposal No. 141 and 132). We encourage any entity or individual interested in the Southern Ocean research to make contributions to BEARDS; i.e., in the form of deployment opportunities, buoys, satellites transmission costs, or data processing. For the IPY2007-2008, IPAB offers to assume transmission costs if interested parties provide the remaining support. Please contact the IPAB coordinator for more information.

IPY activities and enhanced IPAB/BEARDS implementation plan was discussed and further developed during a meeting of the SCAR physical Sciences Standing Committee Scientific Group on 11 July 2006 in Hobart, Australia. Please contact our IPAB and visit the website (http://www.ipab.aq) if you would like to participate. We provide information and data, and serve as a general coordination platform for the project.

The new IPAB Chairperson is Shuki Ushio from the National Institute of Polar Research, Japan. He replaced Enrico Zambianchi from Parthenope University, Italy, since December 2005. The programme coordinator is Christian Haas of the Alfred Wegener Institute for Polar and Marine Sciences, Germany.

About the IPAB/BEARDS proposal, please refer the following site:

http://www.ipy.org/development/eoi/details.php?id=108/

THE INTERNATIONAL SOUTH ATLANTIC BUOY PROGRAMME (ISABP)

The 11the session of the ISABP met in Buenos Aires, Argentina in May, hosted by the Chaiman, Ariel Triosi at the Argentine Naval Hydrographic Office. The TC reported that 217 drifters had been deployed during the interessional period in the ISABP area. Of these 166 were SVP drifters and 51 were SVP-B. These drifters were deployed by the Global Drifter Center, Brazil, South Africa, Argentina, and in some cases by ships of opportunity. The US Navy deployed 10 SVP-BW drifters in the northern part of the ISABP area. During the intersesional period the number of drifters operating was between 219 and 274. There are 228 drifter deployments planned for the current intersessional period. Argentina has 2 moored buoys operating, and Brazil also has 2. In order to take full advantage of Argentina's 2 moorings, a plan was developed to move the moorings periodically from one location to the next as the data are needed. Except for one unplanned excursion (where the mooring was recovered), this plan has been working well. Vandalism continues to be a problem in the region.

There continues to be a lack of data in the Gulf of Guinea and Angola Basin. During the current intersessional period, ISABP members are encouraged to deploy in those areas, along with the SE and SW Atlantic and Drake Passage in particular. In order to encourage African coastal states to participate in ISABP, the next meeting will be held in Cape town, South Africa in May of 2008. A workshop is planned just prior to the meeting. The TC took as an action item to recruit the Island of Tristan da Cuhna for ISABP to conduct deployments. The inhabitants are primarily lobster fisherman, making it relatively easy to deploy SVP's during normal operations by their coastal patrol boat.

Meeting participants decided that the Argo Program contributes significantly to the monitoring goals of the ISABP, therefore voted to include Argo floats as monitoring platforms in the program's objectives and operating principles. The Chairperson told the members that he would continue to deploy on the XBT line between South Africa and Argentina as he has been doing in the past.

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THE NORTH PACIFIC DATA BUOY ADVISORY PANEL (NPDBAP)

The NPDBAP was officially accepted as an entity reporting to the DBCP and PICES at the DBCP 18 meeting held in October, 2002. This is the fifth Annual Report as an official body of the DBCP.

During the period Sept 1, 2005 to August 31, 2006 an average of 137 drifting buoys per month were reporting to MEDS in the North Pacific Ocean (30.00N to 65.00N and 110.00E to 110.00W These buoys produced approximately 73.600 messages per month. These numbers have more than doubled from last year with 64 buoys and 28,000 messages per month in 2005. As of August 2006, 109 buoys were reporting, 28 with barometric pressure, which are shown in bold text in Table 1. Figures 1 to 5 show breakdowns of the number of buoys in operation and the number of messages received during the period. The tables and figures were compiled by MEDS and are available on the NPDBAP web site which can be found at: http://npdbap.noaa.gov.

Meetings

The 4th meeting of the NPDBAP was held on Sunday, October 16th 2005, from 14:00 to 17:00, prior to the Twenty-first session of the Data Buoy Co-operation Panel (DBCP – XXI) .The meetings was held at the Regente Palace Hotel, Buenos Aires, Argentina. Panel and DBCP representatives from Canada, PR of China, Korea, United States and the WMO were in attendance

Time and Place of next meeting:

The next meeting of the NPDBAP on for Sunday, 15 October 2006 , from 14:00 to 17:00, prior to the Twenty-second session of the Data Buoy Co-operation Panel (DBCP – XXII) .The meetings will take place at the Acapulco Room at the Sea Lodge Hotel, La Jolla, California USA.

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Technical Coordinator – NPDBAP
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THE OCEAN SUSTAINED INTERDISCIPLINARY TIMESERIES ENVIRONMENT OBSERVATION SYSTEM (OceanSITES),

Status and update on OceanSITES

The global timeseries project OceanSITES has made progress in several areas in the last year. Much of that were outcomes of a Steering Committee meeting in Hawaii in February 2006 and of the JCOMM conference and meeting in Halifax prior to that. OceanSITES now is recognized as an element of the integrated global ocean observing system to be built, and is included in the JCOMM structure, in the Observation Programme Area, and in the “accounting” in terms of percent completion. For this purpose, the OceanSITES maps are also produced in the standard JCOMM format now. An example is shown in figure 1.

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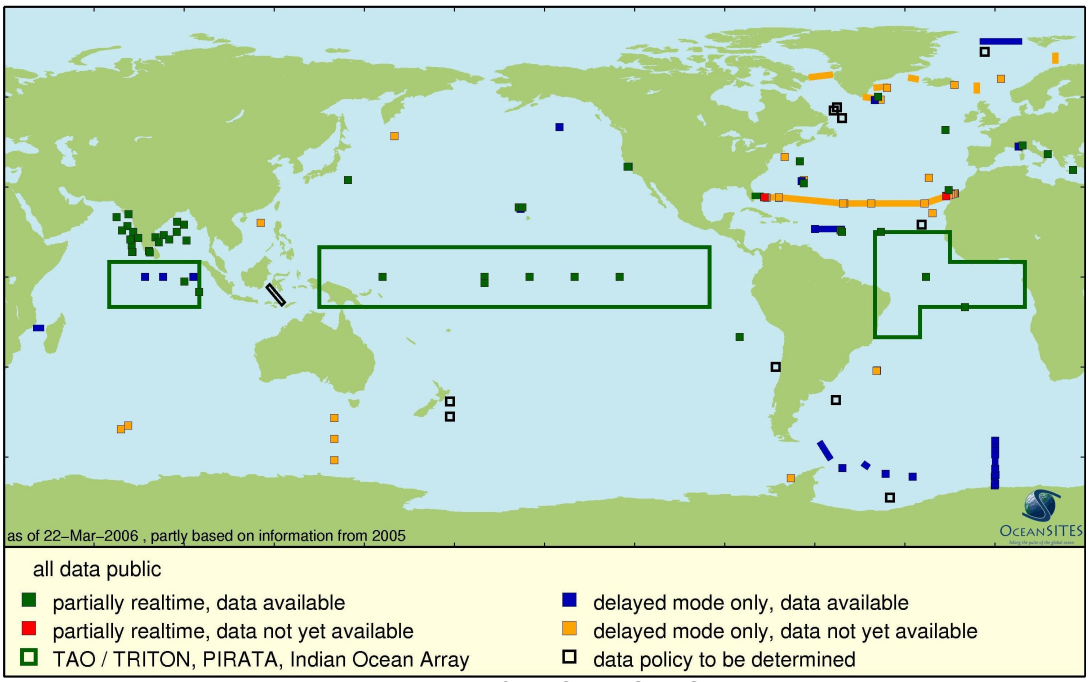

Fig. 1. *Near-term status of the OceanSITES timeseries network.*

Developments or decisions that are worth noting include:

- In addition to the (Scientific) Steering Committee, a Data Team now exists that is working to set up a global timeseries data system. The Data Team met face-to-face for the first time in Hawaii, in conjunction with the Steering Committee. A format has been defined and data servers/portals are now being populated with sample data.
- Funding for the Data Team is an urgent issue. The scientists can usually combine Steering Committee travel with other meeting or conferences, but this is not true for the Data Team. This needs to be addressed.
- A glossy color brochure for OceanSITES has been produced and is available now.
- The OceanSITES website has undergone a redesign and is now being hosted by WHOI. It is continually being upgraded.
- OceanSITES will restrict itself to truly Eulerian data, i.e. not underway data on a transport section, or surveys to/from/around a timeseries site. Those data types are taken care of by other programmes, and OceanSITES wants to fill a gap rather than duplicate.
- An open data policy will be enforced for member sites. The color coding on the maps will indicate data status and availability.
- OceanSITES joined Ocean-United in order to contribute more visibly to the GEO planning effort and to try to insert more of the OceanSITES objectives into GEO.
- OceanSITES will need support in the form of a project office now, and therefore was represented at a NOAA/JCOMM meeting about the future of JCOMMOPS and needs or benefits that could be covered by JCOMMOPS.
- The membership of the Steering Committee is being broadened, with a Mediterranean member, a new carbon cycle member, Canadian representation, and others.

- An agreement was reached on how to handle the equatorial arrays. They clearly need to be part of OceanSITES since they are the most prominent timeseries network that exists. But including each site on the map and in the "counting" would bias the picture. Thus counting will be done separately for routine tropical arrays and the extra-tropical sites, while the enhanced or "supersites" in the tropical systems will be included in the detailed maps and non TAO/TRITON/PIRATA counting.

More information on OceanSITES is available on the web at http://www.oceansites.org/.

THE TROPICAL MOORED BUOYS IMPELMENTATION PANLE (TIP)

The TAO/TRITON (Tropical Atmosphere Ocean/Triangle Trans-Ocean Buoy Network) 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 PMEL (Pacific Marine Environmental Laboratory), 12 TRITON moorings maintained by JAMSTEC (Japan Agency for Marine-Earth Science and Technology), and 5 subsurface ADCP (Acoustic Doppler Current Profiler) moorings (4 maintained by PMEL 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 130 E and 137 E , and a test site maintained by PMEL for sensor performance and evaluation studies.

At present (September 2006), weak El Nino-like conditions prevail in the tropical Pacific, with eastern tropical Pacific sea surface temperature anomalies generally greater than 0.5 ºC, western warm pool anomalies greater than 1.0 ºC, and westerly wind anomalies in the western tropical Pacific. The most recent (September 7, 2006) EL NIÑO/SOUTHERN OSCILLATION (ENSO) DIAGNOSTIC DISCUSSION issued by NOAA's Climate Predication Center states that "conditions support a continuation of ENSO-neutral conditions for the next one to two months, with weak warm episode (El Niño) conditions likely by the end of 2006".

PIRATA (Pilot Research Moored Array in the Tropical Atlantic) is nearing the end of a 5-year (2001-2006) consolidation phase during which the array's 10-mooring configuration has been evaluated for its utility in support of research and operational forecasting. Three additional moorings to the southwest of the array were deployed in August 2005; two additional moorings to the north east and one mooring to the southeast of the array were deployed in June 2006. Mooring preparation, data processing and evaluation are provided by the US. Ship time for mooring maintenance is provided by Brazil and France. 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. New initiatives to add surface salinity measurement to all TAO moorings, and heat, moisture and momentum flux measurements at 4 TAO and three 3 PIRATA moorings were begun in 2006.

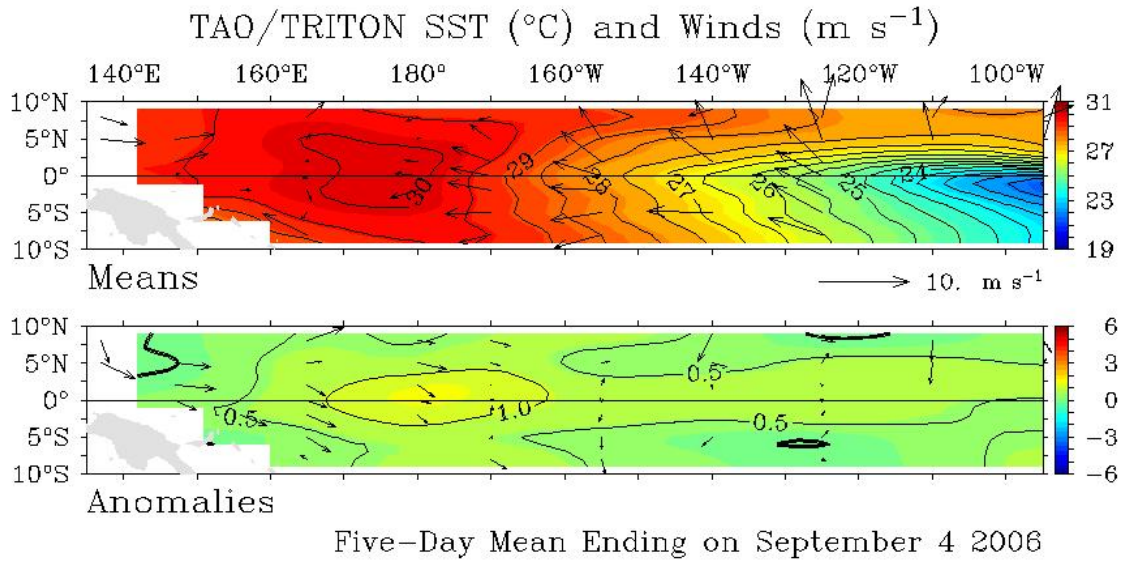

Figure 1. Sea surface temperature (contours) and surface wind velocity (arrows) from the TAO/TRITON mooring array. The upper panel shows the measured values and the lower panel shows the difference from climatological values.

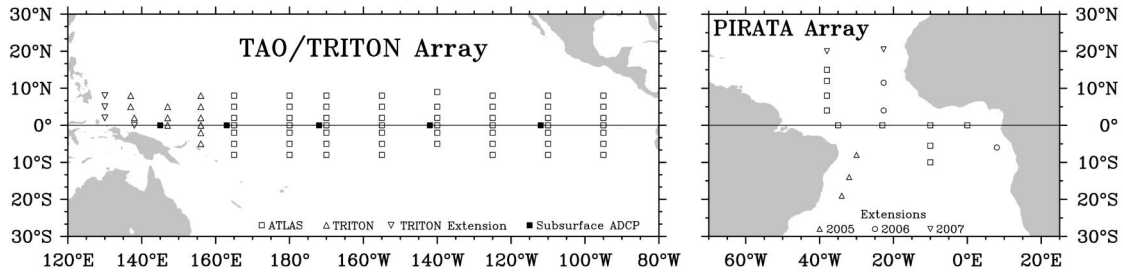

Figure 2. Mooring locations within the TAO/TRITON (left) and PIRATA (right)Arrays.

TAO/TRITON data return remains good, with an overall value for real-time primary data availability of 85% for the time period 1 October 2005 to 31 August 2006. (Data return statistics for the period 1 October 2005 to 30 September 2006 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 time period was 76%. Much of the data loss is due to vandalism. Other factors contributing to lower data return for the PIRATA include the relative size of the array (1 mooring loss represents a larger portion of the array compared to 1 TAO/TRITON mooring) and the frequency of maintenance cruises; TAO moorings are routinely serviced on a semi-annual schedule, while PIRATA moorings are limited to annual or longer maintenance.

