ANNUAL REPORT FOR 2006

DBCP Technical Document No. 31

INTERGOVERNMENTAL OCEANOGRAPHIC COMMISSION (OF UNESCO)

WORLD METEOROLOGICAL ORGANIZATION

DATA BUOY COOPERATION PANEL

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N O T E

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FOREWORD

It is my pleasure to present the twentieth Annual Report of the Data Buoy Co-operation Panel, describing the Panel's activities during 2006.

Firstly, I am delighted to report that we have been successful in appointing a new Technical Coordinator to succeed Mr Etienne Charpentier, who served the Panel diligently for 16 years. As has become well known, the Panel's considerable success is largely the result of its ability to recruit able and efficient Technical Coordinators for the implementation of its workplan, the guidance of the Panel in developing its strategy, and the day-to-day resolution of the myriad practical technical problems besetting buoy programmes and their data distribution. In recruiting a new Technical Coordinator, the Panel had to choose carefully from a field of nearly 50 candidates, and consulted widely in drawing up a short list of five interviewees. Face-to-face interviews were held at ECMWF in March 2006, facilitated by the presence of many key stakeholders at JCOMM/DBCP workshops hosted at the Centre. Ms Hester Viola, Bureau of Meteorology, Australia, with a strong background in data management, was the unanimous first choice amongst an exceptionally strong field, any of whom would have been an excellent appointment, and started work for the Panel in July 2006. Naturally, she has a hard act to follow, as Mr Charpentier had established himself as the doyen of technical coordinators, whose actions and advice had come to be implicitly trusted by many beyond the Panel, including those involved in policy and decision making at the highest levels in environmental observation. The Panel is proud that he has gone on to occupy a key position within the Ocean Affairs section of the World Meteorological Organization, where he will further develop his skills and promote the interests of all involved in ocean measurements, including those of this Panel! We thank him most sincerely for his exemplary efforts for the Panel over so many years, and wish him well in his new career.

As has been noted in previous reports, the Panel has been anxious to build on its achievements and further develop its mission rather than rest comfortably on past successes. In this regard, I have been aided by the wise deliberations of the Task Team, as well as by considerable input from other Panel members and the observing community in general. As a result, a number of new initiatives have been created, to serve both the Panel's immediate needs and those of the wider community. Key amongst those are:

- Workshops, to engage with the users of buoy data and establish their current priorities and future needs, and to pilot the inclusion of suitable metadata in buoy datasets: the first workshops were held at ECMWF in March 2006;
- Training programmes, to engage new countries in the work of the Panel, both by increasing awareness and competence in the use of buoy data, and by fostering collaborative activities and deployment opportunities in critical and data-sparse areas: the first of these is to be held at Ostend in June 2007;
- Pilot projects, to rigorously evaluate new technologies that might ultimately enhance both the research and operational capabilities of data buoys: the first example is a detailed evaluation of the performance of the Iridium satellite communications system in real ocean conditions, launched for two years in October 2007 as the DBCP Iridium Pilot Project;
- Provision of interim technical support to new observing systems those wishing to evaluate the efficacy of a technical coordinator's role, both for their own purpose, and as part of an inclusive JCOMMOPS organization.

At its session in La Jolla in October 2006, the Panel acted very positively to set aside funds to support these new activities, and instructed its chair to convene an Executive Board to make decisions on the Panel's behalf during the intersessional period. The session itself,

and the scientific and technical workshop which preceded it, embraced the spirit of outreach to new observing systems and communities, and I feel confident that the Panel is now well placed to continue its pivotal role in ensuring the smooth flow of observations and other data from the oceans to a wide user community, and in addressing new observational and organizational challenges.

David Meldrum
Chairperson, DBCP

SUMMARY

Introduction

WMO Resolution 10 (EC-XXXVII) and IOC Resolution EC-XIX.7, established the Drifting Buoy Cooperation Panel in 1985. In 1993 the governing bodies of IOC and WMO agreed to change the name of the Panel to the Data Buoy Cooperation Panel (DBCP) and to slightly modify its terms of reference, so that the Panel might also provide any international coordination required for 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 Observations Programme Area of the Joint WMO-IOC Technical Commission for Oceanography and Marine Meteorology (JCOMM).

1. Current and Planned Programmes

15 countries, 8 action groups and two data management centres submitted reports on their data buoy activities

2. Data Flow

In January 2006, 1384 drifting buoys reported their data on GTS. In December 2006, this number was 1349, and 433 of them reported air pressure. In December 2006, the DBCP was monitoring 202 moored buoys in the high seas.

During the year, about 1 million drifting buoy observations and 40000 moored buoy observations were reported on GTS every month in the BUOY format.

By August 2006, global data are being received in real time via 49 regional stations. However, real-time data reception from the South Atlantic and the South East Pacific regions still needs to be improved.

3. Data Quality

Through implementation of the DBCP quality control guidelines for GTS data, the quality of air pressure and sea surface temperature data has remained excellent. Mean RMS (Obs-FG) for drifting buoy air pressure data based on ECMWF buoy monitoring statistics now reaches a level of about 0.84 hPa (August 2006). For the period March to August 2006, 76.18% of the RMS (Obs-FG) values were lower than 1 hPa. The percentage of gross errors (ECMWF) is usually less than 1%. A study regarding the quality of Sea surface Temperature from drifting buoys is planned for next year.

4. Data Archival

The Marine Environmental Data Service (MEDS) in Canada has acted as the RNODC for drifting buoys on behalf of IOC and WMO since 1986. During the period August 2005 to July 2006, MEDS has archived an average of 860,000 BUOY reports per month and received reports from an average of 1490 buoys per month, an increase of 345,000 reports (67%) and an increase of 320 buoys (27%) from last year respectively. On average, each drifter is reporting approximately 19 messages a day. Of the BUOY messages received, 98% of the locations were quality flagged as good and required on average 28.5 days from observation to reach the archive. The size of the drifting buoy archive continues to grow with about 42.5 million records containing 18 Gigabytes of data from 1978-2005.

The SOC for Drifting Buoys has been run continuously during year 2005-2006, by Météo-France in Toulouse and Brest as well as by the inter-agency programme Coriolis. 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 Argos are main aspects of this SOC, beside regular exchanges with other data centres,

measurements teams and agencies, and with users. It was noticed that (i) the number of BUOY reports dramatically increased in 2006 because of the Argos multi-satellite option now provided free of charge, (ii) the number of WAVEOB reports keeps regularly rising, with a strong seasonality.

5. Technical Developments

The BUFR compression capability had been implemented by Service Argos within its GTS sub-system was implemented in September 2005 but due to operational problems could only effectively stat in January 2006.

A new BUFR template for buoy directional and non-directional wave data was endorsed by the WMO CBS Expert Team on Data Respresentation and Codes (ET/DRC) for validation by May 2006. Work is underway within the CBS ET/DRC for adopting a CREX template for sea level and a draft template is available.

The Evaluation Subgroup continued to analyze technical issues regarding the standard SVP-B and SVP-BW (WOTAN) drifters. The development of another new drifter type was also initiated during the intersessional period.

The twenty-second session of the DBCP decided to establish an Iridium drifter Pilot Project for a period of two years as of November 2006.

6. Communications System Status

The Argos system has continued to provide a reliable service for recovery and processing of buoy data in real or quasi real-time. Various system enhancements were undertaken during the year. 49 Local User Terminal are now connected to the Argos system and more than 800 data sets per day (100 STIP data sets, 700 Real-time data sets) from all receiving stations are processed in each Argos global data processing center.

7. Capacity Building

At its twenty-second session, the Panel approved a proposal for “a training course on buoy and fixed-platform data management” which was developed in close cooperation with the Ocean Data and Information Network for Africa (ODINAFRICA). The primary goal for the workshop will be to provide training to buoy operators and researchers in African nations on application and management of the data from in situ oceanographic and marine meteorological observations. The training course is planned in June 2007, at the IODE Project Office, Oostende, Belgium.

8. Administrative Matters

The Panel has nine action groups: the EUCOS Surface Marine Programme of the network of European Meteorological Services (E-SURFMAR); the Global Drifter Programme (GDP); the International Arctic Buoy Programme (IABP); the International Buoy Programme for the Indian Ocean (IBPIO); the WCRP-SCAR International Programme for Antarctic Buoys (IPAB); the International South Atlantic Buoy Programme (ISABP); the DBCP-PICES North Pacific Data Buoy Advisory Panel (NPDBAP); the Tropical Moored Buoys Implementation Panel (TIP); and OceanSITES.

The Panel's Technical Coordinator, Mr Etienne Charpentier, was employed by UNESCO/IOC as a fund-in-trust expert and was located with CLS/Service Argos in Toulouse, France. He resigned on 31 January 2006. Following a formal recruitment process, the new Technical Coordinator, Ms Hester Viola commenced work for the Panel as of 1 July 2006 and based at the same location. New arrangement for the Technical Coordinator’s employment consists of a UNESCO Appointment of Limited Duration (ALD); grade P2, whereby an initial contract might be extended up to a maximum total of four years

Seven countries contributed on a voluntary basis to the financial support of the Panel and/or SOOP in 2006: Australia, Canada, Germany, India, New Zealand, South Africa, and the USA. European countries – including Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Netherlands, Norway, Portugal, Spain, Sweden and the United Kingdom – have contributed through E-SURFMAR.

For the financial year January to December 2007, the Panel agreed the following budget with indicative figures for upper limits of expenditure:

A. Expenditures	**US$**
Technical coordinator	93,000
Technical coordinator's missions	20,000
JCOMMOPS logistics support	15,000
Travel of Chairman, Vice-chairmen	2,100
JTA activities including JTA chairman's contract and travel	15,000
Outreach and Publications	10,000
JCOMMOPS development	10,000
Provision for possible JCOMMOPS relocation	20,000
New technical evaluation	30,000
Capacity Building	25,000
Collaborative arrangements	20,000
WMO charges (1% of fund management through WMO)	1,000
Contingencies	50,000
TOTAL	**311,100**

RÉSUMÉ

Introduction

Le Groupe de coopération pour la mise en œuvre des programmes de bouées dévirantes (DBCP) a été établi en 1985 aux termes de la résolution 10 (EC-XXXVII) de l'OMM et de la résolution EC-XIX.7 de la COI. En 1993, les organes directeurs de la COI et de l'OMM ont décidé de le rebaptiser Groupe de coopération pour les programmes de bouées de mesure (DBCP) et d'en modifier légèrement le mandat afin qu'il puisse également assurer la coordination internationale requise pour les programmes de bouées ancrées sur lesquels reposent les grands programmes de l'OMM et de la COI (résolution XVII-6 de l'Assemblée de la COI et résolution 9 (EC-XLV de l'OMM). Il fait désormais partie du domaine d'activité relatif aux observations de la Commission technique mixte OMM/COI d'océanographie et de météorologie maritime (CMOM).

1. Programmes actuels et programmes prévus

Quinze pays, huit groupes d'action et deux centres de gestion des données ont rendu compte de leurs activités relatives aux bouées de mesure.

2. Acheminement des données

En janvier 2006, 1 384 bouées dérivantes ont diffusé leurs données sur le SMT. En décembre 2006 ce chiffre était de 1 349 et 433 de ces bouées transmettaient des données sur la pression atmosphérique. En décembre 2006, le DBCP contrôlait 202 bouées ancrées en haute mer.

Durant l'année, environ un million d'observations de bouées dérivantes et 40 000 de bouées ancrées ont été transmises chaque mois sur le SMT en code BUOY.

Depuis août 2006, les données transmises au niveau mondial sont reçues en temps réel par 49 stations régionales. Toutefois, il convient d'améliorer la réception en temps réel des données provenant des régions de l'Atlantique Sud et du Pacifique Sud-Est.

3. Qualité des données

Grâce à l'application des directives de contrôle de la qualité du DBCP pour les données transmises sur le SMT, la qualité des données relatives à la pression atmosphérique et à la température de surface de la mer est restée excellente. En ce qui concerne la mesure de la pression atmosphérique par les bouées dérivantes, les statistiques ont montré que l'écart quadratique moyen entre les données observées et le champ en première approximation du modèle météorologique du CEPMMT était de l'ordre de 0,84 hPa en août 2006. Pour la période comprise entre mars et août 2006, 76,18 % des valeurs de l'écart quadratique moyen étaient inférieures à 1 hPa. Le pourcentage d'erreurs flagrantes (CEPMMT) est généralement inférieur à 1 %. Il est prévu d'entreprendre l'année prochaine une étude sur la qualité des données relatives à la température de surface de la mer provenant des bouées dérivantes.

4. Archivage des données

Le Service des données sur le milieu marin (SDMM), qui se trouve au Canada, fait office depuis 1986 de centre national de données océanographiques responsable (CNDOR) pour le compte de la COI et de l'OMM. Entre août 2005 et juillet 2006, le SDMM a archivé en moyenne 860 000 messages BUOY par mois et reçu des messages de 1 490 bouées en moyenne par mois, soit une augmentation de 345 000 messages (67 %) et de 320 bouées (27 %) par rapport à l'année précédente. En moyenne, chaque bouée dérivante fournit 19 messages par jour. Pour ce qui est des messages BUOY reçus, 98 % des localisations ont été estimées bonnes et le passage du stade de l'observation à celui de

l'archivage a pris en moyenne 28,5 jours. La taille des archives sur les bouées dérivantes continue de croître (environ 42,5 millions de messages contenant 18 Giga-octets de données observées de 1978 à 2005).

Les activités du Centre océanographique spécialisé pour les bouées dérivantes ont été conduites au cours de l'année 2005-2006 par Météo-France à Toulouse et à Brest ainsi que dans le cadre du programme interinstitutions Coriolis. Météo-France procède chaque jour à la collecte et à l'archivage des messages de bouées océaniques. Outre ses échanges réguliers avec d'autres centres de données, équipes de mesure et autres institutions ainsi qu'avec les usagers, le Centre en question apporte son concours au projet Coriolis (www.coriolis.eu.org), et collabore avec le JCOMMOPS et le programme Argos. On a relevé que i) le nombre de messages BUOY avait considérablement augmenté en 2006, grâce à l'utilisation plus large du système multisatellite Argos désormais gratuite, et ii) que le nombre de messages WAVEOB continuait de croître régulièrement avec de fortes fluctuations saisonnières.

5. Évolution technique

Le service Argos a mis en place en septembre 2005 un système de compression des messages BUFR dans le cadre du SMT, mais en raison de problèmes techniques celui-ci n'est devenu véritablement opérationnel qu'en janvier 2006.

Un nouveau modèle de codage en BUFR pour les données de bouées relatives au spectre directionnel et non directionnel des vagues a été approuvé par l'Équipe d'experts pour la représentation des données et les codes relevant de la CSB, et devrait être validé en mai 2006. L'équipe d'experts en question étudie la possibilité d'adopter un modèle de codage en CREX pour les données relatives au niveau de la mer, modèle qui existe déjà à l'état de projet.

Le Sous-groupe de l'évaluation a poursuivi l'analyse des questions techniques concernant les bouées dérivantes SVP-B et SVP-BW (WOTAN). Durant l'intersession, la mise au point d'un nouveau type de bouées dérivantes a aussi été amorcée.

À sa vingt-deuxième session, le DBCP a décidé de mettre en place un projet pilote de bouées dérivantes équipées d'un système Iridium pour une période de deux ans à compter de novembre 2006.

6. État de fonctionnement du système de télécommunications

Le système Argos continue d'assurer, avec toute la fiabilité voulue, la récupération et le traitement en temps réel ou quasi réel des données fournies par les bouées. Quelques améliorations ont été apportées au système durant l'année écoulée. Quarante-neuf terminaux locaux d'utilisateurs sont aujourd'hui reliés au système Argos et plus de 800 jeux de données (100 jeux de données STIP, 700 jeux de données en temps réel) provenant de toutes les stations de réception sont traités quotidiennement dans chaque centre mondial de traitement des données Argos.

7. Renforcement des capacités

À sa vingt-deuxième session, le Groupe de coopération pour les programmes de bouées de mesure a approuvé une proposition visant à organiser un cours de formation sur la gestion des données provenant des bouées, proposition élaborée en coopération étroite avec le Réseau d'échange de données et d'informations sur l'océan en Afrique (ODINAFRICA). Ce cours aura pour objectif principal de donner aux exploitants de bouées et aux chercheurs des pays d'Afrique une formation à l'application et à la gestion des données d'observation océanographiques et de météorologie maritime, *in situ*. Il sera organisé en juin 2007 dans les locaux du bureau des projets pour l'IODE, à Ostende (Belgique).

8. Questions administratives

Le Groupe de coopération compte neuf groupes d'action: le Programme maritime d'observation en surface d'EUCOS (E-SURFMAR), qui relève d'EUMETNET, le Programme mondial de flotteurs lagrangiens de surface, le Programme international de bouées de l'Arctique (IABP), le Programme international PMRC-SCAR de bouées pour l'océan Indien (PIBOI), le Programme international de bouées de l'Antarctique (IPAB), le Programme international de bouées de l'Atlantique Sud (ISABP), le Groupe consultatif DBCP-PICES pour les programmes de bouées de mesure dans le Pacifique Nord, le Groupe de mise en œuvre du programme de bouées ancrées dans les mers tropicales et le projet OceanSITES.

Le coordonnateur technique du Groupe de coopération, M. Etienne Charpentier, recruté comme expert par la COI de l'UNESCO au titre d'un fonds d'affectation spéciale et basé à Toulouse (France) dans les locaux du CLS/Service Argos, a donné sa démission le 31 janvier 2006. À l'issue d'un processus officiel de recrutement, la nouvelle coordonnatrice technique, Mme Hester Viola, est entrée en fonction au CLS le 1er juillet 2006. Le nouveau contrat de travail du coordonnateur technique consiste en un engagement de durée limitée (EDL) de l'UNESCO au grade P.2, le contrat initial pouvant être prolongé pour une période totale n'excédant pas quatre ans.