Progress towards the establishment of an Indian Ocean moored buoy array was made with the deployment of 4 surface ATLAS moorings and one subsurface ADCP mooring in October/November 2004. The moorings were deployed from the Ocean Research Vessel Sagar

Kanya in collaboration with the Indian National Institute of Oceanography (NIO) and National Center for Antarctic and Ocean Research (NCAOR). These moorings complement previously established JAMSTEC TRITON moorings and a subsurface ADCP mooring. The Indian Ocean ATLAS moorings are instrumented similarly to those in PIRATA. In addition, all have near-surface (10 m) current meters, plus one has OceanSites flux enhancements which include longwave radiation, barometric pressure, and additional subsurface current meters. These moorings are being replaced from the ORV Sagar Kanya at the present time (September 2006). Expansion plans for the Indian Ocean Array include one additional ATLAS mooring to be deployed on the present ORV Sagar Kanya cruise, two additional ATLAS moorings to be deployed in November 2006 from Indonesia's RV Baruna Jaya I, an ATLAS mooring in the southwest basin to be deployed as part of the French VASCO-CIRENE Experiment in early 2007, and possibly an additional ADCP mooring deployment south of Java.

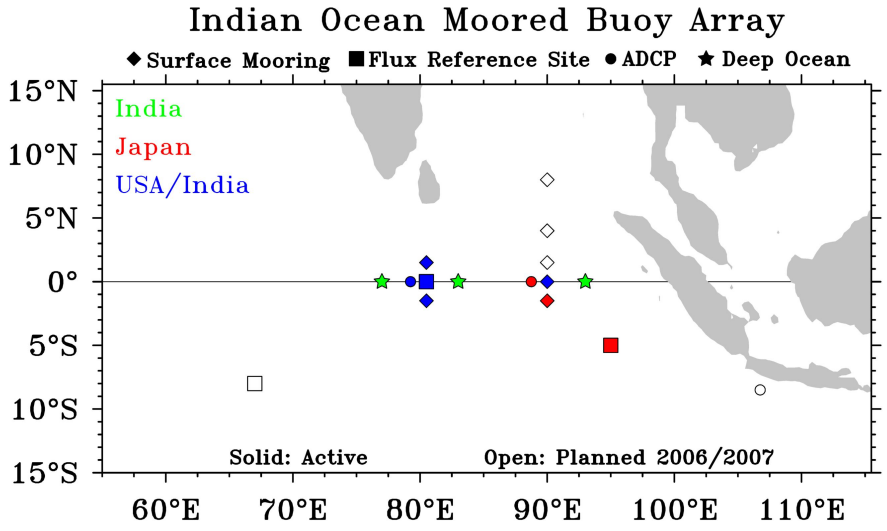

Figure 3. Locations of existing Indian Ocean mooring sites and a mooring to be deployed in late 2006 and 2007.

Management of the TAO portion of TAO/TRITON officially transferred from PMEL to NDBC in October 2004. PMEL's data processing, quality assessment, and web delivery/display software were installed at NDBC in 2005 and a period of parallel processing at both installations will be completed by October 2006. Responsibility for field operations will transfer to NDBC in 2007, while instrument preparation will remain at PMEL. Development of a "refreshed" ATLAS system comprised of more "off-the-shelf" components is underway at NDBC.

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.

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ANNEX V

TSUNAMI WARNING SYSTEMS

Ken Jarrott

OVERVIEW

Even without the complexities of warnings dissemination and community responses, Tsunami warning systems are a critical test of real-time marine observation networks, communications links and downstream situation analysis and decision processes.

Tsunami warning is inherently international in scope. In a typical event, a tsunami threat is first identified by seismic analysis of the causal earthquake event. Confirmation of a tsunami generation and the issue of warning advice depends on the rapid assimilation of observations from deep-ocean and coastal sea level stations. Warning-critical sea level data will be delivered to a warning centre both from locally-managed sea level stations, and, through international communications links such as the GTS, from stations operated by other countries. Where tsunamigenic sources are close to threatened communities, every minute lost in this chain can contribute materially to loss of life.

IOC International Coordination Groups for Tsunami Warning Systems. In 2005, the IOC established an Intergovernmental Coordination Group for the Indian Ocean Tsunami Warning and Mitigation System (ICG-IOTWS), with representation from most nations exposed to risk from tsunamis originating in subduction zones around the Indian Ocean basin. A companion ICG-PTWS performs the same function in the Pacific Ocean. Working Group 2 of both ICGs addresses with Sea Level Data Collection and Exchange. Other working groups address seismic networks, tsunami modelling, interoperable warning centres, tsunami risk assessment, and community preparedness.

The ICG IOTWS Sea Level Working Group addresses both coastal (eg tide gauge) and deep ocean (eg DART buoy) monitoring stations. DBCP member K Premkumar is Chairperson of the IOTWS Working Group 2; K Jarrott is Vice-chairperson - Deep Ocean Stations.

ISSUES FACING THE INDIAN OCEAN TSUNAMI WARNING SYSTEM

While established tsunami warning systems existed for the Pacific (through the Pacific Tsunami Warning Centre in Hawaii and through the JMA in Japan), the development of a basin-wide tsunami warning system for the Indian Ocean presented substantial challenges, including:

- large populations within tens of minutes of tsunami source zones
- a number of proposed national warning centres rather than a single centre
- variations in technical experience of countries in the region, and not a strong history of cooperative development between those countries.

Challenges for sea level data collection and exchange at the start of the process included:

- evolution of common standards for exchange of sea level data (none existed)
- potential mismatch between the observation requirements of existing coastal sea level stations (for tide or climate monitoring) with the new “wave monitoring” tsunami application
- high demand on communications (e.g. reporting intervals down to one minute levels) both from observation stations to a local warning centre, and for the subsequent international relay of that data to neighbour warning centres.
- no formalised standards for deep ocean stations such as DART buoys, and little regional experience in the deployment, support and use of these ocean platforms and their data streams. (This at a time when the US DART product was transitioning from an internal NOAA supply to contracted manufacture, and when four new suppliers have entered the market.)

ANNEX V

INDICATIVE EVENT – 17 JULY 3006 TSUNAMI – SOUTH JAVA

The tsunami event of 17 July illustrates the criticality of timing for data or warnings. The first seismic solution was issued from the Pacific Tsunami Warning Centre 17 minutes after the earthquake event. At precisely that time, the first evidence of a tsunami arrived at Christmas Island (Australia) - a prolonged set of half-metre amplitude waves, with relatively short three-to-four-minute wave periods. Less than 20 minutes later, damaging tsunami waves hit coastal Java, with the loss of hundreds of lives.

At that time, no end-to-end system was in place that could have made a difference in Java. However, it is clear that every minute lost in the process is critical. Apart from warning-system process delays, these delays may arise from:

- coupling of a tsunami sea-level change to the measuring instrument (delays may be imposed through instrument site topology or through harbour-flow restrictions);
- getting sea level data from a station (reporting rate, communications reliability or data latency);
- determining data validity (QC processes) and recognition of a tsunami signature;
- formulating a warning advice or in passing sea-level data directly to a neighbouring national warning centre (process and international communications delays).

PROGRESS AND ACTIVITIES OF IOTWS SEA LEVEL WORKING GROUP

Achievements

1. Coastal instrument guidelines have been proposed, covering measurement accuracy, sampling rates, reporting intervals and siting considerations.
2. GTS exchange formats for sea level data have been developed, using CREX codes
3. Terms of Reference for an International Tsunameter Partnership have been ratified by the ICG. In short, the ITP is to work on instrument standards, interoperability, and technology exchange on deep ocean tsunami stations (eg DART buoys). The ITP aims to support the establishment, effectiveness and on-going viability and enhancement of tsunami warning systems.
4. To date, progress on the development of sea level networks has been driven by individual national development plans, with local use of the data being the primary goal. This mindset has now shifted – demonstrable international access and use of the data from each sea level station is now recognised as a key goal.
5. The coastal sea level station network is being built in most cases on existing GLOSS sites, with enhanced high-reporting-rate communications providing
6. The first deep ocean stations have been deployed, but none are yet reporting internationally. Before mid 2007, it is expected that as many as 10 deep ocean stations might be operating in the Indian Ocean area, including representation of the technology from all four international sources of these platforms, and few of them combined with Indian Moored buoys technology.

Issues

1. The long term sustainability for the sea level observation network and for other elements of national warning systems is a major concern, most particularly for elements contributed by external donor nations that have an establishment role, but not necessarily a sustaining role.
2. Long term data archiving of high resolution sea level data is required – requirements being developed.

Actions and Recommendations

1. A review of the composite sea level observation network design is to be undertaken (taking account of the contribution of deep ocean & coastal sea level observing network). This will lead to a documented rationale for the composite IOTWS sea level observation network.

2. A minimum set of instrument characteristics is to be developed for deep ocean stations in consultation with members and suppliers, for review by members (via International Tsunameter Partnership).
3. An interim communal web-accessed database for all deep ocean and coastal sea level stations is being developed, capturing info on equipment types, simple metadata, plans, and progress towards a fully operational state (ie. reporting globally to agreed protocols). Proposal for IOC or other agency to host an extension of this to cover the longer term operational lifecycle of these stations.

SUMMARY

Many of the activities reported above map on to DBCP experience and tool sets. An on-going communication and engagement with the DBCP is proposed.

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SUMMARY OF DISCUSSIONS, INFORMAL JCOMMOPS ROUNDTABLE
9 May 2006, Silver Spring, USA

Participants: Mike Johnson (roundtable Chairperson and JCOMM Observations coordinator), David Meldrum (DBCP Chairperson), Graeme Ball (SOT Chairperson), Howard Freeland and Dean Roemmich (Argo Co-chairpersons), Mark Merrifield (GLOSS Chairperson), Maria Hood (IOCCP coordinator), Uwe Send (OceanSITES Co-chairperson), Ed Harrison (OOPC Chairperson), Shubha Sathyendranath (POGO executive director), Eric Lindstrom (via telephone - JCOMM satellite expert), JCOMM secretariat.

Background: Representatives of the various observing programmes (those already involved in JCOMMOPS plus those that may benefit from future involvement) summarized their programme's requirements and future needs for an operational support centre. The former JCOMMOPS Coordinator also summarized the present status of JCOMMOPS including relevant background information. The meeting explored advantages and disadvantages of having a consolidated JCOMMOPS, and informal proposals from potential hosts (following a survey by JCOMM co-president Peter Dexter) were reviewed. A brainstorming session followed to examine whether or not an operational centre is important for an ocean observing system, and if so what are the requirements for an integrated observational system and how an operational support centre can best meet those needs on an international basis in the future.

Discussion (general agreement unless noted):

1. There is value in an operational centre, although some disagreement on the definition of "operational". A support centre for the implementation of the observing programme will be essential to enable the sustained deployment of an ocean observing system over the next 5-10 years, and JCOMMOPS holds a seed for this evolution.

2. JCOMMOPS should be further developed to extend its responsibilities for other observing programmes beyond DBCP, SOT and Argo, including e.g., OceanSITES, IOCCP, GLOSS, and the POGO research cruise database.

3. The level of services provided by JCOMMOPS should be proportional to the level of commitments made by each programme/panel, with JCOMMOPs perhaps acting as a "black box" with two or more Technical Coordinators (TCs) providing services to multiple programmes/panels. For example, a TC could work half-time for Argo and half-time for one or more other panels (e.g., SOT, OceanSITES), provided adequate funding was provided by each.

4. Each programme representative presented its requirements for an implementation support centre, and estimated future needs for a fully sustained observing system support at JCOMMOPS. It is essential that these requirements be refined and documented as part of the next steps in this process. Summary points include:

- Argo: TC (less than full-time) should be co-located with Argo PO Director (full-time). TC meets deployment notification requirements as specified in IOC-Resolution XX.6.

- OceanSITES: Cooperation and integration with JCOMMOPS could be cost-effective (e.g., TC could assist with tracking status of individual sites; pressuring operators to provide data and information; getting data from ARGO and onto GTS; acting as clearing house for technical information about sensors, handling, calibration, QC procedures; collecting information about planned cruises with mooring work). IOCCP: IOCCP neither has nor aims to have a separate operational system; rather the goal is to get observations integrated into existing platforms and there may be a future role for JCOMMOPS in this.

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The current arrangement at IOC for IOCCP coordination has both advantages (e.g., Member States' concerns over data exchange, direct links to UN conventions and observing system development, direct links to National, Regional and World Data Center systems, and UN system visibility for big issues) and disadvantages (e.g., lack of necessary technical capabilities, financial inflexibility to implement activities, and precarious funding schemes for staff support.

- POGO cruise DB: A cost evaluation by JCOMMOPS has been provided subsequent to roundtable. However, there are other proposals beings evaluated and no decision has been made by POGO. NB: POGO estimated that half-time TC would be necessary (see table below), but that because this function would be primarily collecting information from POGO member institutes, that the TC could be recruited at a lower level than that required for DBCP or Argo.

- GLOSS: currently no need for a TC-type function within JCOMMOPS. There are some benefits in international technical coordination but precise needs have not been evaluated and much of the work is already being done at the University of Hawaii and by the Technical Secretary (IOC Thorkild Aarup).

- DBCP and SOT: JCOMMOPS support should be maintained at current level (see table).

5. For future (5-10 years) needs (summarized in table below), three working levels were introduced:

- 1 for high level programme managerial functions (e.g., Argo PO Director)
- 2 for mid-level type of coordination (e.g., current DBCP/SOT or Argo TC)
- 3 for information system operations (e.g., current CLS contribution to JCOMMOPS)

For the purpose of this exercise, JCOMMOPS would include at least levels 2 and 3; level 1 support needs to be further clarified and the participants did not yet elaborate whether e.g., Project Office functions should be included within JCOMMOPS or not. However, JCOMMOPS should include a managerial function (probably one person) if its functions expand to other programmes/panels. The following table summarizes estimates (again, this will need to be refined and documented) in required full-time employees.

level	DBCP	Argo	SOT	GLOSS	IOCCP	Ocean SITES	Cruise DB	total
1 (PO director/chairperson)		1			1	0.25		2.25 *
2 (user support)	0.7	0.7	0.5	0.1	0.5	0.5	0.5	3.5
3 (routine ops/IT)	0.2	0.3	0.2	0.1	0.2	0.2	0.2	1.3
Total	0.9	2.0	0.7	0.1	1.7	0.95	0.7	7.05

6. A process should be started to thoroughly evaluate and enumerate the requirements for (i) a JCOMMOPS that can respond to the evolving needs for a sustained ocean observing programme, as well as (ii) the best host organization to meet these requirements. It would be preferable to co-locate within an operational centre but not within a service provider, although there was not unanimity on the last point. Both requirements documents should be as specific as possible, e.g., a requirement for the host to provide for level 3 support as well as provide either an Oracle database or funding for the transition to another database.

7. Concerns were expressed that moving JCOMMOPS have associated costs, both financial and in diverting the TC's attention from their normal day-to-day coordination work. It is essential to allow for a sufficient transition period, probably two years from the decision point, to ensure adequate continuity. Another concern regards the four-year UNESCO contract limit (terminating 06/2010) under which the current TC for DBCP and SOT is employed.

Funding:

There is general recognition that for the short-term, DBCP has a slight surplus as a result of a five-month gap in TC employment as well as a lower pay-scale for the new TC. It is possible that this cost-savings could be used to support a TC for another programme or be applied towards an eventual re-location and associated transition costs. However, only the DBCP can make decisions regarding the use of this surplus.

No new funding was identified for the medium- or long-term. The suggestion is for consolidated TC and IT support, with resource sharing across the programmes.

A dedicated trust fund for JCOMMOPS is highly desirable, and a proposal for same should be included in the next steps.

Next steps and time-line: The issue will be discussed at the October 2006 JCOMM Management and DBCP meetings, after which two requirements documents will be prepared for discussion and action at the April 2007 Observations Coordination Group meeting:

- Requirements for a JCOMMOPS that can respond to the evolving needs for a sustained ocean observing programme; needs to include detailed explanation of advantages of a consolidated JCOMMOPS.
- Requirements for JCOMMOPS host; needs to include both direct and in-kind support.

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APPENDIX TO ANNEX VI

Present status of JCOMMOPS and background

JCOMMOPS is the natural outcome of international coordination mechanisms which began in 1985 with the Data Buoy cooperation Panel (DBCP). It was formally established by JCOMM-I in 2001with inclusion of the Argo Information Centre in its activities. It benefits from the synergies that exist between the coordination structures that had been established under the WMO and IOC auspices for the DBCP, the Ship Of Opportunity Programme (SOOP), and Argo profiling float pilot project. A good infrastructure has now been put in place and, after 4 years of developments, the centre is now regarded as operational. Centre is presently located in Toulouse, France, basically for historical and practical reasons.

What is JCOMMOPS?

Marine observations from *in situ* observing systems along with other components are paramount for ensuring good quality meteorological ocean products, such as Numerical Weather Prediction and ocean modelling. Observing systems have to meet the requirements for these products and a good coordination is therefore necessary internationally between all actors involved.

The JCOMM *in situ* Observing Platform Support Centre (JCOMMOPS) was formally established by JCOMM first session in 2001 and is based upon coordination facilities provided by the Data Buoy Cooperation Panel (DBCP, i.e. drifting and moored buoys), the Ship of Opportunity Programme (SOOP, i.e. XBTs, TSGs), and Argo profiling float pilot project (see background information in Annex I). Synergy was therefore put in place between these three global marine observational programmes to assist at the international level those in charge of implementing their National components (Annex II).

JCOMMOPS provides with support to programme planning, implementation, and operations including information on (i) observational data requirements, (ii) technology, instrumentation, and costs, (iii) operational status of observing networks (e.g. identification of data sparse area), and (iv) deployment opportunities (by ship and air). It maintains information on relevant data requirements for observations in support of GOOS, GCOS, and the WWW as provided by the appropriate international scientific panels and JCOMM Expert Teams and Groups, and routinely provides information on the functional status of the observing systems. It also encourages platform operators to share the data and distribute them in real-time (Annex V). For example, to that end, it provides technical assistance regarding satellite data acquisition, automatic data processing and Global Telecommunication System (GTS) distribution of the data. JCOMMOPS also provides a mechanism for relaying quality information from data centres and users worldwide back to platform national operators. An infrastructure, including modern Information System has been put in place to support JCOMMOPS operations (Annex III, IV).

JCOMMOPS acts as a focal point for implementation and operation of relevant observing platforms. The Centre which is located in Toulouse of France, is funded thanks to voluntary contributions from Member States, through the marine observing programme and panel such as DBCP and Argo. It costs about $280 000 yearly to run JCOMMOPS (Annex VI, VII). More detailed information on JCOMMOPS and its products could be obtained in its website, i.e. http://www.jcommops.org, including monthly status maps for DBCP, Argo and SOOP.

With two full time coordinators dedicated to overall DBCP, SOOP, and Argo coordination, and spending only part of their time to work on JCOMMOPS software developments, it took four years, i.e. the whole JCOMM intersessional period between JCOMM-I and JCOMM-II to develop

JCOMMOPS, its Information System, and bring it up to full speed. Full benefits of these developments can now be enjoyed by the community.

Background

Period 1987 to 1989

Drifting Buoy Cooperation Panel (DBCP) was established jointly in 1986 by WMO and IOC through Resolution 10 of WMO EC-XXXVII, and IOC Resolution XIX-7. The DBCP has hired a full-time Technical Coordinator (TC/DBCP) since June 1987, using funds provided voluntarily by Panel Member Countries (Terms Of References for the TC/DBCP were defined in the WMO and IOC resolutions mentioned above). First Technical Coordinator, David Meldrum, was located in Toulouse in from June 1987 to May 1989, hired by IOC as a Consultant. At that time, internationally coordinated drifting buoy networks were in their infancy and much had to be done in terms of satellite data collection, data processing and quality control. As all drifting buoy data were collected through Service Argos (that's still the case for more than 95% of them Today) the DBCP decided to establish the position at one of the two Argos Global Data Processing Centres (GPC).

Establishing the position at an Argos GPC facilitated identification of Argos users, interaction with them, and helped in providing additional Argos related technical assistance by acting as a user representative within the walls of Service Argos.

There are two Argos GPCs: one in Toulouse, France (FRGPC), and one in Largo, Maryland, USA (USGPC). Toulouse was eventually chosen as initial TC/DBCP location because the FRGPC was also involved in technical developments for the system while USGPC was basically involved in Argos operations only. This proved to be an excellent choice and the first Technical Coordinator has helped to set up initial Local User Terminal (LUT) networks that served the operational user community, to convince new Argos users to make their buoy data available through the Global Telecommunication system (GTS), and to provide them with technical assistance in this regard. Many of the Argos users were prepared to authorize GTS distribution of their buoy data provided that the amount of work required by them was minimal. Most of required GTS related additional work was therefore realized by the TC/DBCP. The Technical Coordinator has also worked with Service Argos in order to develop the Argos data processing system in such a way that it can practically permit GTS distribution of the data.

In May 1989, Mr David Meldrum resigned from his position.

Period 1989 to 1993

At its 4th session in New Orleans, October 1988, the DBCP decided to move the TC/DBCP position to the USGPC in Largo, USA, basically because most of the Argos buoy users were from North America at that time. A new TC/DBCP, Etienne Charpentier, was recruited in June 1989, and employed on Panel's behalf by the University of Corporation for Atmospheric Research(UCAR), USA, on the basis of a contract between WMO and UCAR. The position worked as efficiently from the USA during that period. New Argos GTS sub-system had also been developed during this period through much interaction (telephone, e-mail, missions) between the TC/DBCP and the FRGPC. Having the position in USA also helped coordinating developments, tests, and validation of the Surface Velocity Drifter Barometer (SVPB) drifter with Scripps Institution of Oceanography and operational meteorological agencies.

At its 8th session in Paris, October 1992, the DBCP proposed to change its Terms Of References as well as those of the Technical Coordinator in order to include moored buoys in the high seas in the Panel's activities. The Panel was therefore renamed to Data Buoy Cooperation Panel (same

DBCP acronym) and Resolution 9 of WMO EC-XLV, as well as IOC Resolution XVII-6 adopted in 1993.

Period 1993 to 1998

In 1992, the Technical Coordinator informed the DBCP that he wished to return to his home country, France, but that he would accept to continue working for the Panel in case the position was moved to the FRGPC, Toulouse, France. The Panel agreed and the position was therefore relocated to Toulouse as of June 1993. Employment contract had been provided by IOC/UNESCO on Panel's behalf, as a fund-in trust expert. The DBCP/TC position has been located there since then.

Period 1998 to 2001

At its 14th session, Marathon, October 1998, the Panel accepted a proposal, under which the DBCP technical coordinator would act also as technical coordinator for the operational Ship-of-Opportunity Programme (SOOP). The Panel indeed recognized that SOOP operations and requirements for technical support were very similar to those of buoy programmes (including in some cases data collection through Argos), that SOOP success was just as critically dependent on such support, and that in addition many Panel member organizations were also involved closely with the SOOP.

At the OceanObs99 conference, the Technical Coordinator was asked by the Secretariats and Stan Wilson to draft a proposal with cost estimates for a possible Argo coordination site possibly run by IOC/WMO (using for example existing DBCP and SOOP experience and coordination facilities in Toulouse as a basis for the proposal). The proposal was to develop and maintain the site, to coordinate the activities of the programme in the same way that coordination and troubleshooting is provided for SOOP and DBCP, and to notify appropriate Member States of float positions when floats are likely to enter, or have entered, their EEZs (i.e. practical implementation of IOC resolution XX/6). Second Argo Science Team (AST) meeting, Southampton, March 2000 agreed with the proposal and decided to establish an Argo Information Centre in Toulouse, run by a Technical Coordinator who would be placed under the supervision of the Technical Coordinator of the DBCP & SOOP.

The International Coordination structure in Toulouse to serve the DBCP, SOOP, and Argo communities was later formalized and a proposal to establish a JCOMM in situ Observing Platform Support Centre (JCOMMOPS) was presented and agreed upon at the second transition planning meeting for JCOMM, Paris, June 2000. Argo Technical Coordinator, Mathieu Belbeoch was eventually recruited in February 2001. JCOMMOPS was formally established by JCOMM at its first session, Akureyri, Iceland, June 2001.

Period 2001 to 2006

JCOMMOPS developments effectively started in conjunction with recruitment of the Argo Technical Coordinator in February 2001. A computer Information System has been designed, developed, and implemented, including a relational database, a dynamic web site, and a Geographical Information System (GIS). Information system provides for on-line services and tools useful not only to end-users but also to the JCOMMOPS Technical Coordinators themselves for their day to day international coordination tasks.

In 2004, the Argo Steering Team (AST) while recognizing AIC's role in JCOMMOPS changed the Argo Technical Coordinator's Terms Of References to also include Support for the Argo Project Office. Argo Technical Coordinator was then place under Argo Project Office director's supervision.

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Period 2006 and later

In January 2006, Mr Etienne Charpentier resigned from his position. The DBCP decided to recruit a new Technical Coordinator based in Toulouse while opening the possibility for moving the position to another location. The employment contract has still been provided by IOC/UNESCO on Panels' behalf, but with modified condition: UNESCO Appointment of Limited Duration (ALD), yearly-based contract with the possibility of renewal up to a maximum of 4 years.

Synergy between DBCP, SOOPIP, and Argo TCs

Argo Technical Coordinator could benefit from TC/DBCP&SOOP experience in International Coordination and database administration while the latter could benefit from Argo TC's experience with new technologies. A number of tools and products have been developed in common as the need for new web based applications were similar between the DBCP, SOOP, and Argo. The synergy put in place has therefore permitted to develop more products and monitoring tools to serve the DBCP, SOOP, and Argo communities, than what would have been possible with two coordinators working at two different locations and using different infrastructures. Day to day communication between the two coordinators who have to deal with similar technical issues also permits to serve their communities better.

Activities where synergy is the most efficient is particularly related to development and operations of the information system. Skills are evenly split between the two Coordinators at JCOMMOPS. Such activities where synergy is strong include:

- Addressing issues with a wider global perspective; common thinking about issues to be addressed, e.g. telecommunication systems, observing network management and deployment opportunities, monitoring, quality information feedback, standardization, best practices, instrument testing and calibration, data processing, GTS, etc.
- When one of the two Coordinators is in mission or in vacation, the other coordinator can take over and answer the phone. The two Coordinators tend to avoid attending the same meetings, and to take vacation at the same time, hence providing non stop JCOMMOPS support all year at normal office work hours. Generic support@jcommops.org e-mail address works for both Coordinators.
- Software development (sharing of ideas for new monitoring tools, and source code)
- Database development and operations (one single database for all observational programmes monitored by JCOMMOPS). Products are compatible, redundancy is avoided, content is comprehensive.
- Geographical Information System (GIS)
- Student training and supervision
- Two persons stronger to negotiate with JCOMMOPS host (CLS) than just one
- Sharing of ideas in international coordination
- Transfer of skills in terms of international coordination from DBCP/SOOP to AIC when AIC was established

Infrastructure

Current JCOMMOPS information system is the result of a 4-year effort, which began in February 2001 with the recruitment of the Argo Technical Coordinator. A team of two persons (TC DBCP&SOOP, Argo TC) assisted by 4 students working for short term periods at JCOMMOPS conducted the developments. This corresponds to 2.5 man*year of developments, students included. Thanks to voluntary contributions from Member states, about $65 000 has been spent so

far (i.e. period 2002 to 2005) in terms of hardware and software. Spending could also be limited thanks to (i) implementation of the system into CLS computer network (Internet & Intranet access, Oracle database, backup infrastructure), and (ii) availability of some of CLS staff resources (e.g. database administrators, network specialist). Time spent by JCOMMOPS staff on software development could be limited thanks to purchase of standard software (relatively expensive concerning the GIS).

Thanks to JCOMMOPS technology choices, an efficient, reliable, and relatively inexpensive information system could be developed and implemented while leaving the time necessary for JCOMMOPS staff to fulfil its primary mission in terms of day to day International Coordination (i.e. versus software developments). The information system itself, not only serves the international users, but also JCOMMOPS staff as an efficient tool facilitating international coordination.

Servers:

Formally all servers operated by JCOMMOPS, although dedicated to JCOMMOPS, are owned by CLS. Right to operate the servers for an undefined period was negotiated with CLS under specific IOC/CLS contract. Because of regular improvements in computer technology, one should consider renewing the servers every 3 years.

The following servers are presently dedicated to JCOMMOPS Information System:

- One Windows 2000 server : Proserver RK Xeon 2.4GHz dual processor, 4 GB Memory, Total 86 GB Hard drives in RAID configuration:
    - ⇨ Server runs the database
    - ⇨ Server runs the Geographical Information system (GIS) ArcIMS 9.0

- One Windows NT 4.0 server: Compaq server, 1GHz processor, 1.5GB Memory, Total 70 GB hard drives in RAID configuration
    - ⇨ Static web server running on this machine
    - ⇨ FTP server running from on this machine
    - ⇨ Most of automatic scripts running from this server

- One MacOSX 10.3.9 server: Xserv dual processor PowerPC G5 2.3 GHz, 2GB Memory, 70 GB Hard drive.
    - ⇨ This is used to run the web server and application server (WebObjects)

Database:

CLS pays for the Oracle 8i License. As most of drifting buoy data and profiling floats are collected via Service Argos, JCOMMOPS needs full access to the following information from Service Argos database: list of operational drifters, associated programmes, agencies, contact points, GTS technical files, and location data.

Oracle license for a dual processor database plus partitioning option as is the case with JCOMMOPS costs about €70 000, plus about €15 000 of yearly maintenance and support. CLS pays most of this cost as JCOMMOPS database is part of CLS database. CLS charges a symbolic €1000/year for operating JCOMMOPS database

EEZ digital map

JCOMMOPS pays about €1500/year for an up to date and official version of EEZ digital map which is provided by Verdian in its Global Maritime Boundaries DataBase (GMDB). Initial cost was €3000.