En 2006, sept pays ont apporté, à titre volontaire, leur soutien financier au Groupe de coopération et/ou au SOOP, à savoir l'Afrique du Sud, l'Allemagne, l'Australie, le Canada, les États-Unis d'Amérique, l'Inde et la Nouvelle-Zélande. Plusieurs pays européens (l'Allemagne, la Belgique, le Danemark, l'Espagne, la Finlande, la France, la Grèce, l'Irlande, l'Islande, l'Italie, la Norvège, les Pays-Bas, le Portugal, le Royaume-Uni et la Suède) ont apporté leur contribution par l'intermédiaire du réseau E-SURFMAR.

Pour l'exercice financier allant de janvier à décembre 2007, le Groupe de coopération a arrêté le budget ci-après, les chiffres indiqués correspondant, pour chaque rubrique, au montant maximal des dépenses pouvant être engagées:

A. Dépenses	**Dollars É.-U.**
Coordonnateur technique	93 000
Missions du coordonnateur technique	20 000
Soutien logistique du JCOMMOPS	15 000
Déplacements du président et des vice-présidents	2 100
Activités liées à l'Accord tarifaire collectif concernant le système Argos (JTA) (contrat et frais de voyage du président du JTA)	15 000
Information et publications	10 000
Développement du JCOMMOPS	10 000
Provision pour un déménagement éventuel du JCOMMPS	20 000
Nouvelle évaluation technique	30 000
Renforcement des capacités	25 000
Accords de coopération	20 000
Frais de l'OMM (1 % des fonds gérés par l'OMM)	1 000
Dépenses imprévues	50 000
TOTAL	**311 100**

RESUMEN

Introducción

El Grupo de cooperación de las boyas a la deriva fue creado en 1985 por la Resolución 10 (EC-XXXVII) de la OMM y por la Resolución EC-XIX.7 de la COI. En 1993, los órganos rectores de la OMM y de la COI decidieron cambiar el nombre del grupo por el de Grupo de cooperación sobre boyas de acopio de datos y modificar ligeramente su mandato, para que se ocupara también de la coordinación internacional que exigen los programas de boyas ancladas en apoyo a los principales programas de la OMM y de la COI (Resolución 9 (EC-XLV) de la OMM y Resolución XVII-6 de la COI). En la actualidad, el Grupo forma parte del sector de actividad sobre las observaciones de la Comisión Técnica Mixta OMM-COI sobre Oceanografía y Meteorología Marina (CMOMM).

1. Programas actuales y programas previstos

Quince países, ocho grupos de acción y dos centros de gestión de datos han presentado informes sobre sus actividades en materia de recopilación de datos procedentes de boyas.

2. Flujo de datos

En enero de 2006, 1.384 boyas a la deriva transmitieron sus datos por el SMT. En diciembre de 2006, esta cifra era de 1.349, de las cuales 433 transmitieron datos sobre presión atmosférica. En diciembre de 2006, el Grupo de cooperación sobre boyas de acopio de datos controlaba 202 boyas fondeadas en alta mar.

A lo largo del año, cada mes se transmitieron por el SMT cerca de un millón de observaciones de boyas a la deriva en formato BUOY y 40.000 observaciones de boyas fondeadas.

Desde agosto de 2006, 49 estaciones regionales reciben en tiempo real los datos transmitidos a nivel mundial. Sin embargo, debe mejorarse la recepción en tiempo real de los datos procedentes de las regiones del Atlántico Sur y del Pacífico Sudeste.

3. Calidad de los datos

Gracias a la aplicación de las directrices de control de la calidad del Grupo de cooperación para los datos trasmitidos por el SMT, la calidad de los datos sobre la presión atmosférica y la temperatura de la superficie del mar ha seguido siendo excelente. En la actualidad, el promedio de la media cuadrática de los datos sobre la presión atmosférica de las boyas a la deriva, que se basa en las estadísticas sobre supervisión de las boyas del Centro europeo de predicción meteorológica a medio plazo (CEPMMP), es de unos 0,84 hPa (agosto de 2006). Durante el período comprendido entre marzo y agosto de 2006, el 76,18% de los valores de la media cuadrática eran inferiores a 1 hPa. El porcentaje de errores flagrantes (CEPMMP) suele ser inferior al 1%. Se prevé que el próximo año se publique un estudio sobre la calidad de la temperatura en la superficie del mar de las boyas a la deriva.

4. Archivo de los datos

Desde 1986, el Servicio de datos sobre el medio marino (MEDS) de Canadá asume las funciones de Centro nacional responsable de los datos oceanográficos de las boyas a la deriva, en nombre de la COI y de la OMM. Durante el período comprendido entre agosto de 2005 y julio de 2006, el MEDS ha archivado aproximadamente 860.000 informes BUOY por mes y ha recibido informes de un promedio de 1.490 boyas por mes, lo cual supone un aumento de 345.000 informes (67%) y de 320 boyas (27%) con respecto al año pasado. En promedio, cada derivador transmite aproximadamente 19 mensajes diarios. En

lo que respecta a los mensajes BUOY recibidos, el 98% de las localizaciones se han considerado buenas y la transición de la fase de observación a la de archivo ha tardado una media de 28,5 días. El tamaño de los archivos sobre boyas a las deriva sigue aumentando y consta de unos 42,5 millones de mensajes que contienen 18 Gigabytes de datos observados entre 1978 y 2005.

Las actividades del Centro oceanográfico especializado para las boyas a la deriva fueron dirigidas entre 2005 y 2006 por Météo-France en Toulouse y Brest, así como en el marco del Programa interorganismos Coriolis. Météo-France realiza cada día la recopilación y el archivo de informes procedentes de boyas del océano mundial. La colaboración del proyecto Coriolis *(www.coriolis.eu.org)* con el Centro de apoyo a las plataformas de observación *in situ* de la CMOMM y el sistema Argos es uno de los aspectos principales de este Centro oceanográfico especializado, además de los intercambios periódicos con otros centros de datos, equipos y entidades de medición, y usuarios. Se observó que i) el número de informes de boyas aumentó drásticamente en 2006 debido a la opción multisatelital de Argos que ahora puede obtenerse gratuitamente, ii) el número de informes WAVEOB aumenta regularmente con fuertes variaciones estacionales.

5. Adelantos técnicos

El Servicio Argos examinó la posibilidad de comprimir los mensajes BUFR en el marco de su subsistema del SMT en septiembre de 2005 pero, a causa de problemas operacionales, tan sólo pudo empezar a funcionar en enero de 2006.

El Equipo de expertos de la CSB de la OMM sobre representación de datos y códigos aprobó un nuevo modelo de clave BUFR para los datos transmitidos por boyas sobre las olas (aspectos direccionales y otros) para que se validara en mayo de 2006. Se está trabajando con el Equipo de expertos de la CSB de la OMM sobre representación de datos y códigos para que se apruebe un nuevo modelo de clave CREX para el nivel del mar y se dispone de un proyecto de modelo.

El Subgrupo de evaluación siguió analizando cuestiones técnicas relativas a las boyas a la deriva SVP-B y SVP-BW (WOTAN). La elaboración de un nuevo tipo de boyas a la deriva se inició en el transcurso del período entre reuniones.

En la vigésima segunda reunión del Grupo de cooperación sobre boyas de acopio de datos se decidió crear un proyecto piloto del sistema Iridium sobre los derivadores del GCBD que funcionará durante un período de dos años a partir de noviembre de 2006.

6. Situación del sistema de comunicación

El sistema Argos sigue facilitando, con la fiabilidad adecuada, un servicio de recuperación y proceso en tiempo real o casi real de los datos suministrados por las boyas. Se han introducido diversas mejoras en el sistema durante el año y se ha previsto seguir mejorándolo durante los próximos años. En la actualidad, 49 terminales locales de usuario están conectadas al sistema Argos y en cada centro mundial de proceso de datos del sistema Argos se procesan más de 800 conjuntos de datos diarios (100 conjuntos de datos STIP, 700 conjuntos de datos en tiempo real) procedentes de todas las estaciones receptoras.

7. Creación de capacidad

En su vigésima segunda reunión, el Grupo aprobó una propuesta para organizar “un curso de formación sobre gestión de datos obtenidos de boyas y de plataformas fijas” en estrecha colaboración con la Red de Datos e Información Oceanográficos para África (ODINAFRICA). El objetivo principal de este cursillo es proporcionar formación a los operadores e investigadores de boyas de los países de África respecto de la aplicación y la gestión de datos obtenidos de las observaciones oceanográficas y marinas *in situ*. Se prevé

que ese curso de formación se imparta en junio de 2007 en la Oficina del Proyecto para el programa IODE en Oostende (Bélgica).

8. Cuestiones administrativas

El Grupo de cooperación cuenta con nueve grupos de acción: el Programa de Observación de la Superficie del Mar EUCOS, de la Red de Servicios Meteorológicos Europeos (E-SURFMAR); el Programa Mundial de Boyas a la Deriva (GDP); el Programa Internacional de Boyas en el Ártico (PIBA); el Programa Internacional de Boyas en el Océano Índico (IBPIO); el Programa Internacional de Boyas en el Antártico (PIBAn) del PMIC y el SCAR; el Programa Internacional de Boyas del Atlántico Sur (PIBAS); el Grupo consultivo de expertos sobre boyas de recopilación de datos en el Atlántico Norte (NPDBAP) del Grupo de cooperación sobre boyas de acopio de datos y la Organización del Pacífico Norte para las Ciencias del Mar (PICES); el Grupo de ejecución de boyas fondeadas en los mares tropicales (TIP); y el OceanSITES.

El Sr. Etienne Charpentier, coordinador técnico del Grupo de cooperación, fue contratado por la UNESCO/COI como experto en fondo de fideicomiso en los locales del CLS/Servicio Argos en Toulouse (Francia). Dimitió el 31 de enero de 2006. Después de un proceso oficial de selección, la nueva coordinadora técnica, la Sra. Hester Viola empezó a colaborar con el Grupo el 1º de julio de 2006 en los mismos locales. Las nuevas disposiciones para el puesto de coordinador técnico incluyen un nombramiento de duración limitada de la UNESCO (ALD) en la categoría P2, por el que un contrato inicial puede ampliarse hasta un máximo de cuatro años.

En 2006, siete países brindaron una ayuda financiera voluntaria al Grupo de cooperación y/o al SOOP, a saber: Alemania, Australia, Canadá, India, Nueva Zelandia, Sudáfrica y los Estados Unidos de América. Los países europeos, en particular Alemania, Bélgica, Dinamarca, Finlandia, Francia, Grecia, Islandia, Irlanda, Italia, Noruega, Países Bajos, Portugal, España, Suecia y el Reino Unido, realizaron su contribución a través de la red E-SURFMAR.

Para el ejercicio financiero comprendido entre enero y diciembre de 2007, el Grupo acordó el siguiente presupuesto en el que figuran cifras indicativas de los límites máximos de los gastos:

A. Gastos	**Dólares de los EE.UU.**
Coordinador Técnico	93.000
Misiones del Coordinador Técnico	20.000
Apoyo logístico del Centro de apoyo a las plataformas de observación *in situ* de la CMOMM	15.000
Gastos de viaje del presidente y vicepresidentes	2.100
Actividades relativas al JTA incluido el contrato y los gastos de viaje del presidente del JTA	15.000
Divulgación y publicaciones	10.000
Desarrollo del Centro de apoyo a las plataformas de observación *in situ* de la CMOMM	10.000
Disposiciones para el posible traslado del Centro de apoyo a las plataformas de observación *in situ* de la CMOMM	20.000
Nueva evaluación técnica	30.000
Creación de capacidad	25.000
Acuerdos de colaboración	20.000
Gastos de la OMM (1% de los fondos gestionados por la OMM)	1.000
Gastos imprevistos	50.000
TOTAL	**311.100**

РЕЗЮМЕ

Введение

Группа сотрудничества в области дрейфующих буев была учреждена в 1985 г. резолюцией 10 ВМО (EC-XXXVII) и резолюцией МОК EC-XIX.7. В 1993 г. руководящие органы МОК и ВМО решили переименовать ее в группу экспертов по сотрудничеству в области буев для сбора данных (ГСБД) и несколько изменить круг ее обязанностей с тем, чтобы она могла также обеспечивать международную координацию, которая требуется для программ по заякоренным буям, поддерживающим основные программы ВМО и МОК (резолюция МОК XVII-6 и резолюция 9 ВМО (EC-XLV)). В настоящее время эта группа действует в рамках программной области – Наблюдения Совместной технической комиссии ВМО/МОК по океанографии и морской метеорологии (СКОММ).

1. Текущие и планируемые программы

15 стран, восемь групп действий и два центра управления данными представили отчеты о своей деятельности в области буев для сбора данных.

2. Поток данных

В январе 2006 г. 1384 дрейфующих буев передавали свои данные в ГСТ. В декабре 2006 г. в их число составило 1349, их которых 433 передавали данные об атмосферном давлении. В декабре 2006 г. ГСБД осуществляла мониторинг за 202 заякоренными буями в открытом море.

В течение этого года около 1 млн данных наблюдений с дрейфующих буев и 40 000 данных наблюдений с заякоренных буев передавались в ГСТ каждый месяц в формате BUOY.

К августу 2006 г. глобальные данные поступали в реальном масштабе времени через 49 региональных станций. Однако все еще необходимо улучшать прием данных в реальном масштабе времени из регионов южной части Атлантики и юго-восточной части Тихого океана.

3. Качество данных

По-прежнему остается отличным качество данных об атмосферном давлении и температуре поверхности моря благодаря соблюдению руководящих принципов контроля качества ГСБД для данных ГСТ. Средняя среднеквадратического значения (Obs-FG) для данных об атмосферном давлении, получаемых с дрейфующих буев, на основе статических данных ЕЦСПП мониторинга буев в настоящее время достигла уровня около 0,84 гПа (август 2006 г.). За период с марта по август 2006 г. 76,18 % среднеквадратических значений были ниже 1 гПа. Грубые ошибки в процентном выражении (ЕЦСПП) обычно составляли менее 1 %. В следующем году планируется провести исследование качества данных о температуре поверхности моря, получаемых с дрейфующих буев.

4. Архивация данных

Служба данных о морской среде (МЕДС) Канады действует в качестве ОНЦОД для дрейфующих буев от имени МОК и ВМО с 1986 г. В течение периода с августа 2005 г. по июль 2006 г. МЕДС архивировала в среднем 860 000 сводок BUOY в месяц и получала сводки в среднем от 1490 буев в месяц, что составляет увеличение на 345 000 сводок (67 %) и на 320 буев (27 %) соответственно по сравнению с прошлым годом. В среднем каждый буй передавал приблизительно 19 сообщений в день. Из всех полученных сообщений в формате BUOY 98 % данных по определению местоположения буя были хорошего качества, и в среднем требовалось 28,5 дней с момента наблюдения для того, чтобы архивировать эти данные. Размер архива по

дрейфующим буям продолжает расти и составляет около 42,5 миллионов записей объемом 18 гигабайт данных за период с 1978 по 2005 гг.

Специализированный океанографический центр (СОЦ) для дрейфующих буев управлялся в течение 2005-2006 гг. под руководством МетеоФранс в Тулузе и Бресте, а также межведомственной программы Кориолис. Ежедневный сбор и архивирование сводок с буев по Мировому океану выполняется МетеоФранс. Сотрудничество в рамках проекта Кориолис (*www.coriolis.eu.org*), а также сотрудничество со СКОММОПС и Аргос являются основными элементами деятельности этого СОЦ, помимо регулярного обменного взаимодействия с другими центрами данных, наблюдательными группами и учреждениями, и также с пользователями. Было отмечено, что (i) в 2006 г. значительно возросло количество сводок BUOY, т. к. в настоящее время пользование многоспутниковой системой Аргос осуществляется бесплатно, (ii) число сводок WAVEOB продолжает постоянно увеличиваться с четко выраженной сезонностью.

5. Технические мероприятия

Служба Аргос внедрила с сентября 2005 г. в своей подсистеме ГСТ функциональные возможности для компрессии данных BUFR, которые вследствие операционных проблем смогли осуществляться эффективным образом только с января 2006 г.

Матрица новой формы представления данных о направленных и ненаправленных волнах, полученных с буев, в BUFR была одобрена группой экспертов КОС ВМО по представлению данных и кодам (ГЭ-ПДК) для проверки ее использования на практике до мая 2006 г. В рамках ГЭ-ПДК проводится работа по принятию матрицы CREX для данных об уровне моря, проект которой имеется.

Подгруппа по оценке продолжала анализировать технические аспекты, касающиеся стандарта SVP-B и SVP-BW (исследования методов расчета ветра по окружающему шуму) (WOTAN) для дрейфующих буев. В течение этого межсессионного периода были начаты работы по разработке другого нового типа дрейфующего буя.

Двадцать вторая сессия ГСБД приняла решение об учреждении экспериментального проекта по использованию спутниковой системы Иридиум для сбора данных с дрейфующих буев.

6. Состояние системы связи

Система Аргос продолжила предоставлять надежное обслуживание для получения и обработки данных с буев в реальном и почти реальном масштабе времени. В течение этого года были предприняты различные системные расширения технических возможностей. В настоящее время 49 терминалов местных пользователей подсоединены к системе Аргос, и в каждом центре обработки глобальных данных Аргос обрабатывается более 800 комплектов данных в день (100 комплектов данных в STIP, 700 комплектов данных в реальном масштабе времени) со всех станций приема.

7. Наращивание потенциала

На своей двадцать второй сессии группа экспертов утвердила предложение «об учебном курсе по управлению данными, поступающих с буев и фиксированных платформ», которое было разработано в тесном сотрудничестве с Сетью океанических данных и информации для Африки (ОДИНАФРИКА). Основной целью семинара будет проведение обучения операторов буев и исследователей в африканских странах применению и управлению данными океанографических и морских метеорологических наблюдений в точке. Учебный курс планируется провести в июне 2007 г. в Бюро по проекту МООД, Оостенд, Бельгия.

8. Административные вопросы

Группа экспертов состоит из девяти групп действий: Приземная морская программа сети европейских метеорологических служб ЕВКОС (Е-СЮРФМАР); Глобальная программа по дрейфующим буям (ГПДБ); Международная программа по арктическим буям (МПАРБ); Международная программа по буям для Индийского океана (МПБИО); Международная программа ВПИК-СКАР по антарктическим буям (МПАБ); Международная программа по буям в Южной Атлантике (ИСАБП); консультативная группа экспертов ГСБД-СТОМИ по буям для сбора данных в северной части Тихого океана (НПДБАП), а также группа экспертов по осуществлению программы заякоренных буев в тропической зоне (ТИП) и Океан-СИТЕС.

Технический координатор группы экспертов г-н Этьен Шарпентье продолжил свою работу в ЮНЕСКО/МОК в качестве эксперта, нанятого за счет целевого фонда; его рабочее место располагалось в КЛС/Службе Аргос в Тулузе, Франция. Он ушел в отставку 31 января 2006 г. После выполнения официальной процедуры найма персонала, новый технический координатор г-жа Хестер Виола начала работу для Группы экспертов с 1 июля 2006 г.; ее рабочее место находится там же. Новая процедура для найма технического координатора заключалась в назначении ограниченной продолжительности ЮНЕСКО (НОП), пост Р2, в соответствии с которым первоначальный контракт может быть продлен максимально на срок до четырех лет.

В 2006 г. семь стран внесли свой добровольный вклад в финансовую поддержку для Группы экспертов и/или ППС, а именно: Австралия, Канада, Германия, Индия, Новая Зеландия, Южная Африка и США. Европейские страны, включая Бельгию, Данию, Финляндию, Францию, Германию, Грецию, Исландию, Ирландию, Италию, Нидерланды, Норвегию, Португалию, Испанию, Швецию и Соединенное Королевство, внесли свой вклад через Е-СЮРФМАР.

На следующий финансовый год январь-декабрь 2007 г. группа экспертов согласовала следующий бюджет с ориентировочными количественными показателями для максимальных размеров расходов:

А. Расходная статья	**долл. США**
Технический координатор	93 000
Поездки технического координатора	20 000
Материально-техническое обеспечение СКОММОПС	15 000
Поездки председателя, вице-председателей	2 100
Деятельность КТС, включая контракт председателя КТС и поездки	15 000
Информационно-пропагандистская деятельность и публикации	10 000
Развитие СКОММОПС	10 000
Обеспечение возможного изменения месторасположения СКОММОПС	20 000
Новая техническая оценка	30 000
Наращивание потенциала	25 000
Мероприятия по сотрудничеству	20 000
Расходы ВМО (1 % от фонда управления через ВМО)	1 000
Непредвиденные расходы	50 000
ИТОГО	**311 100**

REPORT

1. CURRENT AND PLANNED PROGRAMMES

Reports on national and international data buoy programmes are attached as *Annexes I* and *II* and reports by data management centres as *Annex III*.

2. DATA FLOW

2.1 Numbers of reporting buoys

In January 2006, data from a total of 1384 drifting buoys were collected and processed at the Argos Global Processing Centres in Toulouse, France and Largo, Maryland, USA, for distribution in real-time on GTS. This number was 1349 in December 2006. The table below summarizes the evolution of the number of buoys in the last 15 years. Thanks to the JCOMM/OCG phased in implementation plan as well as DBCP implementation strategy, most of the effort to reach that level has been made between 2003 and 2006.

Year	Drifting buoys on GTS
July 1991	264
July 1992	474
August 1993	548
September 1994	587
September 1995	631
September 1996	638
September 1997	581
August 1998	543
July 1999	728
July 2000	807
July 2001	763
July 2002	459
August 2003	752
July 2004	950
June 2005	1157
July 2006	1314

Table 1 : Status of drifting buoys reporting onto GTS

A detailed breakdown by country of "active" drifting buoys and moored buoys in the high seas, and those reporting onto the GTS is given for December 2006 in Annex IV, whereas Annex V shows the number of buoy data onto the GTS per country and sensor for December 2006.

Data availability index maps, produced on a monthly basis by Météo-France since February 1994 (see examples of these maps in Annex III), allow the identification of data sparse ocean areas for each kind of geophysical variable and therefore assist the various data buoy programmes in adjusting deployment strategies. The index is representative of how the requirements (such as of WWW, WCRP or GOOS-GCOS) are met: an index of 100 means that an average of eight observations of the variable concerned per day per five hundred km area has been received during the month. Maps are produced for air pressure, air temperature, sea surface temperature and wind. The index takes into account the observations transmitted in SHIP and BUOY code forms and another figure gives the percentage of BUOY reports from the total of SHIP plus BUOY reports received.

The maps show clearly the impact of the completed drifter array for global SST data, of the Tropical Moored Buoy Implementation Panel (TIP) for wind and sub-surface temperature data, of DBCP regional action groups such as the ISABP and of the Southern Ocean Buoy Programme (SOBP) for air pressure data, or of specific national or regional programmes such as US and Canadian moored buoy programmes, the MSNZ drifting buoy programme (air pressure), and the E-SURFMAR buoy programme (drifters and moorings).

2.2 Data reception

The regional processing center in Tokyo (Japan) encountered hardware problems in late 2005. During the maintenance, all services were provided by the Toulouse and Largo centers. Lima (Peru) and Jakarta (Indonesia) centers were functioning normally. Each of the six Argos processing centres - in Jakarta, Largo, Lima Melbourne, Tokyo, and Toulouse - operated without a major hitch in 2006.

The two global processing centers in Toulouse and Largo functioned as expected. More than 800 data sets per day (100 STIP data sets, 700 Real-time data sets) from all receiving stations are processed in each center. The regional processing centres in Jakarta Lima and Tokyo only process data sets from stations covering their region. Supplementary data providing global coverage are supplied by the Toulouse centre or by the Largo centre when necessary.

The data sets collected by the Bureau of Meteorology (BoM), the New Zealand Meteorological Service (NZMS), and other NMHS antennas worldwide are relayed to the Toulouse or the Largo Argos Global data Processing Centres.

Six new stations were added to the Argos network during the year. Four are in new locations: Cape Ferguson (Australia, NOAA), Seoul (Korea, Korean Meteorological Agency), Taiwan (National Taiwan Ocean University), Rothera (Antarctica, British Antarctic Survey). Two were added in Lima (Peru, CLS Peru) and Miami (FL, USA, NOAA). Three antennas were removed from the network. The Argos stations network now comprises 49 antennas as shown in annexes VIII and IX.

Figure 1 shows for the 22nd May 2006, the global data set (STIP) arrival times at the Toulouse and Largo processing centers during the day. Ideally, if there was no downloading and transmitting delay, one data set should be received every 100 minutes (1h40).

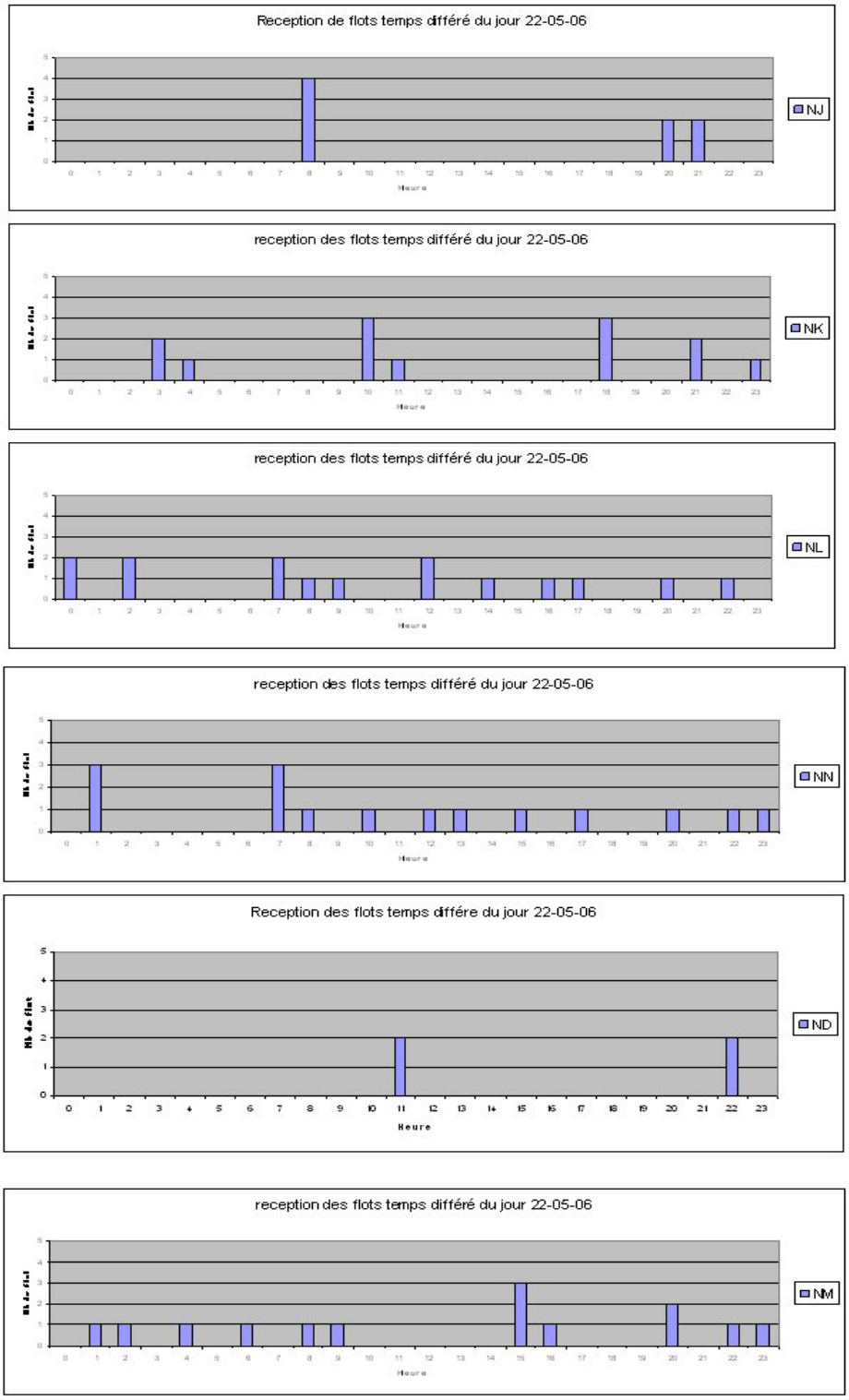

Figure 1

Table 2 shows the throughput time for stored data result delivery from NOAA-18, NOAA-17, NOAA-16 and NOAA-15.

Satellite Delivery	**NOAA-15, NOAA-16, NOAA-17 & NOAA-18**
< 1 h	**14 %**
< 1 h 30	**28 %**
< 2 h	**45 %**

< 2 h 30	**61 %**
< 4 h	**83 %**

Table 2

Those delivery times will be significantly improved when Svalbard station comes on line, since we will be receiving NOAA-18 blind orbits from the Eumetsat station and NOAA 17 & 15 blind orbits from the NPOESS antenna.

Table 3 below shows the throughput time for stored data result delivery from NOAA-12 and NOAA-14, two back-up satellites. The delivery of stored data is not done after every download for these two satellites but four satellites, and very soon five satellites with MetOp A, are now in table 1.

Satellite Delivery	**NOAA-12 & NOAA-14**
< 1 h	**3 %**
< 1 h 30	**6 %**
< 2 h	**12 %**
< 2 h 30	**26 %**
< 4 h	**62 %**

Table 3

Table 4 shows the throughput time for real-time result delivery from NOAA-18, NOAA-17, NOAA-16, NOAA-15, NOAA-14 and NOAA-12 and acquired by the 44 HRPT receiving stations.

Satellite Delivery	**NOAA-12, NOAA-14 NOAA-15, NOAA-16 NOAA-17 & NOAA-18**
< 10 minutes	**12 %**
< 15 minutes	**38 %**
< 30 minutes	**82 %**
< 45 minutes	**89 %**

Table 4

Figure 2 shows, per 30°x30° square, the real time mean data availability delay and the percentage of data received in real time via the 49 regional stations during the month of July 2006. It also shows the differed time mean data availability delay for the rest of the data. The ocean regions where efforts must be done to provide more data in real-time are

- South Atlantic Ocean,
- South-East Pacific Ocean,
- North of Indian Ocean (Hyderabad station is not functioning properly).

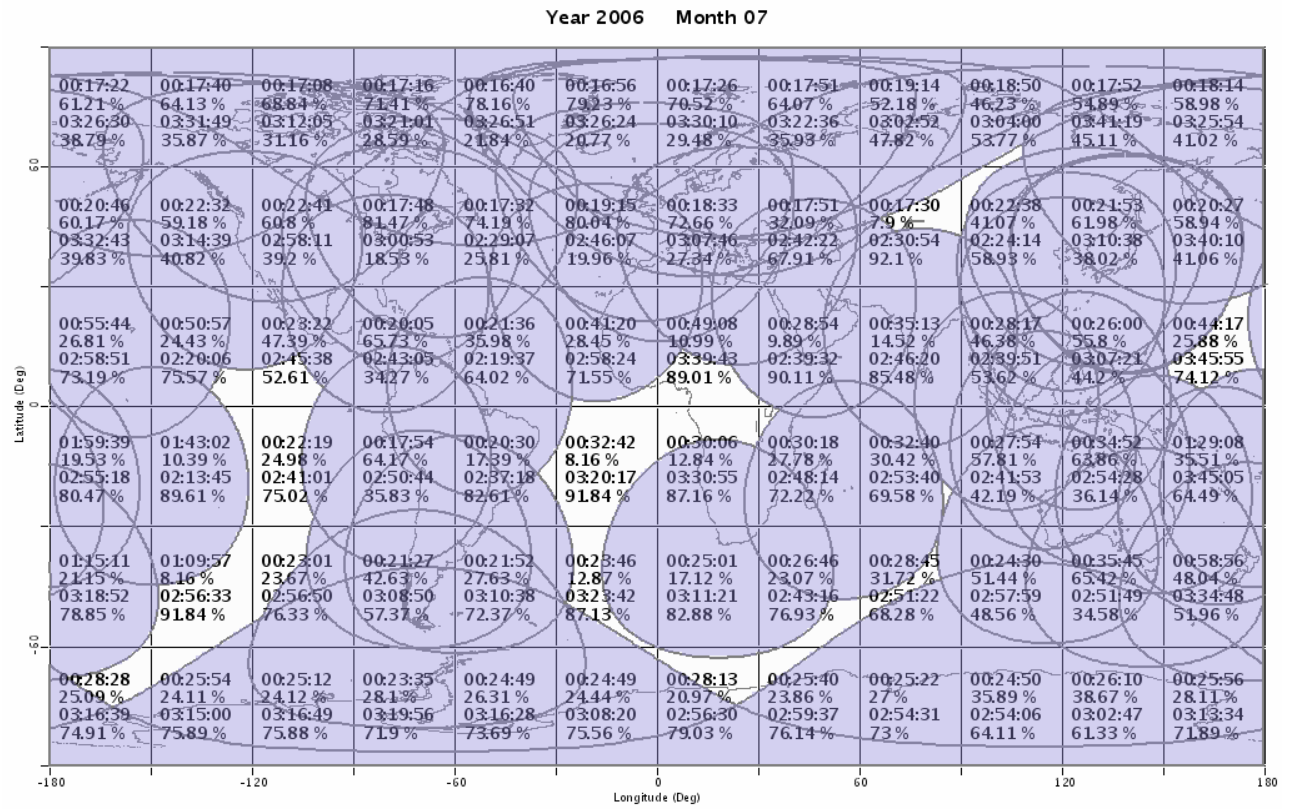

Figure 2
30°x30° squares
1st row: Real time mean data availability delay
2nd row: Percentage of data received in real time
3rd row: Differed time mean data availability delay
4th row: Percentage of data not received in real time

Facilities at Barrow, Alaska are being enhanced thanks to NOAA/NESDIS commitments for required software upgrades, which might be implemented after 2006. NOAA continues to work to collect blind orbit data from Svalbard Norway and expects to resolve obstacles after the successful check out of the MetOp satellite in the spring 2007. NOAA has updated Monterey CA, Oahu Hawaii, Anchorage AK, Wallops VA, and Fairbanks AK to receive direct broadcast data from MetOp satellites. In 2007, NOAA will add Miami FL to the sites that are MetOp ready. These upgrades ensure the continuity of real time data collection.

In addition, use of Argos multi-satellite service permits to increase the number of reports distributed on GTS, including the number of timely reports.

3. DATA QUALITY

Complete information regarding the DBCP quality control guidelines can be found at the DBCP web site at http://www.dbcp.noaa.gov/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) are reported either via a mailing list (buoy-qir@vedur.is) which 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, and proposed remedial action (e.g. removing data from GTS, recalibration) are automatically forwarded to the buoy operators or persons responsible for GTS distribution of the data (PGC). Thanks to this system, PMOCs do not have to know who the PGCs are. The system works because the Technical Coordinator, acting as a focal point, maintains at JCOMMOPS a database of WMO numbers and associated PGCs.

Buoy monitoring statistics are produced by the Australian Bureau of Meteorology (BOM), the European Centre for Medium Range Weather Forecasts (ECMWF), the NOAA National Centers for Environmental Prediction (NCEP), the United Kingdom MetOffice, and Météo France. In addition, the Marine Environmental Data Service (MEDS) provides for quality information regarding location fixes. Specific QC tools are also provided via web pages by Météo France (http://www.shom.fr/meteo/qctools/), NCEP (http://www.ncep.noaa.gov/NCO/DMQAB/QAP/qcflags/), and JCOMMOPS. Other centres are encouraged to actively participate in the guidelines either for global data, regional data or specialized data.