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Application server software

License for WebObjects 5.2.3 and Apple XCode tools are now included with MacOSX server operating system. JBuilder is also being used for some of the products.

Graphical chart server

Licence for Cordi graphical chart server PopChart 4.0 costs about €500. This is used for producing web based graphics for statistics, histograms, time series.

Geographical Information System (GIS):

License at a cost of about €15000 for the ArcIMS server plus €4000 for client GIS (ArcMap) have initially been purchased. JCOMMOPS now pays a yearly maintenance and upgrade license for ESRI ArcIMS. It costs about €1500/year. ArcIMS 9.0 is used for producing web based dynamic maps. ArcMap 9.0 is used for producing static maps.

Development computers and associated software

Development computers and associated software for two Coordinators and one student have been purchased. Each computer (e.g. Apple Mac-G5) costs about €3000 and are planned for renewal every 3 year. About €1500 of software for each computer are added for database administration, development tools, graphical/visualization tools, etc. It is estimated that license for such type of software needs to be renewed every 2 years.

Software development:

A number of scripts to upload data into the database have been written. The scripts have been written in following computer languages: PL/SQL, Java, Borland Delphi, Unix shell , windows BAT, and VisualBasic.

Information system infrastructure budget for present JCOMMOPS location in Toulouse are given in table 1.

Table 5 summarizes Global JCOMMOPS yearly budget, including Technical Coordinators employment cost, missions, logistical support contract with host (i.e. secretariat support, office space, telephone, internet access, office computers and software), and information system infrastructure.

Operations of JCOMMOPS Information System

Operations of JCOMMOPS Information System is being provided primarily by JCOMMOPS staff. Some services are also provided by host.

Services provided by JCOMMOPS staff

- Overall DBCP, SOOP, and Argo Technical Coordination, including user assistance (see Terms Of References for JCOMMOPS, DBCP/SOOP TC, and Argo TC).
- Overall information system monitoring and operations
- Database conception, development, administration (at conceptual level), and operations
- Design, development, and operations of scripts to routinely load JCOMMOPS database with appropriate data (from data centres, CLS, platform operators, etc.)

- Design, development of tools, and production of routine products (e.g. monthly maps)

Services provided by host

- Database maintenance and administration (at implementation and operating level)
- Network and Internet access using CLS infrastructure
- Full backup of database and servers using CLS infrastructure
- Connection to Service Argos database for accessing CLS information, including last positions.
- Limited computer network administration support

Users of JCOMMOPS

JCOMMOPS users are international. They include actors from the marine meteorological and oceanographic communities, including operational agencies, research institutes and universities, platform operators, manufacturers, and satellite data telecommunication providers. Experience showed that JCOMMOPS can serve well all international users as most of JCOMMOPS communication is made via e-mail and services offered via web tools. In a user's perspective, JCOMMOPS could be located almost anywhere provided that the host is providing appropriate logistical support, secretariat's support, information system infrastructure, and Internet as well as GTS connectivity.

It must be noted that primary users of JCOMMOPS information system are TC DBCP&SOOP and Argo Technical Coordinators. They use the information system for global coordination tasks, including day to day monitoring and user assistance.

There are a number of user assistance related services that JCOMMOPS provides, especially in terms of data exchange, satellite data processing, logistical opportunities, and programme implementation. Some of them are detailed below.

Argos related user assistance:

For platforms which data are collected via Argos (almost all of the drifting buoys, many moorings, e.g. TAO, some XBT data, and most of Argo profiling floats), JCOMMOPS acts as a user representative and can directly discuss technical issues with CLS on a daily basis to make sure that data are properly processed and distributed. Specific technical questions are asked by the users to JCOMMOPS who then can discuss the details in length with CLS.

At least for DBCP applications, present location of the Technical Coordinator of the DBCP within CLS, provides for strong user representation at Service Argos. Hence user requirements are well taken into account by CLS. For example, TC/DBCP is assisting CLS in Argos development projects related to meteorological and oceanographic applications and is making sure that the user requirements are being considered as much as possible.

GTS related user assistance

Similar support is provided by JCOMMOPS for platforms which data are inserted on GTS (drifting buoys, moorings, XBTs, and Argos profiling floats). JCOMMOPS services include assistance in setting up technical files, in sorting out problems, and active participation in data processing development projects to make sure that user requirements are properly taken into account.

Argo data management related user assistance

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GTS insertion for Argo floats is done through (i) Coriolis centre in Brest, France, (ii) CLS America, thanks to software developed at NOAA/AOML, (iii) Japan Meteorological Agency (for Japanese and Korean floats), (iv) MEDS (for Canadian floats), and (v) BOM (for Australian floats).

Information system infrastructure budget for present JCOMMOPS location in Toulouse.

	Direct cost ($)		
	Item	**investment cost**	**yearly cost**
Servers	3 servers renewed every 3 years	12,000 €	4,000 €
Backup	1 robot	Paid by host	
Database	1 Oracle license (2 processors & partitioning option)	Paid by host	1,000 €
GIS	ArcIMS ArcMap	15,000 € 4,000 €	3,000 €
Application server software	WebObjects Cordi PopChart	900 € 500 €	450 € 250 €
Development computers and misc. Software	3 computers (two coordinators and one student) and software (e.g. database manager, visualization)	4,500 €	
Software developments			
GMBD		3,000 €	1,500 €
Total		39,900 €	10,200 €

Investment cost	**39,900 €**
Yearly cost	**10,200 €**

Note: In practice, during the 4-year period 2002 to 2005, by adding up all actual investment and yearly costs, about $65 000 have been spent by Member States. Dollar rate fluctuated between $0.94 per Euro and $1.37 per Euro during the considered period.

Global JCOMMOPS yearly budget and contributions

This includes Technical Coordinators employment cost, missions, logistical support contract with host (i.e. secretariat support, office space, telephone, internet access, office computers and software), and information system infrastructure.

	Present
Logistics paid to host	25 000 € ($ 30 200)
TC DBCP&SOOP employment	80 000 € ($ 96 700)
TC DBCP&SOOP missions	12 500 € ($15 100)

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Argo TC employment	100 000 € ($120 900)
Argo TC mission	12 500 € ($15 100)
Information system	10 200 € ($12 300)
TOTAL	**240 200 € ($290 300)**

Note: Employment (IOC), and logistical contract (CLS) at 2005 level. Used Euro/US Dollar rate of $1=€0.827 (UN exchange rate as at April 2006).

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ANNEX VII

THE DBCP EXECUTIVE BOARD

Introduction

During DBCP-XXII it became apparent that the ongoing administrative needs of the Panel might better be addressed by the creation of an Executive Board to act on behalf on the Panel during the intersessional period. The reasons for this were two-fold:

- The increasing number of Panel initiatives planned for the intersessional period, including Capacity Building and technical development programmes, that might require prompt decisions;
- The availability to the Panel of significant funds, identified during a thorough review of the Panel's finances by Mr Frank Grooters, and the Panel's wish that these funds be spent wisely in the furtherance of its aims and objectives.

It was also noted that other panels had for many years enjoyed the services of an Executive Board (e.g. the AMDAR Panel), and that the principle had been well tested and found to be effective and beneficial. Accordingly, the Panel instructed its Chairperson to convene such a board, using the AMDAR model as a basis.

Duties and responsibilities of the Executive Board

It was agreed the board should act promptly to deal with any administrative and planning issues that might arise, and should instruct the Chairperson to authorise 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 annual session. In the interests of clarity, specific line items would henceforth be inserted in the Panel's budget for the intersessional period, with each agreed activity being assigned an upper limit for expenditure. The Executive Board might decide to spend up to these amounts without further recourse to the full Panel, although it was recognised that such a level of expenditure was unlikely to be achieved.

It was suggested that he board should confer regularly by e-mail, and should exploit opportunities afforded by attendance at other meetings (e.g. the JCOMM OCG meeting) for face-to-face meetings. Exceptionally, the board might meet on other occasions if required, with participation in such meetings being funded by members' own organisations if at all possible.

The board should report its activities to the Panel at its annual session, and throughout the year as appropriate. It might also decide to consult with Panel members during the intersessional period if required.

Membership of the Executive Board

The following membership was agreed for the first year, with the understanding that both this and the duties of the board might be revised by the Panel at each session.

DBCP Chairperson, or his/her appointed deputy (Executive Board Chairperson)
DBCP Technical Coordinator
DBCP member (appointed by the Chairperson in the first instance)
IOC secretariat
WMO secretariat

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

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ANNEX VIII

PROPOSAL FOR A TRAINING COURSE ON BUOY AND FIXED-PLATFORM DATA MANAGEMENT

PART 1: PROPOSAL FOR A TRAINING COURSE FOR AFRICAN REGION
(as submitted to the ODINAFRICA Workshop, 24 to 26 April 2006)

TRAINING COURSE ON BUOY AND FIXED-PLATFORM DATA MANAGEMENT

1. INTRODUCTION AND JUSTIFICATION

Need for Capacity Building

The United Nations Convention on the Law of the Sea has given maritime countries, including African states, the responsibility to protect and manage the marine resources within at least 200 miles of their coasts.

Most economies of the African region are greatly dependent on both the temporal and spatial variation of weather and climate.

The ocean and the atmosphere are tightly inter-linked, hence the ocean greatly influences weather and climatic trends especially in the tropics.

Water vapour fluxes supply rainfall, latent heat due to the rain energizes the monsoon wind system, winds drive the ocean currents and ocean currents modify the sea surface temperatures.

Whereas the global land surface is adequately covered by observing systems to monitor weather and climate some crucial parts of the ocean still remain poorly observed.

International meteorological and oceanographic communities have developed a number of initiatives for the instrumentation of ocean basins through the deployment of observing platforms, and the development of communication systems for the transfer of these data sets to national data centres.

International standards for formatting and coding of the datasets have been developed to make it easy for the users to identify and download these observations.

However the development of the capabilities to acquire and deploy the platforms, and the establishment of appropriate communication systems to receive the data from these remote platforms in their coded form has not been uniform.

There exists a huge gap in these capabilities between the African region and the rest of the world.

It is this gap that the international community needs to address by passing on this knowledge to bring the countries in Africa to par with the rest of the world.

The proposed training course is intended to be a first step towards the achievement of this goal.

Data Buoy Cooperation Panel (DBCP)

The DBCP is an official joint body of the World Meteorological Organisation (WMO) and the Intergovernmental Oceanographic Commission (IOC), providing any international coordination required for drifting and moored buoy programmes supporting major WMO and IOC programmes (IOC Resolution XVII-6 and WMO Resolution 9 (EC-XLV)). The Panel is now part of the

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Observations Programme Area of the Joint WMO-IOC Technical Commission for Oceanography and Marine Meteorology (JCOMM).

Its principal objectives are: (i) to achieve the optimum use of any data buoy deployments being undertaken worldwide and an increase in the amount and quality of buoy data available to meet the objectives of major IOC and WMO programmes; and (ii) to encourage and support the establishment of "action groups" in particular programmes or regional applications to effect the desired co-operation in data buoy activities.

The DBCP supports and/or establish various "action groups", such as: the EUCOS Surface Marine Programme of the network of European Meteorological Services (E-SURFMAR)European; the Global Drifters Programme (GDP; the International Arctic Buoy Programme (IABP); the International Programme for Antarctic Buoys (IPAB); the International South Atlantic Buoy Programme (ISABP); the International Buoy Programme for the Indian Ocean (IBPIO); the North Pacific Data Buoy Advisory Panel (NPDBAP); the Tropical Moored Buoy Implementation Panel (TIP), the Black Sea Buoy Programme; and the OceanSITES. Action Groups focus deployment of buoys in a particular ocean area or for a particular application. Regional (or global) Action Groups are independent self-funded bodies that maintain an observational buoy programme in support of the WWW, WCRP, GCOS, GOOS, and GEOSS. They agree to exchange good quality basic meteorological and/or oceanographic data in real time over the GTS. They also agree on exchange of information on data buoy activities and development and transfer of appropriate technology. They submit annual reports to the DBCP. Regional Action Groups usually engage their own coordinators, who work closely with the Technical Coordinator of the DBCP.

The DBCP is a forum of people interested in the development and use of data buoy technology, including the collection and distribution of data from buoys, within the world's oceans. This Panel is therefore regarded as a good model to provide the expertise which the African Region requires for autonomous ocean observation technology and relevant data management.

2. OBJECTIVE OF THE WORKSHOP

The main objective of the training course is to promote participation of developing countries in all aspects of the DBCP programme – deployment of drifting buoys, operation and maintenance of fixed platforms and moorings, communications systems, data processing and end-user products.

Specifically the training course will focus on;

- introduction to autonomous instrumentation in the ocean
- introduction to data communication systems
- introduction to data types and formats
- introduction to accessing and using data
- introduction to international coordination activities

3. TARGET GROUP.

This training course will target the following in the African region;

- Operational meteorologist and oceanographers, including

  Buoy and other platform operators.
  Data Communication experts.
  Data and information managers.

- Research scientists.

4. EXPECTED OUTCOME

- Enhancement of understanding of ocean observation technology and its evolution.

- Improvement in the acquisition and use of platform data by Africa's meteorological and oceanographic institutions.

- Improvement of local research activities, through access to drifter/mooring data and their use in NWP and climate forecasting, to understand the causes and predictability of the African climate system.

- Motivation to improve the observation network within the region's oceans, by 1) identifying priority areas in terms of platform deployment in the region, by 2) recommendations on the spatial and temporal distribution of an effective network of platforms, and 3) by involvement in international coordination activities.

5 IMPLEMENTING AGENCIES.

The implementing agencies will be DBCP and its relevant action groups (IBPIO and ISABP), and IODE within the ODINAFRICA-III framework.

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PART 2: DRAFT PROGRAMME FOR THE TRAINING COURSE

1 Workshop Objectives

The JCOMM/IODE Buoy and Fixed-platform Programme Management training curriculum is designed to provide participants with knowledge and skills in all aspects of Data Buoy activities, including

- deployment of drifting buoys
- operation and maintenance of fixed platforms and moorings
- communications systems
- data processing and end-user products

This first training course in the framework of JCOMM/DBCP and IODE will focus on an introduction to operational observation techniques and data management.

2 Workshop Technical Outline

The following is an outline of the relevant Course Manuals to be prepared for this course. All of the following topics will be covered in lectures and practicals, and included in the reference materials contained in the IODE OceanTeacher Digital Library.