During the period August 2005 to July 2006, 251 status change proposals were made by PMOCs. Most of these proposals have been made via the web page directly instead of the mailing list. All proposals made via the web page have been automatically forwarded (i) to the mailing list, and (ii) Programme GTS Coordinator (PGC).

Air Pressure

Mean RMS (Obs-FG) for drifting buoy air pressure data based on ECMWF buoy monitoring statistics now reaches a level of about 0.84 hPa (August 2006). For the period March to August 2006, 76.18% of the RMS (Obs-FG) values were lower than 1 hPa; another 17.78% between 1 and 2 hPa; 3.73% between 2 and 3 hPa; and less than 2.33% above 3 hPa. This highlights actual quality of both first guess surface pressure field and observational pressure data from drifting buoys. Quality of SVPB air pressure data is similar to global drifting buoy data. This is not as good as last year, where we had percentages in the order of 75.9%, 20.8%, 1.8%, and less than 1% respectively, in that the proportion of RMS values above 2hPa was almost double and there are fewer distributed in the 1-2hPa range. However, the fact that the proportion under 1hPa continues to fall, highlights the improving quality of both first guess surface pressure field and the observational pressure data from drifting buoys. These figures demonstrate that we have definitely reached a point where model and air pressure observations from buoys will continue to agree very well. The percentage of gross errors (ECMWF) is usually less than 1%.

Sea Surface Temperature

According to NCEP buoy monitoring statistics, RMS (Obs-FG) for SST data from drifting buoys is now at a level of about 0.65C (August 2006). A low of about 0.40C was observed in July 2006. On the other hand, percentage of gross errors, which were below 0.5% during the previous intersessional period then increased to, levels above 0.67 in early to mid 2006. This quality measure was at a level of about 0.28% in August 2006. Quality of SST from drifting buoys is of excellent quality.

It should however be noted that using the RMS of differences between the NCEP model analysis and the drifter SST data for estimating the SST quality has substantial limitations. The Global Drifter Programme will conduct a preliminary study showing 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.

Wind

According to ECMWF buoy monitoring statistics, RMS (Obs-FG) for wind speed data now reaches a level of about 2.01 m/s (August 2006). For the period March to August 2006, about 88% of mean RMS (Obs-FG) are less than 3m/s, about 6.5% between 3 and 4 m/s, and about 5% are larger than 4 m/s.

Since August 2005, percentages of gross errors have varied greatly. A peak of about 3.8% was observed in early 2006, though they have reduced in recent months, which, with the RMS errors improving significantly since last year - statistics below show comparisons with previous years – it can be said that there has been an improvement in quality and accuracy of data.

The increase last year in the percentage larger than 3 m/s has not continued into this year: with 11.68% in August 2006, 15.8% in June 2005, 12.1% in July 2004, and 11.1% in July 2003. The percentages less than 2m/s have increased dramatically compared to the previous two years, though the proportion between 2-3m /s lowering balances some of this. Overall, there are no obvious patterns of change identifiable in this data year to year.

4. DATA ARCHIVAL

The full reports of 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, and of the JCOMM Specialized Oceanographic Centre (SOC) for drifting buoys, operated by Météo-France, are given in Annex III.

5. TECHNICAL DEVELOPMENTS

5.1 Codes

BUFR compression

The BUFR compression problem has been fixed by CLS as of January 2006 and GTS distribution of compressed buoy data BUFR reports could be resumed as of this date.

CREX template for tidal data

Work is underway within the CBS ET/DRC for adopting a CREX template for sea level and a draft template is available.

BUFR template for buoy wave data

The BUFR template for buoy directional and non-direction wave data has been approved by the CBS ET/DRC for validation at its meeting in Muscat, Oman, 5-8 December 2005. The template in particular meets 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 in both the Atlantic Ocean and the Mediterranean Sea). At its twenty-second session, the Panel recommended that E-SURFMAR address the issue with PDE in order to eventually have PDE wave data distributed on GTS using that template and to seek validation. New BUFR template is described in annex VII.

Extending range of WMO numbers

The Panel agreed to propose an extension of buoy WMO identification numbers from the existing 5 digits to 7 digits. The extended WMO numbers would be allocated as following: 7 digit numbers in the general form of A1bWnnnnn and keeping compatibility with the “+500 rule”, i.e.

- Moorings: nnnnn in the range 00000 to 00499
- Drifters: 00500 to 99999

- OceanSITES: $A_1$8nnnnn, with nnnnn in the range 00000 to 00499
- Argo: no change, i.e. $A_1$9nnnnn

Existing numbers A1bWnnn will be considered equivalent to the new form A1bW00nnn. Numbers for moorings will be allocated independently from those for drifters (presently one number is allocated to both a mooring and a drifter with 500 added to the same country).

The Panel asked the Technical Coordinator to submit required BUOY code and BUFR template changes to the CBS.

5.2 SVPB Evaluation Sub-group

In 2006, the GDC continued the performance test of SVP drifters manufactured by Clearwater, Pacific Gyre, MetOcean and Technocean. The results showed much improvement during the year, and GDC decided that no further testing is needed at this time. In general, Panel members are happy with the performance of the surface drifters, although there are spotty instances of high failure rates that bear some investigation. There were high rates of wind sensor failures as well. The pressure-spiking problem appeared again this year in the Southern Oceans, although Panel members did not have sufficient time to analyze the data collected. Technocean and Pacific Gyre reworked their submergence sensors, and Pacific Gyre redesigned their antenna with good results for location performance.

Recommendations from the Drifter Technology workshop held in Reading, UK, 27-28 March 2006, are being implemented. The GDC evaluation of strain gauges for detection of drogue on/off has been completed. The study to see if submergence sensors can be used to calculate wave energy has yielded positive results. Work has been done on a low power GPS transmitter. The Panel needs clarification on the hourly SST requirement, as Panel drifters may already be meeting the need to delineate the diurnal and semi-diurnal signals. Recommendations from the drifter technology workshop should be pursued during the current intersessional period, and buoy operators and manufactures are encouraged to keep up the good work.

It is clear that buoy operators need to maintain close communications with manufacturers to quickly identify problems and work to get them resolved. In this regard, it is helpful to have a team dedicated to ensure that the flow of high quality data continues.

At its twenty-second session, 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. The Panel accepted with appreciation that Dr Bill Burnett (USA) would act as a new chairperson of the Evaluation Group.

6. COMMUNICATION SYSTEM STATUS

6.1 Argos system

6.1.1 Space segment

The basic service has been provided since December 2003 by NOAA-16 and NOAA-17. NOAA-18 (N), successfully launched on 20 May 2005 replaced the NOAA 16 as the operational afternoon spacecraft. All DCS instruments are operating nominally with the exception of a Data Recorder Unit (DRU) on NOAA 18. NOAA-18 (N), NOAA-15 (K), NOAA-14 (J) and NOAA-12 (D) are used as secondary satellites. MetOp-1 was launched on 19 October 2006 and replace NOAA 17 in the morning mission after its checkout phase. MetOP-1 is equipped with Argos-3 technology and provides for downlink capability. The next NOAA launch will be NOAA N' in 2008. The global and regional datasets they collect are delivered according to the "multi-satellite" service characteristics.

From **Satellite status**	July 02	May 03	July 03	October 03	Dec 03	June 04	May 05	August 06
Commissioning	NOAA-17	ADEOS-2					NOAA-18	
Basic service	NOAA-16 NOAA-15	NOAA-16 NOAA-15	NOAA-16 NOAA-15 ADEOS-2	NOAA-16 NOAA-15	NOAA-17 NOAA-16	NOAA-17 NOAA-16	NOAA-17 NOAA-16	NOAA-17 NOAA-16
Multi-satellite service (additional satellites)	NOAA-17 NOAA-14 NOAA-12 NOAA-11	NOAA-17 NOAA-14 NOAA-12 NOAA-11	NOAA-17 NOAA-14 NOAA-12 NOAA-11	NOAA-17 NOAA-14 NOAA-12 NOAA-11	NOAA-15 NOAA-14 NOAA-12 NOAA-11	NOAA-15 NOAA-14 NOAA-12	NOAA-18 NOAA-15 NOAA-14 NOAA-12	NOAA-18 NOAA-15 NOAA-14 NOAA-12
Lost				ADEOS-2				
Decommissioned						NOAA-11		

Table 5

Figure 3 shows Local Equator crossing time (ascending node) and associated predictions for 3, 6 and 12 months in August 2006.

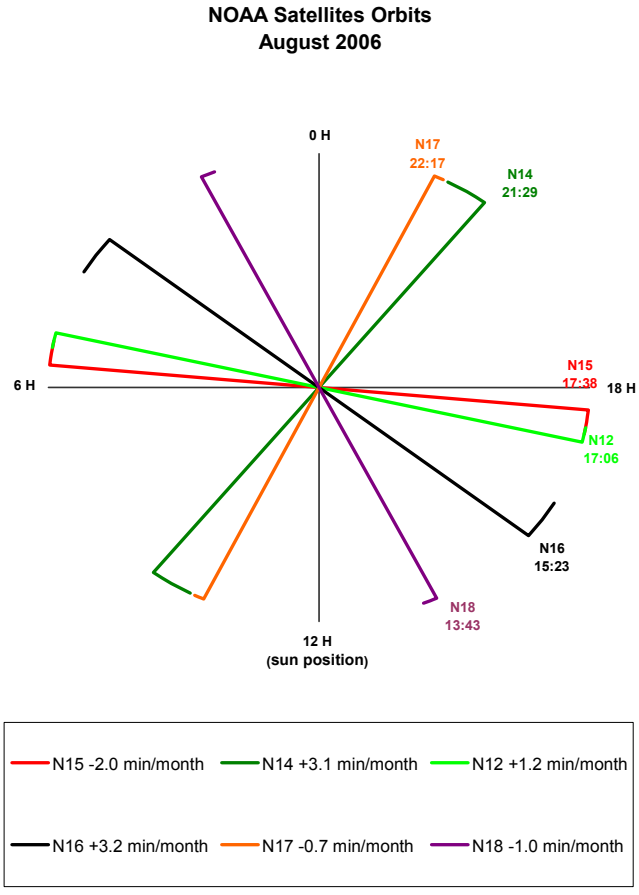

Figure 3

6.1.2 Ground receiving stations

The two global stations able to acquire the STIP telemetry are still the Fairbanks and Wallops Island stations. These two global processing centres continue to process more than nearly 700 playback and real-time datasets per day and the two centres are fully redundant. They deliver the STIP telemetry from the satellites NOAA-12, NOAA-14, NOAA-15, NOAA-16, NOAA-17, NOAA-18, and MetOp-1.

The Lannion global station, which could also acquire the STIP telemetry in some conditions, is no longer used since 2000. An effort is underway to eliminate blind orbits by using NPOESS Svalbard (Norway) facility operated by NOAA.

The STIP telemetry from NOAA-14 is delivered by grouping three or four orbits. The STIP telemetry from NOAA-12 is delivered twice a day. As regards NOAA-12, only two orbits per day are delivered by NOAA/NESDIS. It is just enough to collect the minimum amount of data from the orbitography Argos beacons required for the processing of the Argos location.

CLS and Service Argos Inc. pursued their efforts to increase the number of receiving stations able to provide TIP data sets from the NOAA satellites. There are currently 49 stations delivering real time (TIP) data sets to CLS and CLS America Most of them process data from NOAA-16, NOAA-17, NOAA-18, NOAA-15, NOAA-14 and NOAA-12. See paragraph 2.2 for details.

6.2 New communication techniques and facilities

A document describing developments in satellite communications is available on the DBCP website, and is continually updated, as new information becomes known. It draws attention to the imminent availability of a much more compact and less expensive Iridium data transceiver, and the emergence of new Iridium resellers (NAL and Service Argos - application pending), who would be able to provide a service more closely aligned to the needs of the Panel.

The DBCP has established an Iridium drifter Pilot Project for a period of two years as of November 2006. 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, and GCOS applications, and the WMO Natural Disaster Prevention and Mitigation Programme. In addition, the Pilot Project will aim to evaluate whether 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 Pilot Project is targeting the deployment of more than 50 drifters during the two-year period.

7. CAPACITY BUILDING

The Panel has been involved in Capacity Building activities for years through the production of technical documents on buoy technology and related data management procedures, and through the organization of technical and scientific workshops in conjunction with Panel sessions.

The Panel now considers that it is critical to develop its capacity building activities further, as the technology and global coordination for operational activities are now considered sufficiently mature. Experience has shown that Capacity Building initiatives such as organizing training workshops in developing countries (e.g. the Training and Capacity Building Workshop for the Eastern Indian Ocean, 7-10 June 2006 in Bali, Indonesia), while primarily benefiting to them, could also be used as an effective mechanism to encourage the active involvement of these countries in the observing programme operations and maintenance (e.g. ship time, buoy deployments). For example, because of the Bali workshop, the Tropical Moored Buoy Implementation Panel (TIP) has received substantial commitments from Indonesia in terms of “ship time” in support of the deployment and servicing of the moorings. The Panel therefore decided to be promoting such initiatives. Drifter donation to developing countries will also be explored. At its twenty-second session, the Panel decided to devote some resources as it was available, for capacity building activities including development of training materials, based on the agreement and approval for each proposed activity

At its twenty-second session, the Panel also approved a proposal for “a training course on buoy and fixed-platform data management” which was developed in close cooperation with the Ocean Data and Information Network for Africa (ODINAFRICA). The primary goal for the workshop

will be to provide training to buoy operators and researchers in African nations on application and management of the data from in situ oceanographic and marine meteorological observations. The training course is planned in June 2007, at the IODE Project Office, Oostende, Belgium.

8. ADMINISTRATIVE MATTERS

8.1 Action groups

[*See at beginning of Annex II the guidelines for the action groups of the Panel.*]

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

Area of interest:	Ocean areas potentially affecting NWP over European countries. This covers the North Atlantic Ocean North of 10°N and the Mediterranean Sea (90°N-10°N; 70°W - 40°E).
Targeted horizontal resolution:	250 km x 250 km, 150 drifting buoys, 4 moorings
Variables measured:	Drifting buoys : Air pressure, wind, air temperature, SST Moorings : air pressure, wind, air temperature, SST, waves (directional spectra), relative humidity, SSS
Manager, E-SURFMAR:	Pierre Blouch, Météo France
Chairperson, Data Buoy Technical Advisory Group (DB-TAG):	Jon Turton, UK MetOffice
Data Buoy Manager:	Jean Rolland, Météo France
Web site:	http://esurfmar.meteo.fr
Meetings:	DB-TAG meets once a year (May).

The activities of the European Group on Ocean Stations (EGOS) were transferred to the EUCOS Surface Marine Programme (E-SURFMAR) in January 2005. E-SURFMAR THEN became an action group of DBCP, to replace EGOS. E-SURFMAR, which is an optional programme of EUCOS, now has the following membership:

Belgium	• Institut Royal Météorologique de Belgique
Denmark	• Danmarks Meteorologiske Institut
Finland	• Finnish Meteorological Institute
France	• Météo-France
Germany	• Deutscher Wetterdienst
Greece	• Hellenic National Meteorological Service
Iceland	• Veðurstofa Íslands
Ireland	• Met Éireann
Italy	• Ufficio General per la Meteorologia
Norway	• Det Norske Meteorologiske Institutt (DNMI)
Portugal	• Instituto de Meteorologia de Portugal
Spain	• Instituto Nacional de Meteorologia
Sweden	• Sveriges Meteorologiska och Hydrologiska Institut
The Netherlands	• Koninklijk Nederlands Meteorologisch Instituut
United Kingdom	• The Met. Office

The full report by E-SURFMAR is reproduced in Annex II.

8.1.2 GLOBAL DRIFTER PROGRAMME (GDP)

Area of interest:	The global ocean
Targeted horizontal resolution:	5 degree x 5 degree (1250 units)

Variables measured:	Basic: surface velocity, SST; other: surface pressure, wind, salinity, sub-surface temperature profiles
Directors:	Rick Lumpkin, NOAA/AOML, USA Peter Niiler, SIO, USA
Data Assembly Center Manager:	Mayra Pazos, NOAA/AOML, USA
Operations Manager:	Craig Engler, NOAA/AOML, USA
Web site:	http://www.aoml.noaa.gov/phod/dac/gdp.html
Meetings:	As the need arises.

The GDP established in 1996 as the follow-up to the Surface Velocity Programme (SVP) of TOGA and WOCE and became an action group of the Panel in 1997. The NOAA Atlantic Oceanographic and Meteorological Laboratory (AOML) in Miami, FL. hosts the Global Drifter Center (GDC).

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 encourages other drifter programs to contribute their data to the Data Assembly Centre (DAC) if the SVP WOCE type drifter collects those data with drogues set between 10 and 15 meters.

The report by the IABP is reproduced in Annex II.

8.1.3 INTERNATIONAL ARCTIC BUOY PROGRAMME (IABP)

Area of Interest:	Central Arctic Ocean and its marginal seas, excepting Exclusive Economic Zones, where agreements of the Coastal States have not been obtained.
Variables measured:	Basic variables: atmospheric pressure, air temperature. Other variables: atmospheric pressure tendency, wind speed and direction, snow, and sea-ice properties, as well as subsurface oceanographic characteristics.
Targeted horizontal resolution: 250 x 250 km	
Chairperson:	Tim Goos, Meteorological Services Canada
Coordinator:	Ignatius Rigor, University of Washington, USA
Web site:	http://iabp.apl.washington.edu/
Meetings:	Annual meetings in spring/early summer of the Northern Hemisphere.

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

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

WHITE TRIDENT exercise, which provides for the programme backbone needs commitment for at least 7 ICEX AIR buoys from participating countries.