Theme 1: Introduction to autonomous instrumentation in the ocean

GOAL	To introduce trainees to observational networks in the ocean, focusing on the various types of autonomous measurements and instruments
CONTENTS	▪ Sensors for atmospheric and oceanographic variables ▪ Ship observations – ship sensors, Automatic Weather Stations (AWS) and auto-release radiosonde balloons ▪ Drifting buoys ▪ Moored instruments and platforms ▪ Profiling instruments - Argo floats ▪ Satellite observations and products ▪ Other instruments and platforms such as AUVs, gliders and landers

Theme 2: Introduction to data communication systems

GOAL	To introduce trainees to the current status of operational data collection and exchange systems
CONTENTS	▪ Satellite systems for platform location and data collection ▪ Data dissemination via the GTS ▪ Buoy Data Centres

Theme 3: Introduction to data types and formats

GOAL	To introduce trainees to data management procedures for buoys and fixed platforms
CONTENTS	▪ Real-time quality control procedures ▪ Off-line assessment of data quality ▪ Metadata ▪ Data archiving

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Theme 4: Introduction to accessing and using data

GOAL	To show trainees how to access online buoy / fixed-platform data sources, and to demonstrate some public information on the status of such data
CONTENTS	▪ Data archiving centres (RNODC and SOC) ▪ JCOMMOPS status information ▪ Data access policy ▪ DBCP publications

Theme 5: Introduction to international coordination activities

GOAL	To introduce trainees to international coordination activities
CONTENTS	▪ The role of the DBCP and its action groups within the framework of the Joint WMO-IOC Technical Commission for Oceanography and Marine Meteorology (JCOMM) ▪ International coordination and support for implementation: JCOMMOPS ▪ Vision and plan for the global ocean observations

3 Special Materials

The trainees will be provided a demonstration of the buoy deployment, in cooperation with the action groups of DBCP, buoy manufacturers, and relevant service providers, with voluntary contribution of above programmes and groups.

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ANNEX IX

SUMMARY OF REPORTS BY DATA MANAGEMENT CENTRES

Responsible National Oceanographic Data Centre (RNODC) for Drifting Buoys

Introduction

The Marine Environmental Data Service (MEDS) is a Responsible National Oceanographic Data Centre (RNODC) for Drifting Buoy Data. As part of its role, RNODC-MEDS acquires, processes, quality controls and archives real-time drifting buoy messages reporting over the Global Telecommunications System (GTS), as well as delayed mode data acquired from other sources. All data are made available to the international scientific community through an online request system.

Statistics

During the last inter-sessional period, MEDS has archived an average of 860, 000 BUOY messages per month from an average of 1490 buoys per month, covering most of the global ocean surface. This is an increase of 67% in messages and 27% in buoys from last year. On average, approximately 19 observations per day per buoy were observed. Most buoys are reporting SST, about 35% reporting pressure and approximately 5% reporting wind and air temperature. Only a few buoys are reporting salinity. Of the BUOY messages received during the year, 98% of the locations were quality flagged as good, with only 2% doubtful.

MEDS performs its QC on a monthly basis and as such, it takes anywhere between one and seven weeks for BUOY data to be added into the archive averaging 28.5 days between reception and update. A growing need for real-time drifter data in a more timely manner has prompted MEDS to look at increasing the frequency of archive updates.

The overall size of the drifting buoy archive continues to grow each year with a steady increase of about 15-20% on average over the past 10 years. Currently, MEDS have about 42.5 million records containing close to 18 Gigabytes of data from 1978-2005.

Update on 2005-2006 work

MEDS participates in the DBCP QC guidelines to monitor the quality of location data distributed on the GTS. Each month, statistics on the number of erroneous positions are sent on the buoy-qir@vendur.is distribution list with a link to maps in three projections to visualize the data. The Arctic, Antarctic and the rest of the world maps display buoy tracks of the previous month and allows the user to “mouse over” tracks to determine which buoys are reporting erroneous locations.

New software was written to read and decode BUFR messages into an internal format for update to MEDS archives. Functionality related to new versions and data compression still need to be added.

Goals for 2006-2007

- Complete the remaining pieces of the BUFR software.
- Look into increasing the frequency of BUOY archive updates possibly on a weekly or even daily basis.
- Update new data submission from AOML for 2003-2005.

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Specialized Oceanograhic Centre (SOC) for drifting buoys

The SOC for Drifting Buoys has been run continuously during year 2005-2006. SOC is made of Météo-France teams in Toulouse and Brest as well as teams involved in the inter-agency programme Coriolis (Ifremer leading the program, and in charge for delayed mode aspects, portal to external users, etc.). A daily collection and archiving of buoy reports from the world ocean is performed by Météo-France. Collaboration within the Coriolis project (www.coriolis.eu.org), with JCOMMOPS and also Argos are main aspects of this SOC, beside regular exchanges with other data centres, measurements teams and agencies, and with users.

Météo-France operates quality control procedures on drifting buoys data. Warning messages are sent to the buoy-qir@vedur.is mailing list of Internet when a problem appears (e.g. bad location detected, wrong acceleration and loss of drogue, sensor drift, etc.) or when a modification seems needed (i.e. to recalibrate or to remove a sensor from GTS) via the JCOMMOPS QC relay interface. Statistics on comparisons with analysis fields are set up for each buoy. Monthly statistics are sent to the buoy-qir@vedur.is mailing list too.

Buoy data QC tools developed by Météo-France are available on the Internet (www.meteo.shom.fr/qctools) to help buoy operators to check their buoys: Monthly statistics carried out by 5 meteorological centres for individual buoys; Plots of data and differences with model outputs; Blacklists of buoys reporting dubious air pressure values or being perhaps ashore can be seen.

In addition to the products linked to buoy QC, the SOC for Drifting Buoys produces monthly products for buoys, moored buoys, drifting buoys, ships. Data are delivered on request, or on a regular basis and via Internet (http://esurfmar.meteo.fr/doc/o/daim).

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

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ANNEX X

BUFR TEMPLATE FOR BUOY AND WAVE DATA

(as adopted for validation by May 2006 by ET/DRC, Muscat, Oman, 5-8 Dec. 2005)

#	Descriptor	Name	Expanded descriptors	Comment, encoding
1	001003	WMO region	001003	First digit of WMO number (e.g. 62024 => 6)
2	001020	WMO region sub-area	001020	Second digit of WMO number (e.g. 62024 => 2)
3	001005	Buoy/platform identifier	001005	Last 3 digits of WMO number (e.g. 62024 => 024)
4	002001	Type of station	002001	1=Manned station
5	002036	Buoy type	002036	1=Fixed buoy
6	002149	Type of data buoy	002149	16=unspecified moored buoy 24=Omnidirectional waverider 25=Directional waverider
7	301011	Date	004001 (year) 004002 (month) 004003 (day)	Date of observation
8	301012	Time	004004 (Hour) 004005 (Minutes)	Time of observation
9	008021	Time significance	008021	Value = 26 (time of last known position)
10	301011	Date	004001 (year) 004002 (month) 004003 (day)	Date of last known position coded here; coded missing for fixed station
11	301012	Time	004004 (Hour) 004005 (Minutes)	Time of last known position coded here; coded missing for fixed station
12	008021	Time significance	008021	Value = “missing”
13	301021	Latitude and longitude (high accuracy)	005001 (Lat; high accuracy) 006001 (Lon; high accuracy)	Coarse accuracy descriptors (005002 and 006002 respectively) were used with PDE buoys
14	027004	Alternate latitude (high accuracy)	027004	Coded if Argos is used for location; otherwise coded missing
15	028004	Alternate longitude (high accuracy)	028004	Coded if Argos is used for location; otherwise coded missing
16	007030	Height of station above MSL	007030	
17	001051	Platform Transmitter ID	001051	If Argos is used, Argos ID number;
18	002148	Data collection and/or Location system	002148	1=Argos 2=GPS Coded missing if none
19	001012	Platform drift direction	001012	Coded missing for moored buoys
20	001014	Platform drift speed	001014	Coded missing for moored buoys
21	002040	Method of removing platform direction and speed from current	002040	Coded missing for moored buoys
22	033022	Quality of buoy satellite transmission	033022	0=Good 1=Dubious 3=missing
23	033023	Quality of buoy location	033023	0=Reliable 1=Last known position 2=Dubious 3=missinh
24	033027	Location quality class (range of radius of 66% confidence)	033027	0: >= 1500m 1: 500m to 1500m
25	022063	Total water depth	022063	Mooring depth; otherwise coded missing
26	302021	Waves	022001 (direction of waves)	

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			022011 (period of waves) 022021 (height of waves)	
27	302022	Wind waves	022002 (direction wind wv) 022012 (period wind wv) 022022 (height wind wv)	
28	302023	Swell waves	022003 (direction swell wv) 022013 (period swell wv) 022023 (height swell wv)	
29	008081	Type of equipment (observing platform)	008081	(New descriptor, scale=0, ref=0, bits=6) 0=sensor 1=transmitter 2=receiver 3=observing system Here coded with value=3: Equipment = “platform”
30	025026	Battery voltage	025026	(New descriptor, Volts, scale=0, ref=0, bits=6) Platform battery voltage
31	008081	Type of equipment (transmitter)	008081	(New descriptor, scale=0, ref=0, bits=6) 0=sensor 1=transmitter 2=receiver 3=observing system Here coded with value=1: Equipment = “transmitter”
32	025026	Battery voltage	025026	(New descriptor, Volts, scale=0, ref=0, bits=6) Transmitter battery voltage
33	008081	Type of equipment (receiver)	008081	(New descriptor, scale=0, ref=0, bits=6) 0=sensor 1=transmitter 2=receiver 3=observing system Here coded with value=2: Equipment = “receiver”
34	025026	Battery voltage	025026	(New descriptor, Volts, scale=0, ref=0, bits=6) Receiver battery voltage
35	008081	Type of equipment – value Missing = cancel	008081	0=sensor 1=transmitter 2=receiver 3=observing system Here coded with value = “missing”
36	002034	Drogue type	002034	Coded missing for moored buoys
37	022060	Lagrangian drifter drogue status	022060	(New descriptor, scale=0, ref=0, bits=3) 0=detached 1=attached 3=missing Coded missing for moored buoys
38	007070	Drogue depth	007070	Coded missing for moored buoys
39	002190	Lagrangian drifter submergence	002190	Coded missing for moored buoys
40	025086	Depth correction indicator for sub-surface measurements along cable	025086	0=depths are not corrected 1=depths are corrected 3=missing

41	002035	Cable length	002035	Depth of hydrostatic pressure sensor at bottom of cable
42	002168	Hydrostatic pressure of lower end of cable	002168	
43	020031	Ice deposit (thickness)	020031	Ice thickness
44	002038	Method of temperature and/or velocity measurement	002038	e.g. 2=hull contact sensor 8=thermistor chain
45	306004	Digitization, depth/salinity method, depths/salinities/temperatures	002032 (indicator for digit) 002033 (method sal/depth) 103000 (delayed repl 3 desc) 031001 (replication factor) 007062 (depth) 022043 (sea temperature) 022062 (salinity)	Replication factor indicates number of (depth, temp., salinity) data points that are encoded
46	002030	Method of current measurement	002030	
47	306005	Time/duration of current measurement, depths/directions/speeds	002031 (method current) 103000 (delayed repl 3 desc) 031001 (replicationfactor) 007062 (depth) 022004 (direction current) 022031 (speed current)	Replication factor indicates number of (pepth, dir, speed) data points that are encoded
48	007031	Height of barometer above MSL	007031	
49	008081	Type of equipment (sensor)	008081	(New descriptor, scale=0, ref=0, bits=6) 0=sensor 1=transmitter 2=receiver 3=observing system Here coded with value=0: Equipment = “sensor”
50	012064	Instrument temperature	012064	Temperature of air pressure sensor
51	302001	Pressure and pressure change	010004 (pressure at station) 010051 (MSLP) 010061 (3-hour tendency) 010063 (tend. Characteristic)	Mean Seal Level Pressure to be computed based upon pressure at station level and sensor height
52	008081	Type of equipment – value missing = cancel	008081	(New descriptor, scale=0, ref=0, bits=6) 0=sensor 1=transmitter 2=receiver 3=observing system Here coded with value = “missing”
53	007032	Height of sensor above marine deck platform (for temp.&hum. measurement)	007032	Height of thermometer above marine desck
54	007033	Height of sensor above water surface (for temp.&hum. measurement)	007033	Height of thermometer (assumed should be coded with value = 2 metres for PDE buoys)
55	012101	Dry-bulb temperature (scale 2)	012101	Dry-bulb temperature at 2m (012004) was used for PDE buoys
56	012103	Dew-point temperature (scale 2)	012103	
57	013003	Relative humidity	013003	
58	007032	Height of sensor above marine deck platform (for wind measurement)	007032	Real height of anemometer above marine deck
59	007033	Height of sensor above water surface (for	007033	Real height of anemometer above average water surface

		wind measurement)		
60	008082	Artificial correction of sensor height to another value	008082	(New descriptor, scale=0, ref=0, bits=6) 0=sensor height is not corrected 1=sensor height is artificially corrected 7=missing Assumed should be coded to value 1 for PDE buoys
61	007033	Height of sensor above water surface (here height of anemometer to which it is artificially corrected)	007033	Here height of anemometer to which it is artificially corrected Assumed should be coded with value = 10 metres for PDE buoys
62	002169	Anemometer type	002169	e.g. 0=rotor 1=propeller rotor
63	002002	Type of instrumentation for wind measurement	002002	
64	008021	Time significance	008021	Value = 2 (time averaged)
65	004025	Time period in minutes	004025	Value for averaging period (e.g. 10 minutes)
66	011001	Wind direction	011001	Wind direction at 10m (011011) was used with PDE buoys
67	011002	Wind speed	011002	Wind speed at 10m (011012) was used with PDE buoys
68	008021	Time significance	008021	Value = 23 (monitoring period)
69	004025	Time period in minutes	004025	Period during which gust is being monitored prior to observation time
70	011043	Maximum wind gust direction	011043	
71	011041	Maximum wind gust speed	011041	
72	008082	Artificial correction of sensor height to another value (set to missing to reset previous value)	008082	(New descriptor, scale=0, ref=0, bits=6) 0=sensor height is not corrected 1=sensor height is artificially corrected 7=missing Here coded with value = “missing”
73	007033	Height of sensor above water surface (set to missing to cancel previous value)	007033	Value=”missing”: Redefine height to previous level
74	007032	Height of sensor above marine deck platform (for precipitation measurement)	007032	Here height of precipitations
75	004024	Time period in hours	004024	Period during which precipitation is being monitored prior to observation time
76	013011	Total precipitation	013011	Total precipitation during monitoring period
77	007032	Height of sensor above marine deck platform (set to missing to cancel the previous value)	007032	Value = “missing”
78	008021	Time significance	008021	Value = 3 (accumulated)
79	004024	Time period in hours	004024	Period during which global radiation is being accumulated prior to observation time
80	014021	Global radiation, integrated over period specified	014021	
81	008021	Time significance	008021	Value = “missing”
82	025028	Operator or manufacturer defined parameter (#1)	025028	(New descriptor, scale=1, ref=-16384, bits=15) Housekeeping parameter number 1
83	025028	Operator or manufacturer defined parameter (#2)	025028	(New descriptor, scale=1, ref=-16384, bits=15) Housekeeping parameter number 2
84	025028	Operator or manufacturer defined parameter (#3)	025028	(New descriptor, scale=1, ref=-16384, bits=15) Housekeeping parameter number 3

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85	*022073*	*Maximum wave height*	*022073*	
86	*022070*	*Significant wave height*	*022070*	*$H_sH_sH_sH_s$ in WAVEOB section 0*
87	*022074*	*Average wave period*	*022074*	*$P_aP_aP_aP_a$ in WAVEOB section 0*
88	*022076*	*Direction from which dominant waves are coming*	*022076*	*d_dd_d in WAVEOB section 0*
89	*022077*	*Directional spread of dominant waves*	*022077*	*d_sd_s in WAVEOB section 0*
90	*022071*	*Spectral peak wave period*	*022071*	*$P_pP_pP_pP_p$ in WAVEOB section 0*
91	*022078*	*Duration of wave record*	*022078*	*D'D'D'D' in WAVEOB section 1*
92	*022082*	*Maximum non-directional spectral wave density*	*022082*	*$C_mC_mC_m$ in WAVEOB section 2*
93	*022084*	*Band containing maximum non-directional spectral wave density*	*022084*	*n_mn_m in WAVEOB section 2*
94	*025043*	*Wave sampling interval (time)*	*025043*	*SSSS in WAVEOB (I_a=0)*
95	*025044*	*Wave sampling interval (space)*	*025044*	*SSSS in WAVEOB (I_a=1)*
96	*112000*	*Delayed replication of 12 descriptors*	*112000*	*Replication for frequency bands. PDE buoys did not used delayed replication*
97	*031001*	*Replication factor*	*031001*	*Delayed replication therefore added. Replication factor = Number of frequency bands*
98	*022080*	*Waveband central frequency*	*022080*	*$f_nf_nf_n$ in WAVEOB section 1*
99	*201134*	*Add 6 bits to data width*	*201134*	
100	*022096*	*Spectral band width*	*022096*	*Here coded with 10 bits as descriptor requires 4 bits and we have 6 bits added due to previous operation descriptor*
101	*201000*	*Reset data width to normal*	*201000*	
102	*022090*	*Non-directional spectral estimate by wave frequency*	*022090*	*$A_nA_nA_n$ in WAVEOB (I_b=0) section 5*
103	*022086*	*Mean direction from which waves are coming*	*022086*	*$d_{a1}d_{a1}$ in WAVEOB section 4*
104	*022087*	*Principal direction from which waves are coming*	*022087*	*$d_{a2}d_{a2}$ in WAVEOB section 4*
105	*022095*	*Directional spread of individual waves*	*022095*	
106	*022085*	*Spectral wave density ratio*	*022085*	*c_nc_n in WAVEOB section 2*
107	*022088*	*First normalized polar coordinate from Fourier coefficients*	*022088*	*r_1r_1 in WAVEOB section 4*
108	*022089*	*Second normalized polar coordinate from Fourier coefficients*	*022089*	*r_2r_2 in WAVEOB section 4*
109	*022092*	*Directional spectral estimate by wave frequency*	*022092*	*$A_nA_nA_n$ in WAVEOB (I_b=1) section 5*

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ANNEX XI

PROPOSAL FOR A DBCP SATELLITE DATA TELECOMMUNICATION PILOT PROJECT (DSatCom-PP)

In the first instance, the goal of the Pilot Project will be to evaluate and demonstrate the operational use of Iridium Satellite data telecommunication technology for the real-time collection of drifter data in support of the WWW, GOOS, GCOS, and Natural Disaster Prevention and Mitigation applications. In addition, the Pilot Project will aim to demonstrate that this can be realized in a cost effective way, on a global basis, and under various ocean conditions. Deployment of drifters in data sparse areas of interest to developing countries will also be targeted. The proposed project is particularly timely in view of developments in GEOSS and disaster monitoring, and in recognition of the ways in which the WMO proposes to handle its future information requirements.

1) Goals of the Pilot Project

The Pilot Project will seek to demonstrate the feasibility of Iridium technology for drifter real-time data telecommunication in terms of:

- Running a global observing system (40 to 50 units deployed worldwide);
- Network reliability and survivability;
- Data throughput in terms of quantity and timeliness;
- Data management, especially data formatting and insertion on the GTS;
- Operational shipment and deployment, including rapid response options;
- Cooperation with developing countries in terms of drifter deployment and technology transfer;
- Availability of Iridium transmitters and drifters;
- Overall cost effectiveness (manufacturing, transmission, data processing, life-time);

2) Global System

Sufficient number of drifters will have to be deployed in order to provide for a reliable performance evaluation and for demonstrating that the system can work from any ocean area under various ocean conditions. Drifters will be deployed in different ocean basins, including in the Northern and Southern Hemispheres, in tropical regions, in mid-high latitudes, and in the Polar Regions. The goal is to show that the instruments will work in harsh sea environments, high winds, and under a wide range of temperatures. To that end, it is being proposed to build and deploy between 40 and 50 units.

3) Support to Natural Disaster Prevention and Mitigation applications

Of particular interest will be hurricane and storm surges monitoring and forecast activities. All units will measure SST and most will be Lagrangian drifters drogued at 15 metres. Some of the units will be deployed as hurricane drifters and report one or more of the following variables: Sea Level Pressure, wind speed, wind direction, waves, sub-surface temperature profiles using thermistor strings. Development of rapid deployment technology will be part of the Pilot Project's activities (deployment package, certification for air deployment, small hull, two-way for programming storm buoy mode).

4) Capacity Building

Developing countries will be invited to participate in the Pilot Project by providing for deployment opportunities in their regions of interest. The Pilot Project may wish to highlight deployments of drifters in the Western Indian Ocean and/or the Gulf of Guinea as these have been identified as data sparse areas. The Pilot Project will seek transfer of technology through the participation of experts from developing countries in the project and through publication of documentation.

5) Hardware

Buoy operators and manufacturers, especially Iridium Value Added Manufacturers (VAMs) will be invited to participate in the Pilot Project so as to:

- Identifying appropriate transmitters and GPS units (e.g. Iridium 9601 device).
- Mounting these on drifters and developing appropriate on-board software.
- Cost effective manufacturing. A sufficiently large number of drifters will be equipped with such transmitters and GPS receivers and the resulting drifter design should permit production of operational units at reasonable cost.
- Making sure that the electric power consumption is acceptable so that drifter life-time exceeding one year can be achieved. Overall cost effectiveness of programme operations will have to be demonstrated through the computation of metrics involving hardware, packaging, shipping, satellite data transmission, and data processing costs.
- Collaborating in the design of reliable deployment packages for deployment by ship and/or air, and reliability of drifter shipping to remote regions and developing countries.

6) Iridium

Iridium and members of its Value Added Reseller (VAR) network will be invited to participate in the Pilot Project. They will be invited to assist with the establishment of a suitable data routing architecture (e.g. through a dedicated gateway at the Iridium ground station) and with the collection of monitoring statistics, e.g. for transmission failure rates, bit errors, call drops, timeliness, etc.

A robust cost model will also need to be discussed at an early stage.

7) Data Management

The Pilot Project will make sure that the collected data can be converted to geo-physical units, that appropriate automatic quality control procedures are applied, that the data can be encoded according to WMO GTS standards, and that the data are being distributed in real-time onto the GTS. Membership of the pilot project will include data management centres or agencies willing and able to provide such facilities.

Pilot Project membership will also include the DBCP Evaluation Group, who will assist in the definition of a standard Iridium data transmission message format, and in the evaluation of results

8) Interested buoy operators, DBCP members, and other interested partners

Other participants in the Pilot Project will be expected to offer one or more of the following:

- Provision of Iridium data telecommunication costs (air time)
- Provision of Iridium data telecommunication units
- Provision of drifters
- Testing and calibrating instruments
- Deployment of drifters in their area of interest
- Shipping units to remote regions and developing countries
- Provision of deployment opportunities

9) DBCP Evaluation Group

The Evaluation Group will specifically address the following issues;

- Instrument performance evaluation
- Evaluation of the quality of returned GPS fixes

- Evaluation of data timeliness
- Designing and proposing a standard Iridium data transmission message format
- Proposing technological parameters to be transmitted
- Proposing best ways of measuring certain variables (e.g. temperature profiles, wave data)
- Proposing best way of using two-way satellite data telecommunication (e.g. programming of the storm mode)

10) Initial Membership and participation

The following organizations or agencies will be invited to participate in the Pilot Project

- WMO
- IOC
- DBCP Evaluation Group
- E-SURFMAR
- Météo-France
- UK Met Office
- SAMS
- Ocean-US
- Iridium Satellite LLC
- CLS
- NAL Research Corporation (Iridium VAR)
- Trident Sensors (Iridium VAM)
- METOCEAN (Iridium VAM)
- Marlin-Yug
- Technocean

Others are free to join provided they have something to offer to the Pilot Project.

11) Project organization, time frame and reporting

It is proposed to establish a steering team for the Pilot Project chaired by the DBCP Chairperson. Draft Terms of References and proposed Membership for the Pilot Project Steering Team are given in appendix.

The Pilot Project will start as of November 2006 for an initial two-year period and will report to the DBCP on progress at its annual sessions. The Steering Team will communicate mainly via email and will meet as the need arises. Participants at Pilot Project meetings will be expected to attend at their own expense although some limited funding might be considered by WMO to support such meetings. Secretariat support for the PP will be provided by WMO.

ANNEX XI

Appendix to Annex XI

Draft Terms of References for the Steering Team of the DBCP Satellite Data Telecommunication Pilot Project (DSatCom-PP)

The Pilot Project will evaluate and demonstrate the operational use of Iridium Satellite data telecommunication technology for the real-time collection of drifter data in support of the WWW, GOOS, GCOS, and Natural Disaster Prevention and Mitigation applications

The Pilot Project will run for an initial two-year period and will report to the DBCP on progress at its annual sessions.

The Pilot Project will seek to demonstrate feasibility of Iridium technology for drifters in terms of

(i) Running a global observing system (40 to 50 units deployed worldwide);
(ii) Network reliability and survivability;
(iii) Data throughput in terms of quantity and timeliness;
(iv) Data management, especially data formatting and insertion on the GTS;
(v) Operational shipment and deployment, including rapid response options;
(vi) Cooperation with developing countries in terms of drifter deployment and technology transfer;
(vii) Availability of Iridium transmitters and drifters;
(viii) Overall cost effectiveness (manufacturing, transmission, data processing, life-time);

A Steering Team will be selected and tasked to guide the Pilot Project in achieving the tasks described above.

Proposed Membership

The Steering Team will include, to the greatest extent feasible, participants from the affected and interested marine community groups. Names are to be determined. The following individuals are proposed:

- David Meldrum, Chairperson, DBCP, and Chairperson, DSatCom-PP
- Elizabeth Horton, Chairperson, DBCP Evaluation Group
- Pierre Blouch, E-SURFMAR
- Steve Piotrowicz, Ocean US
- Ngoc Hoang, NAL Research Corporation
- Scott Scheimreif, Iridium Satellite LLC
- Helen Cussen, Trident Sensors
- Hester Viola, Technical Coordinator of the DBCP
- Philippe Gros, CLS
- Tony Chedrawy, Metocean
- Jeff Wingenroth, Technocean
- Jon Turton, UK MetOffice
- One or two representatives from developing countries

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ANNEX XII

IOC STATEMENT OF ACCOUNT FOR 1 AUGUST 2005 ~ 31 JULY 2006

193-GLO-2001

INTERGOVERNMENTAL OCEANOGRAPHIC COMMISSION

Mr. Charpentier Salary, Mission and Other Costs

(Statement of Account from 1 August 2005 to 31 July 2006)

(Expressed in US Dollars)

Balance Brought Forward as at 1 August 2005 :				**85,634.73**	
Funds Received from:	NOAA	Aug-05		105,000.00	
	Sams Research	Aug-05		975.00	
	Bill Woodward	Aug-05		1,000.00	
	WMO	Sep-05		82,600.00	
	Meteo France	Sep-05		1,000.00	
	Canada	Oct-05		1,000.00	
	WMO	Oct-05		4,000.00	281,209.73
Deduct:					
Disbursements					
Salary of Mr Charpentier :					
	8/2005-12/2005			59,555.26	
	1/1/2006			11,979.06	71,534.32
Missions :					
	Mr Charpentier				
	Washington/San Diego - USA - 23/04/2005 to 07/05/2005		3,489.35		
	Visit PMEL - 02/06/2005 to 08/06/2005		2,774.49		
	Halifax - Canada - 17/09/2005 to 24/09/2005		2,456.14		
	Chile - 12/10/2005 to 27/10/2005		5,104.52		
	Paris - France - 18/11/2005		687.72		
	USA - 12/12/2005 to 16/12/2005		2,877.11	17,389.33	
	Ms Hester Viola				
	Toulouse July 2006			712.96	18,102.29
Sub-contract :					
	"Collecte Localisation Satellites" - paid in October 2005			14,663.42	
	Servicio Meteorologico Nacional - paid in Sep/Nov. 2005			8,000.00	22,663.42
Cash balance as at 31 July 2006					**168,909.70**

ANNEX XIII

INTERIM WMO STATEMENT OF ACCOUNT AS AT 31 JULY 2006

World Meteorological Organization

Data Buoy Co-operation Panel

Interim Statement of Account as at 31 July 2006

(expressed in US dollars)

Balance from 2005		25,621	
Adjustment to Opening Balance (2004-2005 Support Costs)		(3,460)	
Adjusted Opening Balance			22,161
Contributions received			83,493
Total Funds Available			105,654
Obligations Incurred			
Travel - non-WMO Staff		20,095	
Travel - WMO Staff		2,019	
Total expenditures		22,114	
Support Costs (1%)		221	
Total expenditures including Support Costs			22,335
Balance of Fund		US $	83,319
Represented by.			
Cash at Bank	84,473		
Exchange Adjustments	9,962		94,435
Less: Unliquidated Obligations	11,099		
Accounts Payable	17		11,116
		US $	83,319

CONTRIBUTIONS RECEIVED

Australia	16,200	
France	47,393	
Germany	6,000	
India	3,000	
New Zealand	2,400	
South Africa	4,500	
United Kingdom	4,000	
TOTAL		83,493

ANNEX XIV

WMO FINAL STATEMENT OF ACCOUNT AS AT 31 DECEMBER 2005

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

World Meteorological Organization

Data Buoy Co-operation Panel

Final Statement of Account as at 31 December 2005

(expressed in US dollars)

Balance from 2003				125,361
Contributions received				246,481
Total Funds Available				371,842
Obligations Incurred				
	2004	**2005**	**Total**	
Consultants	9,992	10,911	20,903	
Travel	9,459	7,533	16,992	
Transfer to Marine Programe	12,000	-	12,000	
Contribution to JCOMMOPS Data Devt	6,527	-	6,527	
Contribution to DBCP/JTA Mtg 33080/2005	-	3,000	3,000	
Payment to IOC/ Logistic Support	204,000	82,600	286,600	
Bank charges	128	71	199	
	242,106	104,115	346,221	
Balance of Fund			US $	25,621
Represented by.				
Cash at Bank		26,775		
Exchange Adjustments		9,962		36,737
Less: Unliquidated Obligations		11,099		
Accounts Payable		17		11,116

ANNEX XIV

-		US $	25,621
-			
-	-	-	

CONTRIBUTIONS RECEIVED	2004	2005	Total
Australia	16,875	14,500	31,375
Canada	12,500	12,500	25,000
CLS Service ARGOS	10,000	-	10,000
France*	36,633	73,746	110,379
Germany	5,000	5,000	10,000
Greece	2,200	-	2,200
Iceland	2,250	-	2,250
India	-	3,000	3,000
Ireland	1,517	-	1,517
Japan	10,000	2,000	12,000
Netherlands	1,970	-	1,970
New Zealand	2,395	2,000	4,395
Norway	395	-	395
South Africa	3,750	3,750	7,500
USA	22,500	2,000	24,500
TOTAL	127,985	118,496	246,481

*The contributions from France received in 2004 include their contributions for the years 2002-03.