The following organizations are participating in the IABP:

Canada	• Institute of Ocean Sciences (IOS) • Marine Environmental Data Service (MEDS) • Meteorological Service of Canada (MSC) (assisted by Polar Continental Shelf Project, Canadian Coast Guard, Canadian Forces and Institute of Ocean Sciences)
China	• Chinese Arctic and Antarctic Administration
France	• Collecte Localisation Satellites (CLS) (Service Argos)
Germany	• Alfred Wegener Institut für Polar und Meeresforschung (AWI)
Japan	• Japan Agency for Marine-Earth Science and Technology (JAMSTEC)
Japan/USA	• International Arctic Research Center, Frontier Research System for Global Change, University of Alaska Fairbanks
Norway	• Christian Michelsen Research Institute (CMR) • Nansen Environmental and Remote Sensing Centre • Norwegian Polar Institute (NPI) • Norwegian Meteorological Institute (DNMI)
Russian Federation	• Arctic and Antarctic Research Institute of Roshydromet • Russian Federal Service for Hydrometerology and Environmental Monitoring (ROSHYDROMET)
United Kingdom	• United Kingdom Meteorological Office
USA	• Cold Regions Research and Engineering Laboratory (CRREL) • National Ice Center (NIC) (representing the National Aeronautics and Space Administration, the Nation Science Foundation, the National Oceanic and Atmospheric Administration and the Office of Naval Research) • NOAA Pacific Marine Environmental Laboratory (PMEL) • Polar Science Center (PSC) of the Applied Physics Laboratory (APL) of the University of Washington • International Arctic Research Center, University of Alaska Fairbanks (IARC) • Woods Hole Oceanographic Institution (WHOI) • Naval Oceanographic Office (Navoceano) • Naval Meteorology and Oceanography Command • CLS, America (Service Argos)
International Organizations	• World Climate Research Programme of WMO, IOC and ICSU (WCRP)

The full report by the IABP is reproduced in Annex II.

8.1.4 INTERNATIONAL BUOY PROGRAMME FOR THE INDIAN OCEAN (IBPIO)

Area of Interest: Indian Ocean North of 55°S and between 25°E and 120°E
Targeted horizontal resolution: 500 km x 500 km
Variables measured: Drifting buoys : Air pressure, wind, air temperature, SST. Moorings : air pressure, wind, air temperature, SST, waves, relative humidity, SSS
Chairperson: Graeme Ball, BOM, Australia
Vice-Chairperson: K. Premkumar, NIOT, India
Coordinator: Jean Rolland, Météo France
Web site: http://www.shom.fr/meteo/ibpio
Meetings: Annual meetings in conjunction with DBCP meetings.

The IBPIO established in 1996 became an action group of the Panel in October 1996. The following organizations are participating in the IPBIO:

Australia	• Australian Bureau of Meteorology (BOM)
France	• Météo-France
India	• National Institute of Oceanography (NIO)
	• National Institute of Ocean Technology (DoD/NIOT)
South Africa	• South African Weather Service (SAWS)
USA	• Global Drifter Center of NOAA/AOML
	• Naval Oceanographic Office (Navoceano)

The full report by IBPIO is reproduced in Annex II.

8.1.5 WCRP-SCAR INTERNATIONAL PROGRAMME FOR ANTARCTIC BUOYS (IPAB)

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

The IPAB established in 1994 became an action group of the Panel in October 1994. The following organizations are participating in the IPAB:

Australia	• Australian Antarctic Division (AAD)
	• Tasmania and Antarctica Regional Office of the Australian Bureau of Meteorology
Finland	• Finnish Institute of Marine Research (FIMR), University of Helsinki
France / USA	• CLS/Service Argos
Germany	• Alfred Wegener Institute for Polar and Marine Research (AWI)
	• Institute für Meteorologic und Klimaforschung Universität Karlruhe
Italy	• Programma Nazionale di Ricerche in Antartide
Japan	• National Institute of Polar Research (NIPR)
	• Japan Agency for Marine-Earth Science and Technology (JAMSTEC)
New Zealand	• Meteorological Service New Zealand Ltd. (MSNZ)
Norway	• Norwegian Polar Institute (NPI)
South Africa	• South African Weather Service (SAWS)
United Kingdom	• British Antarctic Survey (BAS)
	• United Kingdom Meteorological Office
	• Scottish Association for Marine Science (SAMS)
	• Department of Applied Mathematics and Theoretical Physics, University of Cambridge (DAMTP)

USA	• National Ice Center (NIC) (see above under IABP) • National Science Foundation (NSF) • GI, University of Alaska Fairbanks • National Snow and Ice Data Center • Cold Regions Research and Engineering Laboratory (CRREL) • International Arctic Research Centre (IARC)

8.1.6 INTERNATIONAL SOUTH ATLANTIC BUOY PROGRAMME (ISABP)

Area of Interest: South Atlantic Ocean north of 55S plus Tropical Atlantic Ocean.
Targeted horizontal resolution: 5° x 5°
Variables measured: Air pressure, SST, sea surface velocity
Chairperson: Ariel Troisi, SHN, Argentina
Coordinator: Johan Van der Merwe, SAWB, South Africa
Web site: http://www.dbcp.noaa.gov/dbcp/isabp/
Meetings: Yearly meetings normally in May-July.

The ISABP established in 1994 became an action group of the Panel in November 1994. The following organizations are participating in the ISABP:

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

The full report by the ISABP is reproduced in Annex II.

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

Area of Interest: North Pacific Ocean and marginal seas generally north of 30°N.
Targeted horizontal resolution: 5° x 5°
Variables measured: Air Pressure, SST, sea surface velocity
Co-Chairpersons: NE Pacific: Al Wallace, MSC, Canada
NW Pacific: To be proposed by PICES
Coordinator: Craig Engler, NOAA/AOML
Web site: http://npdbap.noaa.gov/

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

The NPDBAP established in 2002 became an action group of the Panel. The following members are participating in the ISABP:

Canada	• Environment Canada • Marine Environmental Data Service (MEDS)
Japan	• Center for Environmental Remote Sensing in Chiba University • Ocean Research Institute in University of Tokyo
Republic of Korea	• Korea Meteorological Administration (KMA) • Korean Ocean Research & Development Institute (KORDI)
Russian Federation	• Pacific Oceanological Institute • Sakhalin Research Institute of Fisheries & Oceanography • Hydrometeorological Research Institute
USA	• NOAA National Data Buoy Center (NDBC) • Naval Oceanographic Office (Navoceano)

The full report by the NPDBAP is reproduced in Annex II.

8.1.8 TROPICAL MOORED BUOYS IMPLEMENTATION PANEL (TIP)

Area of interest: The tropical ocean regions as part of an integrated approach to observing the climate system to address the research needs of CLIVAR and the operational strategies of GOOS and GCOS. Pacific Ocean: 8°N to 8°S; Atlantic Ocean: 20°N to 10°S; Indian Ocean: 15°N to 25°S.

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

Variables measured: Surface: wind, air temperature, relative humidity, SST and SSS on all surface moorings. Air pressure, precipitation, short wave radiation, long wave radiation on some surface moorings.
Sub-surface: temperature profiles down to 500m on all surface moorings; Salinity profiles down to 120m on some surface moorings; Current velocity on some moorings.

Mike McPhaden, PMEL, USA

Coordinator: Paul Freitag, PMEL, USA

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

The Tropical Moored Buoys Implementation Panel (TIP) became an action group of the Data Buoy Cooperation Panel (DBCP) during 1999 (under then the name of TAO Implementation Panel, which was decommissioned in 2001). Its annual report is reproduced in Annex II.

8.1.9 THE OCEAN SUSTAINED INTERDISCIPLINARY TIMESERIES ENVIRONMENT OBSERVATION SYSTEM (OceanSITES)

Area of interest: The global ocean.

Targeted horizontal resolution: 89 reference stations

Variables measured: Conductivity, salinity, water temperature, air relative humidity, air temperature, air pressure, wind, precipitations, radiation, water pressure, depth, currents, fluxes, dissolved oxygen, fluorescence, pCO_2

Co-Chairpersons, Steering Team: Bob Weller, WHOI, USA
Uwe Send, SIO, USA
Web site: http://www.oceansites.org/

The Ocean Sustained Interdisciplinary Time series Environment observation System (OceanSITES) is a worldwide system of long-term, deepwater reference stations measuring dozens of variables and monitoring the full depth of the ocean from air-sea interactions down to 5,000 meters. It became an Action Group of the Data Buoy Cooperation Panel (DBCP) during 2005.

8.2 Programmes participating in DBCP implementation strategy

The following programmes participate in the DBCP implementation strategy.

8.2.1 SOUTHERN OCEAN BUOY PROGRAMME (SOBP)

The Southern Ocean Buoy Programme is directly being managed by the DBCP as part of its implementation strategy. Coordination of commitments and deployments is realized mainly at DBCP annual sessions and through the Technical Coordinator during the intersessional period. It is not an Action Group because most of the buoys deployed in the SOBP also belong to other DBCP action groups (GDP, ISABP, IBPIO, IPAB, OceanSITES). The area of interest for the programme is defined as the open ocean south of 40 degrees south. The goal of the programme is to maintain a network of about 80 barometer-drifting buoys in this region. This number might be revisited in the context of the JCOMM/OCG strategic workplan: considering the total area of the Southern Ocean South of 40S (76970000 km2) the new target would eventually need to be about 300 units (at 500km x 500km resolution).

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

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)

8.2.2 BLACK SEA BUOY PROGRAMME

The Black Sea Buoy Programme (BSBP) was created de facto in 1999 by an international cooperation of countries and organizations, which have scientific and applied interests in this region. Even though there was not an official international agreement to create the BSBP, this body had been actually working under the cover of international BS GOOS programme and international project “Black Sea – 2001/2005”. Participants (listed below) created the last one, who provided financial, technical and organizational support for BSBP.

The following organizations and institutes, participating in the programme:

Italy	Istituto Nazionale di Oceanografia e di Geofisica Sperimentale
Russia	P.P.Shirshov Institute of Oceanology Russian Academy of Science
Turkey	Institute of Marine Sciences / Middle East Technical University
Ukraine	Oceanolog. Center / Marine Hydrophys. Institute (MHI) National Acad. of Science
USA	Department of Oceanography, Naval Postgraduate School, Naval Oceanographic Office (NAVOCEANO)

The programme is open to all organizations and institutes interested and committed to the objectives and operating principles of the programme. It is self-sustaining and supported by voluntary contributions from participants in the form of equipment (buoys) and/or services such as communications, storage, deployments, data quality control and distribution, data archiving, data analysis and coordination.

8.3 Membership

8.3.1 IOC MEMBER STATES AND WMO MEMBERS DIRECTLY INVOLVED IN THE PANEL'S ACTIVITIES

The following countries were represented at recent sessions of the Panel:

- Eighteenth session (Trois Ilets, Martinique, France, October 2002): Australia, Bahamas, Brazil, Canada, France, India, Italy, Japan, Netherlands, New Zealand, Republic of Korea, South Africa, Ukraine, United Kingdom, USA.

- Nineteenth session (Angra dos Reis, Brazil, October 2003): Australia, Brazil, Canada, France, India, Japan, Malaysia, Netherlands, New Zealand, Republic of Korea, South Africa, United Kingdom, USA;

- Twentieth session (Chennai, India, October 2004): Australia, Canada, France, India, Malaysia, Netherlands, New Zealand, Republic of Korea, South Africa, Ukraine, United Kingdom, USA.

- Twenty-first session (Buenos Aires, Argentina, October 2005): Argentina, Australia, Brazil, Canada, China, France, India, New Zealand, Peru, Republic of Korea, Saudi Arabia, South Africa, Ukraine, United Kingdom, USA;

- Twenty-second session (La Jolla, USA, October 2006): Australia, Canada, France, India, the Netherlands, Japan, the Republic of Korea, Kenya, South Africa, Ukraine, United Kingdom, USA;

8.3.2 NATIONAL FOCAL POINTS

The present list of national focal points for the DBCP is attached as Annex VIII.

8.4 Technical coordinator

Since 1 June 1993, Mr Etienne Charpentier (France).has been employed by UNESCO/IOC as a fund-in-trust expert and working for the Panel as a Technical Coordinator. Since 1 January 1999, he had also been the Technical Coordinator of the JCOMM Ship-of-Opportunity Programme (SOOP). Mr Charpentier resigned on 31 Janauary 2006. With the agreement from his new employer, he has then assisted in the recruitment and training of his successor, in order to ensure as full continuity as possible in the work of the Panel's Technical Coordinator.

A recruitment notice was prepared by the Secretariats and issued 1 December 2005, following consultation with the DBCP chairperson, vice-chairpersons, JCOMM co-presidents, OCG chairperson, SOT chairperson, SOOPIP chairperson, and the Technical Coordinator. Deadline for the candidates to apply was 15 January 2006. A relatively long recruitment process then started where the DBCP Chairperson and vice-chairpersons have been involved, as well as the SOT Chairperson, the OCG Chairperson, Argo Office bearers, major JCOMMOPS stakeholders, and the WMO and IOC Secretariats have been involved. A total of 46 candidates were reviewed. The five top candidates were invited to interview at the Panel's expense on 25 March 2006 at ECMWF, UK. The interview board consisted of the DBCP and SOOPIP chairs, the JCOMM OPA chair and representatives of the WMO and IOC secretariats. The board was clear and unanimous in its first choice, and recommended to IOC that Ms Hester Viola be offered the post. The board also suggested that, given her experience and current grading, shebe appointed at the P2 level. The Executive Secretary of IOC approved the board's recommendation, Ms Viola accepted the offer, and UNESCO contractual and administrative arrangements were completed in late May. Hester Viola started working for the Panel on the 1 July 2006.

New arrangement for the Technical Coordinator's employment consists of a UNESCO Appo intment of Limited Duration (ALD), grade P2, whereby an initial contract might be extended up to a maximum total of four years. Contract is funded through Panel Members' contributions deposited in the IOC Trust Fund.

The contract for logistic support for the position of the Technical Coordinator consists of a s tanding agreement between IOC and CLS concerning the occupancy of premises and the use of fa cilities granted to JCOMMOPS.

8.5 Finances

Overall management of the Panel's finances has continued to be undertaken by the JCOMM Joint Secretariat in WMO and IOC during 2006. Contracts for the employment of the Technical Coordinator as well as for his logistic support have been maintained in IOC. Annex IX contains financial statements as follows:

(a) Finalized IOC Statement of Account for the period 1 January 2006 to 31 December 2006;

(b) Final WMO Statement of Income and Expenditures for the period 1 January 2006 to 31 December 2006.

For the financial year January to December 2007, the Panel agreed the following budget (which encompasses the expenditures and contributions relating to SOOP) with indicative figures for upper limits of expenditure:

A. Expenditures	**US$**
Technical coordinator	93,000
Technical coordinator's missions	20,000
JCOMMOPS logistics support	15,000
Travel of Chairman, Vice-chairmen	2,100
JTA activities including JTA chairman's contract and travel	15,000
Outreach and Publications	10,000
JCOMMOPS development	10,000
Provision for possible JCOMMOPS relocation	20,000
New technical evaluation	30,000
Capacity Building	25,000
Collaborative arrangements	20,000
WMO charges (1% of fund management through WMO)	1,000
Contingencies	50,000
TOTAL	**311,100**
B. Income achieved/required	
Contributions	214,100
Brought forward from previous year	309185
TOTAL	**523,285**

Remark: above figures cover the calendar year 1 January to 31 December 2007. The TC contract covers the period 1 July 2006 to 30 June 2007, and the following contract the period 1 July 2007 to 30 June 2008.

The following seven countries are contributing to the DBCP-SOOP funding: Australia, Canada, Germany, India, New Zealand, South Africa, and USA. European countries – including Austria, Belgium, Cyprus, Denmark, Finland, France, Germany, Greece, Hungry, Iceland, Ireland, Italy, Luxemburg, Norway, Portugal, Spain, Sweden, Switzerland, Netherlands, and United Kingdom – have contributed through E-SURFMAR. Some countries may indicate that their contributions are earmarked for DBCP only or for SOOP only.

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NATIONAL REPORTS ON DATA BUOY ACTIVITIES

The following pages contain national reports on data buoy activities submitted by the following countries:

AUSTRALIA

CURRENT PROGRAMMES ***(for period 1 July 2005 – 30 June 2006)***

A **Agency or programme:** Bureau of Meteorology

Number and type of buoys:
(a) Deployed during the year: **12**
- 1 FGGE
- 1 FGGE-W
- 9 SVP-B
- 1 SVP-BW

(b) Operational at 31 August: **22**

(c) Reporting on GTS at 31 August: **22**

Purpose of programme: To support the Bureau's operational forecasting and warning service.

Main deployment area: Southern and Indian Oceans in support of:
- International Buoy Programme for the Indian Ocean
- Southern Ocean Buoy Programme
- International Programme for Antarctic Buoys.

B **Agency or programme:** Barometer Upgrade Program

Number and type of buoys:
(a) Deployed during the year: **2**
- 2 SVP-B (Bureau-sponsored upgrades)

(b) Operational at 31 August: **3**

(c) Reporting on GTS at 31 August: **3**

Purpose of programme: To increase the number of pressure buoys in the Indian Ocean and to support the Bureau's operational forecasting and warning service.

Main deployment area: Southern and Indian Oceans in support of:
- International Buoy Programme for the Indian Ocean
- Southern Ocean Buoy Programme

C **Agency or programme:** Global Drifter Program

Number and type of buoys:
(a) Deployed during the year: **19**
- 10 SVP
- 9 SVP-B

(b) Operational at 31 August: **18**

(c) Reporting on GTS at 31 August: **18**

Purpose of programme: To support the Global Drifter Program through the IBPIO, and to support the Bureau's operational forecasting and warning service.

Main deployment area: Southern and Indian Oceans in support of:
- International Buoy Programme for the Indian Ocean
- Southern Ocean Buoy Programme

PLANNED PROGRAMMES ***(for period 1 July 2006 – 30 June 2007)***

A **Agency or programme:** Bureau of Meteorology

Number and type of buoys planned for deployment in next twelve months: **17**

0 FGGE

0 FGGE-W

16 SVP-B

1 SVP-BW

Purpose of programme: To support the Bureau's operational forecasting and warning service.