ANNEX XV

REVIEW ON THE STATUS OF DBCP TRUST FUND
Submitted by Frank Grooters, Finalized on 29 August 2006

DBCP TRUST FUND Summary

BUDGET BASED ON WMO and IOC ACCOUNTING FOR 2004-2006 (AS AT 11 July 2006), IN US DOLLARS

Item	Receipts	2004-2005 Obligation	Balance at 31 Dec.	Receipts	2006 Obligation	Balance at 31 Dec.	Receipts	2007 Obligation	Balance at 31 Dec.	Receipts	2008 Obligation	Balance at 31 Dec.
DBCP												
Balance Brought Forward	226,744			273,338			296,371			324,748		
Contributions	748,556			142,293			214,100			214,100		
Adjustment to match WMO/IOC												
Expenditure												
Technical Coordinator		281,734			40,127			83,123			84,000	
Consultancy		20,903			15,000			15,000			15,000	
Travel		53,668			22,100			28,100			28,000	
Bank Charges/Support Cost		199			4,080			500			500	
IOC		286,600										
Marine Programme		12,000										
JCOMMOPS		43,858			20,000			22,000			22,000	
Publications					2,000			2,000			2,000	
Miscellenious					8,633							
Contingency								30,000			30,000	
Supp Meetings/Workshops/Training		3,000			7,320			5,000			5,000	
Total DBCP	**975,300**	**701,962**		**415,631**	**119,260**		**510,471**	**185,723**		**538,848**	**186,500**	
Balance of DBCP Trust Fund			**273,338**			**296,371**			**324,748**			**352,348**
								Estimation		Rough estimation		

ANNEX XV

DBCP Trust Fund: Income and Expenditure

(based on WMO and IOC Finance Information as at 11 July 2006, in USD)

DBCP	1 Jan2004 - 31 Dec 2005 WMO	IOC			Estimated Jan-Dec 2006 WMO	IOC	Estimated Jan-Dec 2007 WMO	IOC
Receipts								
Brought Forward	125,361	101,383			25,621	247,717	113,781	182,590
Contributions (listed below)	246,481	502,075			142,293	0	109,100	105,000
Adjustment to Match WMO								
Total Receipts	**371,842**	**603,458**			**167,914**	**247,717**	**222,881**	**287,590**
Expenditure/Oblig'ns								
Consultancy (JTA Chair)	20,903				15,000		15,000	
Tech Coordinator		281,734				40,127		83,123
JCOMMOPS logistic supp		37,331				15,000		15,000
IOC	286,600				0		0	
Marine Programme	12,000							
Travel/Missions								
Tech Coordinator		36,676				10,000		16,000
DBCP Chairman	4,342				2,100		2,100	
JTA Chairman	12,650				10,000		10,000	
Bank Charges/SuppCost	199				4080		500	
Projects & Activities								
Publications					2,000		2,000	
JCOMMOPS Data Devt	6,527				5,000		5,000	
Miscellenious					8,633			
Contingency							30,000	
JCOMMOPS IS migration							2,000	
Supp. DBCP Mtgs/WSs	3,000				7,320		5,000	
Total Expenditure	**346,221**	**355,741**			**54,133**	**65,127**	**71,600**	**114,123**
Balance of Fund	**25,621**	**247,717**			**113,781**	**182,590**	**151,281**	**173,467**
Contributions								
Argos Inc		1,000						
Australia *	31,375				16,200		16,200	
Canada *	25,000	1,000			40,000		20,000	
CLS	10,000				15,000		15,000	
E-SURFMAR					47,393		48,000	
France(incl E-SURFMAR)	110,379	1,000						
Germany *	10,000				6,000			
Greece	2,200							
Iceland	2,250							
India *	3,000				3,000		3,000	
Ireland	1,517							
Japan *	12,000							
Netherlands	1,970							
New Zealand *	4,395				2,400		2,400	
Norway	395							
South Africa *	7,500				4,500		4,500	
United Kingdom		975			4,000			
United States of America *	24,500	207,500			3,800	0		105,000
WMO		290,600				0		0
Total	**246,481**	**502,075**	**0**	**0**	**142,293**	**0**	**109,100**	**105,000**
	* incl. 2005 contribution		E=estimate				E	E

1. The difference between Expenditure (IOC $286600) and income from WMO ($290600) is $1000 from the WMO Regular Budget
2. The income from Germany is SOOPIP 2004 and 2005 (2*$5000)
3. The income from Japan is SOOPIP 2004 and 2005 (2*$5000) and DBCP $2000
4. The WMO income from USA includes $2000, from Australia $1000 for the 2005 Argentina arrangement
5. The IOC income from USA includes $105000 advanced payment for 2006 incl. SOOPIP 2005 AND $12500 SOOPIP and $90000 DBCP 2004
6. The income from France include late payments for 2002 and 2003 and E-SURFMAR 2004 and 2005 (@ 40k€
7. Income from E-SURFMAR 2006, payment made by France
8. Miscellaneous includes cost for interviews new TC in 2006
9. Bank charges/Support cost 2006 includes Support cost 2004-2005 ($3461), Estimate 2006 (1% total expenditures: $419) and estimate bank charges @ $200
10. $4000 in 2006 from UK as supplement to 2004 contribution
11. $20000 from Canada as supplement to the 2005 contribution, payment in 2006
12. $3800 allocated to DBCP TF in 2006 from US contribution $10000 for support DBCP Workshop Reading; $7320 total expenditure under item Supp. DBCP Mtgs/WSs in 2006

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ANNEX XVI

EXPENDITURES AND INCOME FOR 2005 ~ 2007
Agreed by the Panel at its 22nd Session (20 October 2006)

SUMMARY
INTERIM BUDGET BASED ON WMO and IOC ACCOUNTING FOR 2004-2006 (AS AT 11 July 2006) IN USD

Item	Receipts	2004-2005 Obligation	Balance at 31 Dec.	Receipts	2006 Obligation	Balance at 31 Dec.	Receipts	2007 Obligation	Balance at 31 Dec.	Receipts	2008 Obligation	Balance at 31 Dec.
DBCP												
Balance Brought Forward	226,744			273,338			309,185			212,185		
Contributions	748,556			138,493			214,100			214,100		
Adjustment to match WMO/IOC												
Expenditure												
Technical Coordination		281,734			40,127			93,000			98,000	
Consultancy		20,903			15,000			15,000			15,000	
Travel		53,668			14,119			22,100			28,000	
Bank Charges/Support Cost		199			4,080			1,000			1,000	
IOC		286,600										
Marine Programme		12,000										
JCOMMOPS		43,858			20,000			45,000			40,000	
Outreach and Publications					2,000			**10,000**			10,000	
Contingency								**50,000**			50,000	
Supp Meetings/Workshops		3,000			7,320							
New Technical Evaluation								**30,000**			30,000	
Capacity Building								**25,000**			25,000	
Collaborative Arrangements								**20,000**			20,000	
Total DBCP	**975,300**	**701,962**		**411,831**	**102,646**		**523,285**	**311,100**		**426,285**	**317,000**	
Balance of DBCP Trust Fund			**273,338**			**309,185**			**212,185**			**109,285**
								Estimation		Rough estimation		

ANNEX XVI

DBCP Trust Fund: Income and Expenditure
(based on WMO and IOC Finance Information as at 11 July 2006) in USD

DBCP	1 Jan2004 - 31 Dec 2005 WMO	IOC			Estimated Jan-Dec 2006 WMO	IOC	Estimated Jan-Dec 2007 WMO	IOC
Receipts								
Brought Forward	125,361	101,383			25,621	247,717	126,595	182,590
Contributions (listed below)	246,481	502,075			138,493	0	109,100	105,000
Adjustment to Match WMO								
Total Receipts	**371,842**	**603,458**			**164,114**	**247,717**	**235,695**	**287,590**
Expenditure/Oblig'ns								
Consultancy (JTA Chair)	20,903				15,000		15,000	
Tech Coordination		281,734				40,127		93,000
JCOMMOPS logistic supp		37,331				15,000		15,000
IOC	286,600				0		0	
Marine Programme	12,000							
Travel/Missions								
Tech Coordinator		36,676				10,000		20,000
DBCP Chairman	4,342				2,100		2,100	
NON-DBCP	12,650				2,019			
Bank Charges/SuppCost	199				4080		1,000	
Projects & Activities								
Outreach and Publications					2,000		10,000	
JCOMMOPS Data Devt	6,527				5,000		**10,000**	
Contingency							30,000	20,000
JCOMMOPS IS migration							**20,000**	
Supp. DBCP Mtgs/WSs	3,000				7,320			
New Technical Evaluation							30,000	
Capacity Building							25,000	
Collaborative Arrangement							20,000	
Total Expenditure	**346,221**	**355,741**			**37,519**	**65,127**	**163,100**	**148,000**
Balance of Fund	**25,621**	**247,717**			**126,595**	**182,590**	**72,595**	**139,590**
Contributions								
Argos Inc		1,000						
Australia *	31,375				16,200		16,200	
Canada *	25,000	1,000			40,000		20,000	
CLS	10,000				15,000		15,000	
E-SURFMAR					47,393		48,000	
France(incl E-SURFMAR)	110,379	1,000						
Germany *	10,000				6,000			
Greece	2,200							
Iceland	2,250							
India *	3,000				3,000		3,000	
Ireland	1,517							
Japan *	12,000							
Netherlands	1,970							
New Zealand *	4,395				2,400		2,400	
Norway	395							
South Africa *	7,500				4,500		4,500	
United Kingdom		975			4,000			
United States of America *	24,500	207,500				0		105,000
WMO		290,600				0		0
Total	**246,481**	**502,075**	**0**	**0**	**138,493**	**0**	**109,100**	**105,000**
	* incl. 2005 contribution		E=estimate				E	E

ANNEX XVII

DBCP WORKPLAN FOR THE NEXT INTERSESSIONAL PERIOD

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 the reason for their non-availability.	TC ToR	TC, CLS	Members Secretariats	Chairperson & 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	Chairperson for presentation to the Panel/Ongoing
3	To maintain a catalogue of existing ongoing ocean data buoy programmes	DBCP ToR	TC	Members Secretariats	Chairperson & Panel for information/Ongoing
4	**To continue review of satellite data telecommunications systems**	**DBCP-22 8.4.2**	**Chairperson**	**TC, Members**	**Panel/Ongoing**
5	To monitor Argos GTS sub-system & arrange for modifications as necessary To monitor implementation by Service Argos of new system for GTS data processing	DBCP-21	TC	CLS	Panel & users/Ongoing
6	To coordinate operations of DBCP QC guidelines.	TC ToR	TC	Members Operational services	Panel/Ongoing
7	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
8	To support, as required, existing DBCP action groups, and provide assistance on request to other internationally coordinated buoy programme developments.	TC ToR	TC Secretariats	Chairperson	Panel/Ongoing
9	To coordinate with IOP implementing strategy for the Indian Ocean Observing System as far as data buoys are concerned.	DBCP-20	IBPIO	Chairperson TC Secretariats	Panel/Ongoing
10	**To focus on achieving optimal spatial distribution of the drifter array**	**DBCP-22 5.1.4**	**Panel**		**Panel/next Panel session**
11	**To encourage other centres to act as PMOC**	**DBCP-22 8.1.3**	**Members**	**TC**	**Panel/Ongoing**
12	**To provide information on deployment opportunities**	**DBCP-22 7.2.4, 8.6.1.1**	**Members**	**TC**	**TC**
13	**To investigate whether air deployment opportunities could be provided**	**DBCP-22 2.2.1.2 (xvi),**	**Members**	**Secretariats**	**Panel/next Panel session**

ANNEX XVII

		8.6.1.2			
14	**To include Canadian Coastguards deployment opportunities in JCOMMOPS web site**	**DBCP-22 2.2.1.2 (xv)**	**TC**		**Panel/next Panel session**
15	**To investigate ways to advertise deployment opportunities**	**DBCP-22 8.6.1.3**	**TC**	**Members**	**Panel/next Panel session**
16	**To investigate ways for Members and AG to communicate their needs for deployment opportunities**	**DBCP-22 8.6.1.4**	**TC**	**Members, AG**	**Panel/next Panel session**
17	**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**	**Members**	**WMO Secretariat**	**WMO Secretariat/Ongoing**
18	To act as it's a focal point for tsunami warning, and to keep it informed as to developments during the intersessional period	DBCP-21	Vice-chairperson/Asia K. Premkumar		Panel/Intersessional period
19	To produce table of national commitments in the Southern Ocean	DBCP-16	TC	Members	Panel/July 2007
20	To routinely provide the list of moorings reporting in SHIP or BUOY format	DBCP-21	Members	TC	Panel/Ongoing
21	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
22	**To continue actions with other International Organizations for preventing vandalism.**	**DBCP-22 8.6.3.1**	**Secretariats**		**Panel/Ongoing**
23	**To compile information on vandalism-proof designs**	**DBCP 22 8.6.3.3**	**Members**	**TC**	**Panel/Ongoing**
24	**To investigate ways for raisin public awareness**	**DBCP-22 2.2.1.2 (xiv), 8.6.3.2**	**K. Premkumar**		**Panel/next Panel session**
25	To insert information on vandalism into UN Atlas and submit article to relevant journals such as "Fishing News International	DBCP-20	Chairperson		Panel/next Panel session
26	To investigate flagging of GTS data in BUFR reports.	DBCP-19	TC	CBS ET/DRC	Panel/next Panel session
27	**To provide info/materials for DBCP/JCOMMOPS web sites (news, brochure)**	**DBCP-22 7.2.3**	**Interested Members**	**TC**	**Panel/Ongoing**
28	**To provide feedback on required updates and ways to restructure JCOMMOPS/DBCP web sites**	**DBCP-22 7.2.1**	**Members**	**TC**	**Panel/Ongoing**
29	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	Chairperson	TC	Panel/Ongoing
30	To work at installing and/or connecting new LUTs at Easter, Saint Helenas, Gough, Malvinas/Falkland	DBCP-21	TC, CLS	South Africa, UK	Panel/next Panel session

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31	**To identify GTS delays in Indian Ocean region and suggest ways for reducing them**	**DBCP-22 2.2.1.2(i)**	**CLS**	**TC**	**Panel/next Panel session**
32	To comply with buoy metadata collection scheme	DBCP-21	Buoy operators	TC	Panel/Ongoing
33	To provide input on buoy models for JCOMMOPS database	DBCP-21	Manufacturers	TC	Panel/Ongoing
34	To assist with implementation of Peruvian and Turkish moored buoy programmes if required	DBCP-21	TC		Panel/next Panel session
35	**To compile document(s) on Best Practices and calibration procedures**	**DBCP-22 7.3.2**	**TC, Bill Burnett**	**Members, E-SURFMAR**	**Panel/next Panel session**
36	To review best practices prior to drifter purchase for safety, and GTS data processing purposes	DBCP-21	Members	Evaluation group, TC	Panel/Ongoing
37	To provide Service Argos with list of most used buoy models and formats they operate.	DBCP-21	Manufacturers	TC	Service Argos/Ongoing
38	To investigate quality of records of WOTAN wind speed data	DBCP-21	Evaluation group		Panel/next Panel session
39	**To investigate possibilities for student research projects on an analysis of pressure spiking or wind sensor performance**	**DBCP-22 2.5.1**	**Members**	**TC, Evaluation group**	**Panel/Ongoing**
40	**To perform further study on delays**	**DBCP-22 8.3.7, 8.6.2.3**	**TC, Chairperson**	**CLS**	**Panel/next Panel session**
41	**To operate/maintain an antenna on St Helena Island**	**DBCP-22 8.6.2.3**	**Member (UK Met Office), CLS**		**Panel/Ongoing**
42	**To participate actively in IPAB and/or to provide for deployment opportunities**	**DBCP-22 2.2.1.2 (ii)**	**Members**		**Panel/next Panel session**
43	**To work at developing deployment strategies using GDP tools**	**DBCP-22 2.2.1.2 (iv)**	**Members**	**GDC**	**Panel/next Panel session**
44	**To provide details on its requirements for hourly SST**	**DBCP-22 2.2.1.2 (v)**	**OOPC**		**Panel/next Panel session**
45	**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**
46	**To improve drogue attachment**	**DBCP-22 2.2.1.2 (vi)**	**Manufacturers**		**Panel/next Panel session**
47	**To use AOML barometer upgrade offer**	**DBCP-22 2.2.1.2 (vii)**	**Members**	**AOML**	**Panel/next Panel session**
48	**To increase wave measurements**	**DBCP-22 4.2.3**	**Members**		**Panel/next Panel session**
49	**To address wave measurement technology**	**DBCP-22 4.2.3**	**Evaluation**	**ETWS, OOPC**	**Panel/next**

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			Group		Panel session
50	To forward Panel's recommendations on waves to JCOMM/OCG	DBCP-22 4.2.3	Secretariats	ETWS	OCG/next OCG meetings
51	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
52	To participate in WMO ET/EGOS activities providing estimates of in-situ instrument performance	DBCP-22 5.1.2 (XVII)	TC		Panel/Ongoing
53	To investigate quality of drifter SST	DBCP-22 8.1.8	Rick Lumpkin		Panel/next Panel session
54	To provide advice on the best model to use for estimating quality of wind observations	DBCP-22 8.1.12	Members		TC/next Panel session
55	To investigate GTS distribution of PDE wave data on GTS using new BUFR template	DBCP-22 8.2.4	E-SURFMAR, PDE	TC	Panel/next Panel session
56	To submit proposal to modify the BUOY code and BUFR template for buoy data	DBCP-22 8.2.11	TC		DMCG codes group/next Panel session
57	To monitor implementation of required changes in Argos GTS sub-system for extended WMO numbers	DBCP-22 8.2.11	TC		Panel/Once CBS approves changes
58	To assure efficient dissemination of buoy data through Iridium via GTS	DBCP-22 8.3.9	CLS	Iridium data buoy community	Panel/Ongoing
59	To participate in Argos-3 test programme	DBCP-22 8.3.17	Members, Manufacturers	CLS	Panel/next Panel session
60	To react on the presented characteristics of Argos-4	DBCP-22 8.3.23	Argos users	CLS	Michel Faup/end of 2006
61	To establish a steering team and to finalize the ToR for the Iridium Pilot Project	DBCP-22 8.4.3	Chairperson, Executive Board	Secretariat	Panel/As soon as possible
62	To implement JCOMMOPS work-plan	DBCP-22 8.5.3	TC/DBCP, TC/Argo	CLS	Panel/next Panel session
63	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

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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	Chairperson & Panel for information/Ongoing
2	**To montinue the arrangements (including finance) to secure the services of a technical coordinator.**	**DBCP-22 10.3**	**Chairperson**	**Secretariats**	**Secretariats/Ongoing**
3	**To review programme & establish working priorities of the technical coordinator.**	**DBCP-22 10.4**	**Panel, Chairperson**		**Panel/next Panel session**
4	**To organize scientific & technical workshop at DBCP-XXIII**	**DBCP-22 6.8**	**Ken Jarrott, Bill Burnett**	**Secretariats**	**Panel/next Panel session**
5	**To prepare DBCP annual report**	**DBCP-22 7.2.12**	**Chairperson Secretariats**	**TC**	**Executive councils of WMO & IOC/End of 2006**
6	**To prepare DBCP-22 Workshop Proceedings (CD-Rom and web only)**	**DBCP-22 6.7, 7.2.12**	**Secretariat**	**Ken Jarrott**	**Panel/next Panel session**
7	**To update & publish new versions of DBCP publications No. 3 (Argos guide)**	**DBCP-22 7.2.8**	**Service Argos (No. 3) Secretariats**	**TC (No. 3) Members**	**Panel/next Panel session**
8	**To update implementation strategy (DBCP TD 15)**	**DBCP-22 4.4.1, 4.2.3, 7.2.9**	**Chairperson**	**Members**	**Panel/30 November 2006**
9	**To design and produce JCOMMOPS brochure**	**DBCP-22 7.2.2**	**TC**	**Members, Secretariats**	**Panel/next Panel session**
10	**To revise DBCP brochure**	**DBCP-22 7.2.2**	**TC**	**Members, Secretariats**	**Panel/next Panel session**
11	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	Chairperson	JCOMM OCG Secretariat	Panel/ JCOMM 4-year intersessional period
12	**To send invoices to Participants**	**DBCP-22 10.3**	**Secretariats**		**Panel/November 2006**
13	**To pay their contributions as soon as invoices are received.**	**DBCP-22 10.1.2, 10.3.5**	**Members**		**WMO Secretariat/upon**

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					invoice
14	**To provide electronic versions of papers presented at the workshop**	**DBCP-22 6.7, 7.2.12**	**Authors, Workshop presentation**		**Ken Jarrott/30 November 2006**
15	**To submit national reports & Action Group reports in electronic form**	**DBCP-22 2.3.1**	**Members AG**		*Secretariats/End -2006*
16	**To prepare & distribute revised budget estimates for 2007-2008, and final financial statement**	**DBCP-22 10.1.8, 10.1.10**	**Frank Grooters**	**Secretariats, Chairperson**	**Panel/January 2007**
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 draw up a specification for the future JCOMMOPS mission and its support requirement**	**DBCP-22 4.1.5, 10.3.3**	**Executive Board**	**Members, Secretariat**	**Panel/as soon as possible**
19	**To convene an Executive Board**	**DBCP-22 4.1.7, 10.1.9**	**Chairperson**	**Secretariats**	**Panel/next Panel session**
20	**To inform Chairperson of her wish or otherwise to continue to work as TC/DBCP for the period 1 July 2008 to 30 June 2009.**	**DBCP-22 10.3.1**	**TC**		**Chairperson/1 Oct. 2007**
21	To make recommendations to JTA XXVI	DBCP-22 11.1	Chairperson		JTA, Panel/JTA-XXVI
22	To ensure that each national coordination mechanism for GEO/GEOSS is fully informed of and consistent with existing and planned activities of JCOMM. Panel to contribute to GEO/GEOSS process for Tsunami monitoring system, either through JCOMM or through national coordination of each member country, and to actively communicate with national coordination for GEO to fully inform on the Panel's activities and capabilities in this regard.	DBCP-21	Members		Panel/On going
23	**To write to Members of Asian Countries in order to seek their participation in NPDBAP**	**DBCP-22 2.2.1.2 (iii)**	**Secretariats**		**Panel/next Panel session**
24	**To organize Capacity Building activities (training workshops, training materials, identifying lecturers)**	**DBCP-22 2.2.1.2 (xii), 4.3.3, 4.3.5**	**Panel**	**Secretariats**	**Panel/Ongoing**
25	**To investigate on possible cooperation with relevant Capacity Building programmes in WMO and IOC**	**DBCP-22 4.3.6**	**Secretariats**	**Chairperson**	**Panel/next Panel session**
26	**To work with representatives of sea level working groups to explore cooperation with Tsunami warning systems**	**DBCP-22 2.2.3.3**	**Members**	**Chairperson, Secretariats**	**Panel/next Panel session**
27	**To identify a new vice-Chair**	**DBCP-22 13.2**	**Members**	**Chairperson, Secretariats**	**Panel/next Panel session**

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DBCP WORKPLAN FROM THE DATA USERS AND TECHNOLOGY WORKSHOP WORKPLAN - Reading, United Kingdom, 27-28 March 2006
JCOMM Meeting Report 40

Paragraph	Item	Carried out by	Due date
5.1.8	To investigate on the different data assimilation schemes used by Member Countries and to report on recommended acceptable delays to the Panel.	DBCP TC	Oct. 2007
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	Oct. 2006
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. 2007
5.1.15	To investigate day to day variability in number of drifter data received by ECMWF	DBCP TC	Oct. 2006
5.2.10	To provide detailed rationale for the collection and transmission of hourly SST data (diurnal cycle resolution).	OOPC	Oct. 2006
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. 2006
6.1.5.1 6.1.5.2	To study standardization of drogue detector (e.g. tether strain).	Peter Niiler, Bill Scuba	Oct. 2006
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. 2007
6.3.2.1 6.3.2.2	To draft recommendation on the packaging recommendations for ship operators, particularly to design deployment packages in such a way to ensure for safe deployments from 20m above the sea level height from ships moving up to 25 knots	Craig Engler	Oct. 2006
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. 2006
7.6	To coordinate with GOOS on the agenda of GOOS Regional Alliance Forum (November 2006, Cape Town), in particular for cooperation in Capacity Building.	Secretariat, DBCP chairperson	Nov. 2006
6.2.10	To routinely produce maps showing recommended Argos frequencies.	Argos	ASAP

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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
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-22 (2006)
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

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LIST OF ACRONYMS AND OTHER ABBREVIATION

ADS	Automatic Distribution System (Argos)
AMDAR	Aircraft Meteorological Data Relay (WWW)
AOML	NOAA Atlantic Oceanographic and Meteorological Laboratory (USA)
AIC	Argo Information Center
AST	Argo Steering Team
ATF	Acoustic Tank Facility
BOM	Bureau of Meteorology (Australia)
BUFR	Binary Universal Form for Representation of meteorological data
CB	Capacity Building
CBS	Commission for Basic Systems (WMO)
CLIVAR	Climate Variability and Predictability (WCRP)
CLS	Collecte Localisation Satellites (France)
CNES	Centre national d'études spatiales (France)
DAMOCLES	Developing Arctic Modeling 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)
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)
ECMWF	European Centre for Medium-Range Weather Forecasts
ET/AWS	CBS/IOS Expert Team on Requirements for Data from Automatic Weather Stations (WMO)
ET/DRC	Expert Team on Data Representation and Codes (WMO)
ETDMP	Expert Team on Data Management Practices (JCOMM)
ET/EGOS	CBS/IOS Expert Team on the Evolution of the Global Observing System (WMO)
ETSI	Expert Team on Sea Ice (JCOMM)
ETWS	Expert Team on Wind Waves and Storm Surge (JCOMM)
E-SURFMAR	Surface Marine programme of the Network of European Meteorological Services, EUMETNET
EUMETSAT	European Organization for the Exploitation of Meteorological Satellites
FAO	Food and Agriculture Organization
GEO	Group on Earth Observations
GEOSS	Global Earth Observation System of Systems
GCOS	Global Climate Observing System
GDP	Global Drifter Programme
GHRSST	GODAE High Resolution SST Pilot Project
GISC	Global Information System Centres (WMO WIS)
GLOSS	Global Sea-level Observing System (JCOMM)
GMDSS	Global Maritime Distress and Safety System (IMO)
GODAE	Global Ocean Data Assimilation Experiment (GOOS)
GOOS	Global Ocean Observing System
GOSUD	Global Ocean Surface Underway Data
GTS	Global Telecommunication System (WWW)
GTSPP	Global Temperature-Salinity Pilot Project / Profile Programme

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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
IGDDS	Integrated Global Data Dissemination Service (satellite)
IHO	International Hydrographic Organization
IMB	Ice Mass Balance
IMO	International Maritime Organization
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)
ISABP	International South Atlantic Buoy Programme
ISO	International Organization for Standardization
JCOMM	Joint WMO-IOC Technical Commission for Oceanography and Marine Meteorology
JCOMMOPS	JCOMM in situ Observing Platform Support Centre
JTA	Joint Tariff Agreement (Argos)
KEO	Kuroshio extension region
LUT	Local User Terminal (Argos)
MAN	JCOMM Management Committee
MEDS	Marine Environmental Data Service (Canada)
META-T	Pilot Project for the Collection of Real-time Metadata regarding Sea Surface Temperature and Water Temperature Profile data (JCOMM)
MSS	Maritime Safety Services
NAVOCEANO	Naval Oceanographic Office (USA)
NC	National Centres (WMO WIS)
NCEP	NOAA National Center for Environmental Prediction (USA)
NDBC	NOAA National Data Buoy Center (USA)
NESDIS	NOAA National Environmental Satellite Data and Information Service (USA)
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)
NPDBAP	North Pacific Data Buoy Advisory Panel
NPOESS	National Polar Orbiting Environmental Satellite (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)

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ODAS	Ocean Data Acquisition Systems
ODINAFRICA	Ocean Data and Information Network for Africa (IODE)
OOPC	Ocean Observations Panel for Climate (GCOS-GOOS-WCRP)
OPA	Observations Programme Area (JCOMM)
ORION	US/NSF Ocean Research Interactive Observatory Networks project
OSMC	NOAA Observing System Monitoring Center (USA)
PA	Programme Area (JCOMM)
PANGEA	Partnerships with NOAA for GEOSS Applications (USA)
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)
PGC	Principal GTS Co-ordinator (DBCP)
PICO	Platform and Instrumentation for Continuous ocean 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 (DBCP)
PMT	Platform Messaging Transceivers
POGO	Partnership for Observation of the Global Oceans
PTT	Platform Transmitter Terminal (Argos)
RNODC	Responsible Oceanographic Data Centre (IODE)
SAT	Site Acceptance Test
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)
SIO	Scripps Institution of Oceanography (University of California, USA)
SOC	Specialized Oceanographic Centre (JCOMM)
SOOP	Ship-of-Opportunity Programme
SOOPIP	SOOP Implementation Panel (JCOMM)
SOT	Ship Observations Team (JCOMM)
SST	Sea Surface Temperature
SVP	Surface Velocity Programme (of TOGA and WOCE, replaced by GDP) drifter
SVP-B	SVP Abarometer at a drifter
SVP-BW	SVP Abarometer and wind at a drifter
TAO	Tropical Atmosphere Ocean Array
TIP	Tropical Moored Buoys Implementation Panel
UNOLS	University National Oceanographic Laboratory System (USA)
VOS	Voluntary Observing Ship (JCOMM)
WCRP	World Climate Research Programme
WIS	WMO Information System
WMO	World Meteorological Organization (UN)
WWW	World Weather Watch (WMO)

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