Main deployment area: Southern and Indian Oceans.

B **Agency or programme:** Barometer Upgrade Program

Number and type of buoys planned for deployment in next twelve months: **8**

8 SVP-B (Bureau-sponsored upgrades)

Purpose of programme: To increase the number of pressure buoys in the Indian Ocean and to support the Bureau's operational forecasting and warning service.

Main deployment area: Indian Ocean

C **Agency or programme:** Global Drifter Program

Number and type of buoys planned for deployment in next twelve months: **18**

10 SVP

8 SVP-B

Purpose of programme: To support the Global Drifter Program through the IBPIO, and to support the Bureau's operational forecasting and warning service.

Main deployment area: Indian Ocean

TECHNICAL DEVELOPMENTS

Nil

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

The 2006-2007 deployment plans for Bureau-owned buoys is published on the JCOMMOPS website:

http://www.jcommops.org/depl_opport/australia/20062007/programs/buoy0607plan.html

SPECIAL COMMENTS

Buoy lifetimes:

1. Average lifetime of barometers on (Technocean) SVP-B buoys that failed in a given year:

Year of failure	Bureau Buoy Program		Barometer Upgrade Program		Global Drifter Program	
	Average life (Years)	Barometer failures during the year	Average life (Years)	Barometer failures during the year	Average life (Years)	Barometer failures during the year
2006 *	0.76	4		0	0.49	5
2005	0.69	6	2.17	4	0.29	1
2004	0.69	5	1.54	13	-	-
2003	0.68	3	1.34	9	-	-
2002	-	-	1.21	13	-	-
2001	-	-	1.11	2	-	-

* as at 31 August

Barometer failure defined as: sensor failed; sensor unreliable; or buoy (and sensor) failed.

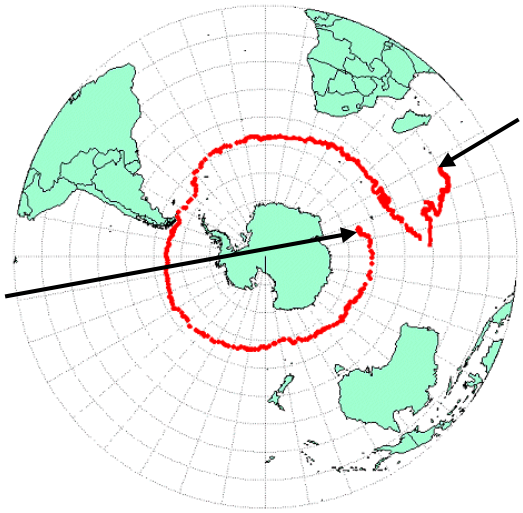
2. Breakdown of surviving barometers on (Technocean) SVP-B buoys (at 31 August 2006):

Buoy Program	Year deployed				
	2002	2003	2004	2005	2006
Bureau of Meteorology	0	6	4	4	5
Barometer Upgrade	1	0	0	-	2
Global Drifter Program	-	-	-	3	3

3. Longest serving Bureau-owned drifting buoy.

Bureau-owned FGGE buoy, PTT 2939, WMO 56535.

Deployed 17 March 1997 near 55S 74E from R.S.V. Aurora Australis.



Beached 20 September 2002 on Rodriguez Is. (20S 63E).

Failed 17 May 2003, after reporting air pressure, pressure tendency, air temperature and sea surface temperature reliably and accurately or 2252 days (74 months).

BRAZIL

CURRENT PROGRAMMES

A. Agency or programme:

Number and type of buoys: (a) deployed during year: 14 SVP-B

(b) operational at 31 August: 08 SVP-B

(c) reporting on GTS at 31 August: 06 SVP-B

Purpose of programme: (a) operational: YES

(b) met/ocean research: YES

(c) developmental: NO

Main deployment areas: BRAZILIAN EEZ, SOUTH OF 10° S.

B. Agency or programme:
(as above, repeat as often as necessary)
PNBOIA (NATIONAL BUOY PROGRAM) AND MOVAR.

PLANNED PROGRAMMES

A. Agency or programme:

Number and type of buoys planned for deployment in next 12 months: 53, SVP AND SVP-B

Purpose of programme: (a) operational: YES

(b) met/ocean research: YES

(c) developmental: NO

Main deployment areas: BRAZILIAN EEZ, SOUTH OF 10° S.

B. Agency or programme:
(as above, repeat as often as necessary)
PNBOIA, MOVAR.

TECHNICAL DEVELOPMENTS

(a) Buoy design: - xxx

(b) Instrumentation: - xxx

(c) Others: - xxx

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

- xxx

SPECIAL COMMENTS (if any)

(a) Quality of buoy data: -xxx

(b) Communications: - xxx

(c) Buoy lifetimes:- xxx

(d) Others: - xxx

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Enc. Divisão de informações Ambientais
ASSINADO DIGITALMENTE

CANADA

CURRENT PROGRAMMES **(Sept 1, 2005 – August 31, 2006)**

A. Agency or programme: **Pacific and – North East Pacific Ocean**

Number and type of buoys:
(a) deployed during year:
# of drifting buoys with winds - 2
# of drifting buoys without winds – 17
# of barometer upgrades deployed as contributor to Global Drifter Program - 10
(b) operational at 31 August 2006:
# of moored 3 meter – 13
developmental (platform for testing new equipment etc.) 3 meter (AXYS) - 1
of moored 6 meter NOMADs -3
# of drifting buoys with winds - 2
# of drifting buoys without winds – 17
# of Canadian funded barometer upgrade drifters reporting - 9
(c) reporting on GTS at 31 August:
# of moored buoys– total 16
# of drifting buoys – total 28 (includes 9 Canadian funded barometer upgraded units)

Purpose of programme: operational

Main deployment areas: North East Pacific Ocean

B. Agency or programme: **Great Lakes and Inland Waters**

Number and type of buoys:
(a) deployed during year: 22
# of moored 3 meter – 8
1.7 meter watchkeepers – 11
of developmental moored buoys for wave testing in Lake Ontario -3
(One 3M, one 1.7 WKR and one Triaxys wave buoy testing waves in the Grimsby area of Lake Ontario)
(b) operational at 31 August 2006: 22
# of moored 3 meter - 8
# of moored 1.7 meter watchkeepers – 11
# of developmental moored buoys for wave testing in Lake Ontario -3
(One 3M, one 1.7 WKR and one Triaxys wave buoy testing waves in the Grimsby area of Lake Ontario)
(c) reporting on GTS at 31 August:
# of moored buoys– total 22

Purpose of programme:
(a) operational
(c) developmental – effectiveness of using Triaxys wave sensors Watchkeeper buoys

Main deployment areas: Great Lakes including Lake of the Woods, Lake St Clair, Lake Nipissing, and Lake Simcoe, Lake Winnipeg and Great Slave Lake, Hudson Bay.

C. Agency or programme: Atlantic, Quebec, St. Lawrence & North Western Atlantic

Number and type of buoys:
(a) deployed during year:
# of moored 3 meter – 1 (seasonal)
# of 1.7 meter watchkeepers - 1

(b) operational at 31 August 2006:
# of moored 3 meter – 2
# of moored 6 meter NOMADs -8
# of drifting buoys without winds - 3
(d) reporting on GTS at 31 August:
# of moored buoys– total 10
# of drifting buoys – total 3

Purpose of programme: (a) operational
Main deployment areas: St. Lawrence River and North West Atlantic Ocean

D. Agency or programme: **Canadian Ice Service**

Number and type of buoys: (a) deployed during year: 1 Calib + 3 Calibs to be deployed shortly
(b) operational at 31 August: 1 + 3 if all are deployed
(c) reporting on GTS at 31 August: 1+ 3

Purpose of programme: (a) operational: Follow leading edge of old ice
(b) met/ocean research: Understanding how old ice decays (partnership with Michelle Johnston CHC).

Main deployment areas: Baffin Bay + Nares Strait

E. Agency or programme **Arctic Ice Beacon Drifting Buoy Network**

(a) Deployed during year : 1 EC In-house assembled buoy and 4 ICEX drifter ice buoys
(b) Operational at 31 August: 7 drifting ice buoys.
(c) Reporting on GTS 31 August: 7 drifting ice buoys.

Purpose of Program:
(a) Operational: Environment Canada's contribution to International Arctic Buoy Program

Main deployment area: Arctic Basin north and west of the Canadian Arctic Islands

F. Agency or programme: **Fisheries & Oceans Canada-Bedford Institute of Oceanography**

Number and type of buoys: (a) deployed during year:
-1 directional wave rider (Apr-Nov, Lunenburg Bay, NS)
-2 ARGOS surface drifters (SLDMB), Labrador Shelf
-4 ARGOS surface drifters with GPS, PEI
(b) operational at 31 August: None
(c) reporting on GTS at 31 August: None

Purpose of programme:
(a) met/ocean research:

-Programs on the pack ice of the Gulf of St. Lawrence using beacons to measure drift for validating and providing inputs to operational ice forecasting models were inactive during winter 2005-06 due to light ice conditions.
-GPS beacons were deployed on the Labrador Shelf to measure surface drift and validate models, and could be used to improve Search-and-Rescue efficiency.
-Surface drifters were deployed in Northumberland Strait to measure surface currents for a study on the dispersion of invasive species.
-Data from a directional wave rider buoy will provide input to high resolution coupled atmosphere-ocean-wave model to predict the impact of climate change on the frequency and intensity of storms, which can affect activities

in the Atlantic Canada offshore. Wave data are made available in real time and displayed on a website.

Main deployment areas: Labrador Shelf, Gulf of St. Lawrence, Northumberland Strait (PEI), Lunenburg Bay

PLANNED PROGRAMMES

A. Agency or programme: Pacific and Yukon – North East Pacific ocean

Number and type of buoys planned for deployment in next 12 months
# of drifting buoys with winds - 4
# of drifting buoys without winds – 16
Canadian funded barometer upgrades in support of GDP - 10
developmental 3 meter (AXYS) - 1 :

Purpose of programme: (a) operational:

Main deployment areas: Drifting buoys will be deployed in the North East Pacific Ocean between 160 & 170 degrees west and 41to 52 degrees north.

B. Agency or programme: **Great Lakes and Inland Waters**

Number and type of buoys: (a) deployed during year: 19 (seasonal)

Purpose of programme: (a) operational

Main deployment areas: Great Lakes including Lake of the Woods, Lake St Clair, Lake Nipissing, and Lake Simcoe, Lake Winnipeg and Great Slave Lake, Hudson Bay.

C. Agency or programme: **Atlantic, St. Lawrence & North Western Atlantic**
Number and type of buoys planned for deployment in next 12 months:
# of drifting buoys without winds - 2
# of moored 3 meter - 1

Purpose of programme: (a) operational

Main deployment areas: St. Lawrence River,
Drifting buoys will be deployed in the Northwestern Atlantic Ocean in coordination with E-Surfmar

D. Agency or programme: Canadian Ice Service

Number and type of buoys planned for deployment in next 12 months: up to 6 with possible ties to IPY.

Purpose of programme: (a) operational: Follow leading edge of old ice and Tracking Icebergs for model validation.
(b) met/ocean research: Understanding how old ice decays (partnership with Michelle Johnston CHC).

Main deployment areas: Eastern Arctic – East Coast

E. Agency or programme: Arctic Ice Beacon Drifting Buoy Network

Number and type of Buoys planned for deployment in the next 12 months:
2 ICEX ice buoys as part of IABP in Arctic Basin.

Purpose of Program (a) Environment Canada's contribution to WMO support of of International Arctic Buoy Program and Polar Continentel Shelf Project. Main deployment area: Arctic Basin west of the Canadian Arctic Islands

F. Agency or programme: Fisheries & Oceans Canada-Bedford Institute of Oceanography

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

-1 directional wave rider (Apr-Nov, Lunenburg Bay, NS)
-2 ARGOS surface drifters (SLDMB), Scotian Shelf
-4 ARGOS surface drifters with GPS, PEI
-4 ARGOS surface drifters with GPS, southern Gulf of St. Lawrence
-6 ARGOS ice drifters with GPS, PEI

Purpose of Program: b) Met/Ocean research:
-To provide data on an opportunity basis to the Canadian Ice Centre for forecasting and to the Canadian Coast Guard to support ice breaking in the Gulf of St. Lawrence.
-To measure surface drift as part of a study on the dispersion of invasive species.
-To provide wave data in real time for high resolution coupled atmosphere-ocean-wave model. Lunenburg Bay Project (CMEP with Dalhousie University and Environment Canada).
-To provide surface drift data on Scotian Shelf for validating a surface current model (with Coast Guard).

Main deployment areas: Scotian Shelf, Gulf of St. Lawrence, Northumberland Strait (PEI), Lunenburg Bay

TECHNICAL DEVELOPMENTS

(a) Buoy design:
-Foam Buoy hull – Ionomer foam 3 meter discus hull from Gilman Corporation for evaluation as a replacement for existing aluminium hulls. The superstructure for the foam buoy is to be manufactured by a separate company. One buoy is to be tested in a fresh water environment, Lake Ontario. A second buoy is to be tested in a coastal environment.
-Ice beacons to use compact Air Launch Ice Beacon

(b) Instrumentation:
-Moored foam buoy hull to use standard operational sensors and equipment used in the existing operational program.
-Ice beacons use ambient air temperature with some equipped with a pressure sensor. Some ice beacons are equipped with Lithium battery pack.

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

-Monthly moored and drifting buoy status reports at http://thetis.pyr.ec.gc.ca/a-buoyestat.phtml
-Buoy data available at http://www.weatheroffice.ec.gc.ca/marine/index_e.html
- Drifting ocean Statistics at MEDS website at http://www.meds-sdmm.dfo-mpo.gc.ca/
- Drifting Ice Beacon reports at http://iabp.apl.washington.edu/

SPECIAL COMMENTS

(a) Quality of buoy data:
-Moored buoys - Good

-Ices beacons - Good although one beacon got trapped in fast ice and did not provide meaningful data as expected.

-ARGOS surface drift location data are good but short time series.

-Wave rider data is good, seasonal May-Nov.

(b) Communications: 91% of moored buoy data delivered to users

GOES - Primary Communications,
Service ARGOS - Backup Communications
DWR, good, uses Service ARGOS and also radio link to shore station for real time wave data access through a website.

(c) Buoy lifetimes: Moored buoys – 5 years after which buoys are refurbished (weld/leak tests, sandblasting, painting etc.)
Drifting buoys – 16 months – 2 years.
Ice Beacons - up to 1 year for Lithium battery, up to 4 months for alkaline battery

COLUMBIA

CURRENT PROGRAMMES

A. Agency or programme:

General Maritime Directorate – DIMAR - Maritime Authority

Program of Oceanographic and Marine Meteorological data measurement system.

Number and type of buoys: (a) deployed during year: 2 Directional Wave Buys.

(b) operational at 31 August: 0

(c) reporting on GTS at 31 August: 0

Purpose of programme: (a) operational: x

(b) met/ocean research: x

(c) developmental:

Main deployment areas:

Barranquilla – Colombia's Continental Caribbean Coast
Tumaco – Colombia's South Pacific Coast

B. Agency or programme:
(as above, repeat as often as necessary)

General Maritime Directorate – DIMAR - Maritime Authority

Program of Oceanographic and Marine Meteorological data measurement system.

PLANNED PROGRAMMES

A. Agency or programme:

General Maritime Directorate – DIMAR - Maritime Authority

Program of Oceanographic and Marine Meteorological data measurement system.

Number and type of buoys planned for deployment in next 12 months:
Recover the 2 wave buys we had deployed on 2006 but we have some vandalism problems.
3 New Directional Wave Buys.

Purpose of programme: (a) operational: x

(b) met/ocean research: x

(c) developmental:

Main deployment areas:

The New Areas:
San Andres – Colombia's Island on the SW Caribbean
Guajira peninsula – Colombia's Continental Caribbean Coast
Buenaventura – Colombia's Central Pacific Coast

B. Agency or programme:
(as above, repeat as often as necessary)

General Maritime Directorate – DIMAR - Maritime Authority

Program of Oceanographic and Marine Meteorological data measurement system.

TECHNICAL DEVELOPMENTS

(a) Buoy design:

(b) Instrumentation:

(c) Others:

On next four years we'll try to calibrate oceanographic models and wave numerical models with the data from the directional buys system and SST.

PUBLICATIONS *(on programme plans, technical developments, QC reports, etc.)*
We are just beginning but in the future are our desire.

SPECIAL COMMENTS (if any)

(a) Quality of buoy data:

(b) Communications: Iridium almost on real time.

(c) Buoy lifetimes:

(d) Others:

Our program has been thought to develop until 2009 and it includes 2 oceanographic buys, 10 directional wave buys, and their use on calibrating numerical models for the Caribbean and the Pacific.

FRANCE

This report concerns surface buoys only. Programmes using profilers (ARGO floats) are not described here.

PROGRAMMES (1 September 2005 - 31 August 2006)

A. METEO-FRANCE

Number and type of buoys :

(a) 31 drifting buoys owned by Meteo-France were deployed in last 12 months :
- -11 SVP-B barometer drifters;
- - 1 SVP-BW drifter (wind measurements)
- - 2 SVP-BS drifters (salinity measurements)
- - 5 SVP-BTC drifters with 60 m long thermistor chain
- -12 Marisonde GT (FGGE type buoys) with 150 or 200 m long thermistor chain

In addition, Meteo-France operates 4 moored buoy stations (plus two others in co-operation with UKMO), three omni-directional waveriders and two automated stations put aboard aid-to-navigation buoys ;

(b) 38 buoys were operational at 31 August 2006 ;

(c) 38 buoys were reporting on GTS at 31 August 2006.

NB: The operational drifting buoys for the North Atlantic and the Mediterranean Sea are now funded by E-SURFMAR.

Purposes of programme :

(a) Operational : to provide Weather Forecast Centres with oceanographic and meteorological observations in real time (EUCOS/E-SURFMAR, French West Indies, IBPIO programme...) ;

(b) Research : to provide scientists with in-situ observations close to the air-sea interface ;

(c) Technical : to improve present materials (tests of new buoys, new sensors: compasses, barometers, conductivity probes, radiation sensors, sonic anemometer…). To validate wind, bathythermal and salinity measurements.

Main deployment areas :

North Atlantic (Off France, Spain and Portugal - West Indies).
Western Mediterranean Sea.
Indian Ocean.

Plans for the next 12 months :

Meteo-France will continue to operate drifting buoys in the Atlantic and Indian oceans through its contribution to the DBCP regional action groups (E-SURMAR and IBPIO). The co-operation with the Global Drifter Center of NOAA will be pursued.

Meteo-France will continue to operate four ocean weather stations (two in West Indies and two in the Mediterranean Sea). The co-operation with the UK Meteorological Office to maintain the Brittany and Gascogne moored buoys will continue. The three waverider stations located in West Indies and the two automated stations put aboard aid-to-navigation buoys will be also maintained.

Other Meteo-France activities in the frame of the DBCP are described further (see paragraphs on technical developments and special comments).

B. INSU

B1. LOCEAN (CARIOCA programme)

Number and type of buoys :

(a) 1 CARIOCA II buoy deployed in the Southern Atlantic Ocean in January 2005, operational during 2 months, reporting on GTS until 23 June 2005 ;

(b) 1 CARIOCA II buoy deployed in the Southern Atlantic Ocean in January 2006 is still operational and reporting on GTS at 31 August 2006 ;

Purposes of programmes :

(a) Research : to understand, quantify and monitor the CO2 fluxes exchanged at the air-sea interface ;

(c) Technical : to develop a buoy able to measure CO_2 concentrations at the ocean-atmosphere interface and to measure the distribution of carbon compounds at the ocean surface. Such buoys will be used in the frame of GOOS.
Web site : *http://www.lodyc.jussieu.fr/carioca/home.html*

Deployment areas :
Southern Ocean.

Plans : Four new buoys will be deployed in the next 12 months in the Southern Ocean (Atlantic sector).

B2. COM (EGYPT programme)

Number and type of buoys:

(a) 5 SVP drifters have been deployed by September 2005 in Sicily canal.

(b) 17 SVP drifters have been deployed in April 2006 during the EGYPT-1 cruise off Libya and Egypt

Purposes of programmes :

(a) Research : Understand the variability of the flow through the straight of Sicily and study the path of the Atlantic Water (surface circulation) and its variability in the south eastern basin of the Mediterranean Sea (see *www.ifremer.fr/lobtln*)

Deployment areas :
Eastern basin of the Mediterranean Sea.

N.B.: the EGYPT surface buoy part of the program has a joint Italian counterpart: EGITTO, from OGS/SIRE, P.M. Poulain, (see *http://poseidon.ogs.trieste.it/sire/drifter/egitto_data.html)*

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

C1. Wave measurement network

Number and type of buoys :

(a) CETMEF operates a network of 12 scalar buoys and 7 directional buoys (DATAWELL). In addition, CETMEF implemented wave measurement systems on two Aid-to-Navigation moored buoys. CETMEF also manages the real-time data for three directional Triaxys wave buoys owned by three French universities (Bordeaux, Pau and Banyuls) ;

(b) 16 buoys were operational at 31 August ;

(c) 7 were reporting on GTS at 31 August.

Purpose of programme :

(a) Operational : to maintain a long duration wave measurement network along the coast of the French mother and overseas territories coasts and to centralize the French wave data.

Deployment area :

French coasts and La Reunion Island.

Plans for the next 12 months :

The network will be maintained. CETMEF plans to complete it with one directional buoy. Real time data are available on the Internet at http://www.cetmef.equipement.gouv.fr/donnees/candhis/ and on the GTS thanks to Meteo-France.

C2. MAREL network

Number and type of buoys :

(a) CETMEF operates a network of two MAREL buoys. In addition, CETMEF operates one estuary station at Honfleur.
(b) Zero buoy was operational at 31 August;
(c) None was reporting on GTS at 31 August.

Purposes of programme :

To provide coastal environmental data in order to study and monitor the direct or indirect effects of human activities on marine environment ;
Web site : http://www.ifremer.fr/difMarelSeine/

Deployment area :

Bay of Seine

Plans for the next 12 months :

CETMEF will continue to maintain one buoy and estuary station in next 12 months.

D. IRD - French participation to PIRATA and to AMMA-EGEE programmes – (in cooperation with Meteo-France) and TAV-CLIVAR programmes (international collaborations)

A) PIRATA:

Number and type of buoys :

IRD operates a network of 5 Atlas buoys in the tropical Atlantic in co-operation with NOAA/PMEL; they are maintained yearly. Two of them were out of work (or without information) from September 2005 and January 2006, after their replacement in June 2005 during the PIRATA FR13 and EGEE 1 / PIRATA FR14 cruise. Thus:

(a) 5 Atlas buoys were reporting on GTS from June 18, 2005.
(b) 4 Atlas buoys were operational from September 18, 2005 to February 3, 2006.
(c) 3 Atlas buoys were operational from February 3, 2006 to June 2006.

All the buoys have been replaced (redeployed) in May-July 2006 during the EGEE 3 / PIRATA FR15 cruise, and thanks to the contribution of German METEOR and US RON BROWN vessel cruises for one site. An additional buoy has been deployed off Congo (6°S-8°E) in the framework of the PIRATA Southeastern Extension supported by South Africa and the BCLME program.

(d) 6 Atlas buoys were reporting on GTS from June 27, 2006 in the central and eastern tropical Atlantic.

The deployment of a CO2 sensor associated to the Atlas buoy at 10°W-6°S has also been ensured during the EGEE 3 / PIRATA FR15 cruise.

One currentmeter mooring (ADCP) is also maintained at 23°W-Equator by IRD from about five years (with periods of interruption). This mooring has been replaced and a second currentmeter mooring (ADCP) funded by IRD has been deployed at 10°W-

Equator by The German METEOR vessel in June 2006.

Purposes of programme :

The PIRATA programme is an extension of the TAO array in the Tropical Atlantic. Contributions are from Brazil, France and USA.

(a) Operational: to provide oceanographic and meteorological observations in real time to Weather Forecast Centres as well as to ocean global circulation modes (e.g. MERCATOR);
(b) Research : to describe and understand the evolution of SST, upper ocean thermal structure and air-sea fluxes of momentum, heat and fresh water in the Tropical Atlantic.

Web site : http://www.brest.ird.fr/pirata/piratafr.html

Deployment area :

Tropical Atlantic Ocean, ATLAS buoys located at: along the equator at 23°W, 10°W and 0°E, and at 10°W- 6°S, 10°W- 10°S and 8°E- 6°S (funded by BCLME).

B) AMMA-EGEE and TAV-CLIVAR:

During the EGEE 3 / PIRATA FR15 cruises (from May to July 2006) in the Eastern tropical Atlantic and Gulf of Guinea, 15 SVP buoys have been deployed. 10 of these buoys were funded by NOAA/AOML-GDC in the framework of CLIVAR, and 5 by Meteo-France in the framework of AMMA.

Plans for the next 12 months :

- IRD will continue in 2006 & 2007 to maintain the five PIRATA ATLAS buoys located in the Gulf of Guinea. Vessel time opportunity is available during the EGEE 5 cruise (scheduled in May-July 2007). The ATLAS buoy located at 23°W-Equator should be serviced by US-NOAA during their cruise dedicated to the servicing of the new NorthEastern PIRATA extension. The 23°W-0°N buoy could be maintained from an US or German vessel.
- During 2007 EGEE cruises, IRD will continue to deploy the SVP buoys provided by NOAA in the framework of CLIVAR.

E. IUEM (European Institute for Marine Studies, UBO) :

Number and type of buoys :

(a) The MAREL-Iroise project results from a IUEM-IFREMER-INSU collaboration ; the buoy is operational since July 2000; a PCO2 sensor adapted from the CARIOCA system is implemented on the buoy since March 2003
(b) The buoy was operational at 31 August
(c) It was not reporting on GTS at 31 August.

Purposes of programme :

The main aim of the IUEM observatory is to describe and understand the relative impact of climatic and anthropogenic strains on the coastal ecosystem “Bay of Brest-Iroise Sea”

Web site : http://www.ifremer.fr/mareliroise

Deployment area :

French coast

Plans for the next 12 months :

IUEM will continue to maintain the MAREL Iroise buoy.

F. SHOM (Hydrographic and Oceanographic Service of the Navy) Number and type of buoys :

(a) 72 drifting buoys owned by SHOM were deployed in last 12 months :

-21 Surdrift buoys (lagrangian drifters drogued between 15m and 1000m depth expandable & long-term life (8 month));

-27 WOCE (World Ocean Circulation Experiment) buoys;

-17 Davis Drifter (lagrangian drifters for measuring water currents within one meter of water surface);

-5 CMOD: Compact Meteorological and Oceanographic Drifter with 100m thermistor cable (10 thermistors);

-2 SVPB-TC : Surface drifter with 58m thermistor cable (10 thermistors)

(b) 38 buoys were operational at 31 August ;

(c) None was reporting on GTS at 31 August.

Purposes of program :

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

Deployment area :

North Atlantic

Plans for the next 12 months :

Nearly 80 surface lagrangian drifters will be deployed in the next 12 months.

G. IFREMER

Number and type of buoys :

(a) IFREMER operates two MAREL boys.

(b) One buoy was operational at 31 August (Boulogne).The buoy in the estuary of Vilaine is temporally stopped;

(c) None was reporting on GTS at 31 August.

Purposes of programme :

To provide coastal environmental data in order to study and monitor the direct or indirect effects of human activities on marine environment ;

Web site : http://www.ifremer.fr/difMarelCarnot/,

Deployment area :

Boulogne sur Mer

Estuary of Vilaine

Plans for the next 12 months :

IFREMER will continue to maintain the Boulogne's marine station and will put back the buoy in the estuary of Vilaine.

TECHNICAL DEVELOPMENTS

Instrumentation

(i) Meteo-France continues to participate in the evaluation of SVP pressure drifters. In parallel to the use of drifters, Meteo-France continuously surveys the performances of air pressure measurement for almost of the drifters of that kind deployed over the

World Ocean.

(ii) Meteo-France is participating in the evaluation of the WOTAN technique (Wind Observation Through Ambient Noise) applied to SVP drifters.

(iii) The evaluation of SVP-B drifters fitted with a conductivity sensor is going on (co-operation between Meteo-France and LODYC).

(iv) Meteo-France is participating in the evaluation of drifters fitted with thermistor string SVP-BTC. Four buoys, ordered to Marlin-Yug, were tested in summer 2006.

(v) Two IcexAir buoys were air deployed in summer 2006. These buoys having a 3 years lifetime should remain operational during the whole IPY (March 2007-March 2009).

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

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SPECIAL COMMENTS

(a) Buoy QC

(i) The Centre de Meteorologie Marine of Meteo-France continues to operate quality control procedures on drifting buoys data. Warning messages are sent to the *buoy-qc@vedur.is* mailing list of Internet when a problem appears (e.g. bad location detected) or when a modification seems needed (i.e. to recalibrate or to remove a sensor from GTS) via JCOMMOPS interface. Statistics on comparisons with analysis fields are set up for each buoy. Monthly statistics are sent to the *buoy-qc@vedur.is* mailing list too.

(ii) Buoy data QC tools developed by Meteo-France are available on the Internet (*http://www.meteo.shom.fr/qctools*) to help buoy operators to check their buoys : monthly statistics carried out by 5 meteorological centers 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.

(b) Buoy data

(i) The Centre de Meteorologie Marine of Meteo-France reports the wave data collected by CETMEF in real time onto the GTS.

(ii) Since 1 January 2002, Meteo-France has been providing the Coriolis Data Centre with surface current data computed thanks to SVP drifter tracks. CORIOLIS contributes to the French operational oceanographic project with in-situ data. Buoy positions, get from the GTS, are interpolated every 3 hours. Surface current data are computed over 6 hours, on a weekly basis. Data are flagged with drogue presence indexes. Wind speed and wind stress data from ECMWF analysis model coupled with sampled surface current data has been provided too from mid-2004.

(c) Other activities

(i) For the eleventh consecutive year, Meteo-France funded 10 barometers to be added to

SVP drifters deployed in the Tropical Indian Ocean, each year in November. Twelve other upgrades were funded in 2006. These drifters are devoted to the Southern Ocean, south of 40°S in the Indian Ocean, as a principle. These actions will be renewed in 2007.

(ii) IRD, also contributes to the deployment of SVP buoys in the equatorial Atlantic during the PIRATA servicing cruises and also in the framework of the EGEE / AMMA and CORIOLIS programmes

JAPAN

CURRENT PROGRAMMES

A. Japan Meteorological Agency (JMA)

Number and type of buoys:
(a) deployed during year:
(Type 1) 12 drifting buoys with air pressure, SST, wave height and wave period sensors
(Type 2) 15 profiling floats
(b) operational at 31 August:
(Type 1) 4
(Type 2) 13
(c) reporting on GTS at 31 August:
(Type 1) 4
(Type 2) 13
Purpose of programme: operational
Main deployment areas: seas around Japan

B. Meteorological Research Institute, JMA

Number and type of buoys:
(a) deployed during year: None
(b) operational at 31 August: 8 profiling floats
(c) reporting on GTS at 31 August: 8
Purpose of programme: oceanographic research (subarctic intermediate circulation)
Main deployment areas: Oyashio-Kuroshio mixed water region (seas east of Japan)

C. Japan Coast Guard

Number and type of buoys
(a) deployed during year:
(Type 1) 1 surface drifters with SST sensor
(Type 2) 3 surface drifters
(b) operational at 31 August:
(Type 1) 0
(Type 2) 1
(c) reporting on GTS at 31 August:
(Type 1) 0
(Type 2) 0
Purpose of programme: operational
Main deployment areas: the Antarctic Ocean

D. Japan Agency for Marine-Earth Science and Technology

Number and type of buoys:
(a) deployed during year:
(Type 1) 1 meteorological and oceanographic drifter (POPS)
(Type 2) 17 meteorological and subsurface oceanographic surface moorings (TRITON buoys)
(Type 3) 100 profiling floats
(b) operational at 31 August:
(Type 1) 1
(Type 2) 17

(Type 3) 350
(c) reporting on GTS at 31 August
(Type 1) 1
(Type 2) 15
(Type 3) 350
Purpose of programme:
(Type 1) meteorological and oceanographic research
(Type 2) meteorological and oceanographic research and ENSO monitoring
(Type 3) oceanographic research (Argo project)
Main deployment areas:
(Type 1) the Arctic Ocean
(Type 2) the western tropical Pacific and the eastern Indian Ocean
(Type 3) the North Pacific, the South Pacific, the South Indian, the Southern and the Arctic Oceans

E. Tohoku University

Number and type of buoys:
(a) deployed during year: 2 profiling floats
(b) operational at 31 August: 3
(c) reporting on GTS at 31 August: 3
Purpose of programme: oceanographic research
Main deployment areas: the North Pacific
("boundary area between subtropical and subarctic regions" & "Kuroshio Extension region")

F. National Institute of Polar Research

Number and type of buoys:
(a) deployed during year: 4 profiling floats
(b) operational at 31 August: 8
(c) reporting on GTS at 31 August: None
Purpose of programme: oceanographic research
Main deployment areas: the Indian sector of the Southern Ocean

G. National Research Institute of Fisheries Science, Fisheries Research Agency

Number and type of buoys:
(a) deployed during year: 2 profiling float
(b) operational at 31 August: 1
(c) reporting on GTS at 31 August: 1
Purpose of programme: oceanographic research
Main deployment areas: the North Pacific
("Kuroshio Extension region")

H. Tohoku National Fisheries Research Institute, Fisheries Research Agency

Number and type of buoys:
(a) deployed during year:
(Type 1) 0 profiling floats
(Type 2) 6 subsurface current meter moorings
(b) operational at 31 August:
(Type 1) 2
(Type 2) 6
(c) reporting on GTS at 31 August:

(Type 1) 2
(Type 2) 0
Purpose of programme:
(Type 1) oceanographic research (subarctic intermediate circulation)
(Type 2) oceanographic research (western boundary currenttransport)
Main deployment areas:
(Type 1) Oyashio-Kuroshio mixed water region (the western North Pacific)
(Type 2) Oyashio region (the western boundary current of subarctic North Pacific)

I. Hokkaido National Fisheries Research Institute, Fisheries Research Agency

Number and type of buoys:
(a) deployed during year: 0 profiling floats
(b) operational at 31 August: 5
(c) reporting on GTS at 31 August: 5
Purpose of programme: oceanographic research (subarctic intermediate circulation)
Main deployment areas: Oyashio-Kuroshio mixed water region (the western North Pacific)

PLANNED PROGRAMMES

A. Japan Meteorological Agency

Number and type of buoys planned for deployment in next 12 months:
(Type 1) 12 drifting buoys with air pressure, SST, wave height and wave period sensors
(Type 2) 15 profiling floats
Purpose of programme: operational
Main deployment areas: seas around Japan

C. Japan Coast Guard

Number and type of buoys planned for deployment in next 12 months: 3 surface drifters with SST sensor
Purpose of programme: operational
Main deployment areas: the Antarctic Ocean

D. Japan Agency for Marine-Earth Science and Technology

Number and type of buoys planned for deployment in next 12 months:
(Type 1) 1 meteorological and oceanographic drifters (POPS)
(Type 2) 17 meteorological and subsurface oceanographic surface moorings (TRITON buoys)
(Type 3) 88 profiling floats
Purpose of programme:
(Type 1) meteorological and oceanographic research
(Type 2) meteorological and oceanographic research and ENSO monitoring
(Type 3) oceanographic research (Argo project)
Main deployment areas:
(Type 1) the Arctic Ocean
(Type 2) the western tropical Pacific (15 buoys) and the eastern Indian Ocean (2 buoys)

(Type 3)	the North Pacific, the South Pacific, the Indian and the Southern Oceans

F. National Institute of Polar Research

Number and type of buoys planned for deployment in next 12 months:	1 profiling floats
Purpose of programme:	oceanographic research
Main deployment areas:	the Indian sector of the Southern Ocean

H. Tohoku National Fisheries Research Institute, Fisheries Research Agency

Number and type of buoys planned for deployment in next 12 months:	
(Type 1)	1 profiling float
(Type 2)	6 subsurface current meter moorings
Purpose of programme:	
(Type 1)	oceanographic research (mode water formation)
(Type 2)	oceanographic research (western boundary current transport)
Main deployment areas:	
(Type 1)	Subtropical region (subtropical North Pacific)
(Type 2)	Oyashio region (the western boundary current of subarctic North Pacific)

MALAYSIA

CURRENT PROGRAMMES

A. Agency or programme:

Number and type of buoys: (a) deployed during year: 2006

(b) operational at 31 August: two tsunami buoys alreadydeployed. One tsunami buoy scheduled for deployment soon

(c) reporting on GTS at 31 August:

Purpose of programme:

(a) operational: Malaysian Tsunami Early Warning System

(b) met/ocean research:

(c) developmental:

Main deployment areas: Near Pulau Rondo, Indonesia. Near Pulau Layang-Layang, South China Sea and Sulu Sea, Philippines

B. Agency or programme:
(as above, repeat as often as necessary)

PLANNED PROGRAMMES

A. Agency or programme:

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

Purpose of programme: (a) operational:

(b) met/ocean research:

(c) developmental:

Main deployment areas:

B. Agency or programme:
(as above, repeat as often as necessary)

TECHNICAL DEVELOPMENTS

(a) Buoy design:

The design objective is to have a strong but lightweight buoy. The materials are polyethylene, aluminium and stainless steel. The shape, size and geometric aspects are given by the dynamic response and stability requirements. With this in mind, the buoy is designed for safe and easy handling, and simple repair and maintenance even in the field.

Buoy characteristics:
Total weight with 200 kg counterweight: 900 kg
Diameter of float with fenders: 2.80 m
Maximum height from mast to bottom (depending on antenna): 6.75 m
Natural frequency in pitch: 0.5 Hz
Sensitivity in trim angle: < 1.0° at 2 knots current

(b) Instrumentation:

i) Seawatch Deep Sea Module (SDSM) - The SDSM consists of a high resolution pressure sensor interfaced to a processor, which is interfaced to an acoustic modem / release.

ii) Meteorological components – directional wave data sensor, wind sensor, and sea surface current sensor.

(c) Others: -

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

Deepwater tsunami surveillance systems for Malaysia under Malaysian Meteorological Department, by Fugro Ocenor and Astronautic Technology (M) Sdn Bhd.

SPECIAL COMMENTS (if any)

(a) Quality of buoy data:

(b) Communications:

The communication with the buoy is a bi-directional link based on the INMARSAT-C satellite system. In this system, it is possible to transmit data whenever wanted to. The buoy has configurable transmitting and receiving intervals. The Inmarsat-C satellite sends and receive unit used in the buoy (and onshore) is a Thrane & Thrane terminal (maritime version), which also includes a GPS receiver providing position information.

(c) Buoy lifetimes:

(d) Others:

THE NETHERLANDS

CURRENT PROGRAMMES

A. Agency or programme: Royal Netherlands Meteorological Institute (KNMI), Scientific Department (DUTCH ARGO Programme)

Number and type of buoys:
(a) deployed during year: 6 APEX ARGO buoys
(b) operational at 31 August: 11
(c) reporting on GTS at 31 August: 11

Purpose of programme:
(a) operational:
(b) met/ocean research: Participation in the ARGO buoy programme
(c) developmental:

Main deployment areas: North Atlantic

PLANNED PROGRAMMES

A. Agency or programme: KNMI full participation in E-SURFMAR (No more specific deployments through KNMI)

Purpose of programme:
(a) operational: E-SURFMAR
(b) met/ocean NMP/research:
(c) developmental:

Main deployment areas: North Atlantic/EUCOS Area

B. Agency or programme: KNMI, Scientific Department (DUTCH ARGO)

Number and type of buoys planned for deployment in next 12 months: 4 APEX ARGO buoys

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

Main deployment areas: North Atlantic

TECHNICAL DEVELOPMENTS

(a) Buoy design:

(b) Instrumentation:

(c) Others:

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

1. Statistics of buoy data from buoys within E-SURFMAR programme are published in monthly statistics (Météo-France).
2. ARGO Database

SPECIAL COMMENTS (if any)

(a) Quality of buoy data: see under Publications

(b) Communications: all buoys are tracked and monitored by CLS Argos System

(c) Buoy lifetimes: see relevant E-SURFMAR documents

(d) Others:

NEW ZEALAND

CURRENT PROGRAMMES ***(for period 1 Oct 2005 – 1 Oct 2006)***

A **Agency or programme:** Meteorological Service of NZ Ltd (MSNZ)

Number and type of buoys:
(a) Deployed during the year: **4**
4 SVP-B
(b) Operational at 31 August: **7**
(c) Reporting on GTS at 31 August: **7**

Purpose of programme: Real-time buoy data for MetService Weather Forecasting activities

Main deployment area: Tasman Sea

B **Agency or programme:** MSNZ Barometer Upgrade Programme for SOBP

Number and type of buoys:
(a) Deployed during the year: **5**
(b) Operational at 31 August: **5**
(c) Reporting on GTS at 31 August: **5**

Purpose of programme: To increase the number of pressure observations in the data-sparse Southern Ocean for MetService's Forecasting Operations and for ingest by global models.

Main deployment area: Southern Pacific Ocean.

C **Agency or programme:** Global Drifter Programme for SOBP

Number and type of buoys:
(a) Deployed during the year: **15**
15 SVP-B
(b) Operational at 31 August: **14**
(c) Reporting on GTS at 31 August: **14**

Purpose of programme: To provide deployment opportunities and logistical support to the GDP to increase the number of buoy observations in the Southern Ocean.

Main deployment area: Southern Pacific Ocean.

PLANNED PROGRAMMES ***(for period 1 Oct 2006 – 1 Oct 2007)***

A **Agency or programme:** Meteorological Service of NZ Ltd (MSNZ)

Number and type of buoys planned for deployment in next twelve months: **5 SVPB**

Purpose of programme: Real-time buoy data for MetService Weather Forecasting activities

Main deployment area: Tasman Sea

B **Agency or programme:** MSNZ Barometer Upgrade Programme for SOBP

Number and type of buoys planned for deployment in next twelve months: **10 SVPB**

Purpose of programme: To increase the number of pressure observations in the data-sparse Southern Ocean for MetService's Forecasting Operations and for ingest by global models.

Main deployment area: Southern Pacific Ocean.

C **Agency or programme:** Global Drifter Programme for SOBP

Number and type of buoys planned for deployment in next twelve months: **5 SVPB**

Purpose of programme: To provide deployment opportunities and logistical support to the GDP to increase the number of buoy observations in the Southern Ocean.

Main deployment area: Southern Pacific Ocean.

TECHNICAL DEVELOPMENTS

(a) Buoy design:

(b) Instrumentation:

(c) Others:

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

SPECIAL COMMENTS (if any)

(a) Quality of buoy data:

(b) Communications:

(c) Buoy Lifetimes:

The MetService Tasman Sea Buoy Network now consists entirely of SVPB type buoys. The first SVPB buoy was deployed into the network in April 2002 and gradually as the FGGE type buoys died, they were replaced with SVPB buoys. The last FGGE buoy was deployed in October 2004 and finished in April 2006.

Since 2002, eleven Technocean SVPB buoys have been deployed into the Tasman Sea network. Four of these have finished having achieved average lifetimes of 15.2 months each. Lifetime is counted for as long as good pressure data remains on GTS, or until battery or transmission failure. The remaining seven buoys are all still operational, one has been reporting for 30 months, and

two others for more than 12 months. The other four buoys are newly deployed.

Since 2000, eighteen of the GDC Technocean SVPB buoys deployed by MetService have failed after an average lifetime of 16.5 month each. The maximum lifetime achieved by one GDC buoy was 42.4 months and the shortest lifetime was 1.8 months when the barometer data was removed from GTS.

Of the Technocean MetService Barometer Upgrade buoys deployed since 2000, thirteen buoys have failed after achieving average lifetimes of 19.4 months each. The longest lifetime achieved by these Upgrades was 48.7 months and the shortest was 1.1 months due to unreliable barometer data.

(d) Others:

NIGERIA

AGENCY: NIGERIAN METEOROLOGICAL AGENCY (NIMET)

A. *CURRENT PROGRAMMES*

There are presently no buoys in Nigeria's territorial waters. Observations are made from four shoreline marine meteorological stations.

Met/Ocean Research: There are on going research activities on Storm Surges. Two of the research topics in marine meteorology are:

- Ocean surges and its implications in coastal region of Nigeria-a case study of Bar Beach in Lagos. With the Atlantic Ocean overflowing its bank, the resulting flooding has become an annual occurrence, adversely affecting Nigerian coastline, port and harbour activities. The Nigerian coast is of low topographic gradient and is exposed to dramatic flooding from storm surges. Researches have shown that from April to October, large swells are generated as a result of low pressure system far in the South Atlantic Ocean. The swells become more active due to wind force and fetch. They travel coastward in the face of southwesterly wind and low coastal atmospheric pressure. The pressure values, wind speed and direction over the ocean and at the coast have been investigated.

  This research is necessitated by the fact that the coastal area
  - Is densely populated.
  - Has a lot of commercial activities
  - Is a region of on going oil installation especially in the Niger Delta

- Sea state prediction using empirical and numerical techniques. Sea state prediction involves using model output products such as surface winds over the sea, which are injected into a parametric ocean model (POM). The output from the model includes both meteorological and oceanographic information necessary for ocean going vessel, oil rigs, sea farer, etc

(b) *PLANNED PROGRAMMES*

The Nigerian Meteorological Agency has in its plans for the next 12 months to purchase and install three (3) buoys in Nigeria's territorial waters the gulf of Guinea.

The purpose of the programme is to generate real time marine meteorological data namely:

- wind speed
- Wind direction
- Air temperature
- Sea surface temperature (SST)
- Wave height
- Wave period
- Barometric pressure
- Ocean current
- etc

This will enhance NIMET's database and capacity for more accurate marine weather forecast, storm surges forecast, research in marine meteorology and oceanography and meet users need.

Main deployment Areas: These moored buoys are to be deployed in:

- Lagos
- Port Harcourt
- Eket Areas

Global Telecommunication System (GTS): It is expected that when the buoys are deployed in Nigeria's territorial waters, the Nigerian Meteorological Agency will be able to report to the GTS.

(c) ***TECHNICAL DEVELOPMENT***

Buoy Design: Welded aluminum. Six water tight buoyancy compartments plus one watertight central compartment for electronics batteries and sensors. Aluminum super structure and Steel substructure. Dimensions: 3m diameter by 3.4m high

Instrumentation: To be equipped with meteorological and oceanographic sensors for wind speed, Wind direction, Air temperature, Sea surface temperature, Wave height, Wave period, Barometric pressure and Ocean current

Communication: Geostationary satellite or direct radio Power: Primary Batteries and solar supplemented.

REPUBLIC OF KOREA

CURRENT PROGRAMMES

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

Number and type of buoys: (a) deployed during year: 2 moored buoys (replacement)

(b) operational at 31 August: 5 moored buoys

(c) reporting on GTS at 31 August: 5 moored buoys

Purpose of programme: (a) operational: 5

(b) met/ocean research:

(c) developmental:

Main deployment areas: regional sea around the Korea Peninsula

B. **Agency or programme**: Meteorological Research Institute (2397)/ Korea Meteorological Administration

Number and type of buoys: (a) deployed during year: 15 Argo floaters

(b) operational at 31 August: 56 Argo floaters

(c) reporting on GTS at 31 August: 56 Argo floaters

Purpose of programme: (a) operational:

(b) met/ocean research: 56

(c) developmental:

Main deployment areas: the East Sea (Japan Sea) and the West Pacific

C. **Agency or programme**: Korea Ocean Research & Development Institute (2096)

Number and type of buoys: (a) deployed during year: 15 Argo floaters

(b) operational at 31 August: 47 Argo floaters

(c) reporting on GTS at 31 August: 47 Argo floaters

Purpose of programme: (a) operational:

(b) met/ocean research: 47

(c) developmental:

Main deployment areas: the East Sea (Japan Sea) and the Antarctic Sea

D. **Agency or programme**: National Oceanographic Research Institute/ Ministry of Maritime Affairs & Fisheries

Number and type of buoys: (a) deployed during year: 1 moored buoy

(b) operational at 31 August: 1 moored buoy

(c) reporting on GTS at 31 August:

Purpose of programme: (a) operational: 1

(b) met/ocean research:

(c) developmental:

Main deployment areas: the southern area of the Korea Peninsula

PLANNED PROGRAMMES

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

Number and type of buoys planned for deployment in next 12 months: 1 moored buoys (replacement)

Purpose of programme: (a) operational: 1

(b) met/ocean research:

(c) developmental:

Main deployment areas: the East Sea (Japan Sea)

B. **Agency or programme:** Meteorological Research Institute (2397)/ Korea Meteorological Administration

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

Purpose of programme: (a) operational:

(b) met/ocean research: 15

(c) developmental:

Main deployment areas: the East Sea (Japan Sea) and the West Pacific

C. **Agency or programme:** Korea Ocean Research & Development Institute (2096)

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

Purpose of programme: (a) operational:

(b) met/ocean research: 15

(c) developmental:

Main deployment areas: the East Sea (Japan Sea) and the Antarctic Sea

D. Agency or programme: National Oceanographic Research Institute/ Ministry of Maritime Affairs & Fisheries

Number and type of buoys planned for deployment in next 12 months: 1 moored buoys

Purpose of programme: (a) operational: 1

(b) met/ocean research:

(c) developmental:

Main deployment areas: the southern area of the Korea Peninsula

SOUTH AFRICA

CURRENT PROGRAMME (1 September 2005 ~ 31 August 2006)

A. Agency or programme: South African Weather Service. Drifting weather buoys.

All deployments are NOAA/AOML SVP buoys with B upgrades by SAWS

Number and type of buoys:

(a) Deployed during the year: 32.

Gough:	9
SANAE:	19
AX-18:	3
West Coast:	1

Two SVP-B's which were fixed on Tristan da Cunha and S Thule were replaced by ICEX aws, and the SVP-B's were redeployed.

Two SVP-B's were deployed for BOM between Cape Town and Marion Island. These two have been replaced by BOM.

(b) SAWS have 13 operational drifters.
NOAA/AOML with B upgrade by SAWS = 28 in operation.

(c) Reporting on GTS: 13 + 28 = 41.

Purpose of Programme:

(a) Weather Forecasting
(b) N/A
(c) N/A

Main Deployment Areas:

South Atlantic Ocean
Antarctic Ice Zone
Southern Indian Ocean

B. South African Weather Service: Introduce neighbouring countries to our activities in Southern Oceans.

A representative from Tanzania weather service was taken on the SA Agulhas voyage to Gough in September.
In addition, a representative from Namibia weather service was taken on the SA Agulhas voyage to Antarctica in December~January.

PLANNED PROGRAMME:

A. Agency or programme: South African Weather Service. Drifting weather buoys.

All deployments are NOAA/AOML SVP buoys with B upgrades by SAWS

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

Gough:	10
SANAE:	15
Tristan da Cunha fixed:	1
Tristan da Cunha: Deployments:	4

AX-18:	2
Drake Passage~Falklands:	6
45S ~ 55S :	4
Total:	42

Purpose of Programme:

(a) Weather Forecasting
(b) N/A
(c) N/A

Main Deployment Areas:

South Atlantic Ocean
Antarctic Ice Zone
Southern Indian Ocean

TECHNICAL DEVELOPMENTS: N/A

PUBLICATIONS: N/A

SPECIAL COMMENTS:

(a) Quality of buoy data: N/A
(b) Communications: N/A
(c) Buoy Lifetimes:
Of 32 drifters deployed during the last year, 9 failed on deployment and at the time of writing another three have stopped transmitting. This high failure rate was discussed at the ISABP, Buenos Aires and taken up with the manufacturer. No explanation was offered.

(d) Others: The SAWS is investigating the possibility of replacing the two defective LUT's on Gough and Marion islands.

UKRAINE
(in cooperation with Naval Oceanographic Office, USA)

CURRENT PROGRAMMES

A. Agency or programme: Marine Hydrophysical Institute of Ukrainian Academy of Science

Number and type of buoys:
(a) deployed during year: 8
SVP-BT mini 2
SVP-BT GPS mini 2
SVP-BTC60 2
SVP-BTC80 2

(b) operational at 31 August: 8

(c) reporting on GTS at 31 August:

Purpose of programme:
(a) operational:

(b) met/ocean research: Investigation of mesoscale dynamics and heat processes in active layer

(c) developmental: Investigation of the ways to build reliable SVP-B mini drifter as well as SVP-BTC drifter with longer lifetime of temperature chain and more temperature sensors

Main deployment areas: Black Sea

PLANNED PROGRAMMES

A. Agency or programme: Marine Hydrophysical Institute of Ukrainian Academy of Science (in coordination with Steering Team of the DBCP Drifter Iridium Pilot Project)

Number and type of buoys planned for deployment in next 12 months: 6
SVP-B mini with Iridium terminal 3
SVP-B with Iridium terminal 3

Purpose of programme:
(a) operational: Black Sea Buoy Program (BSBP) as a part of E-SURFMAR

(b) met/ocean research: Investigation of mesoscale dynamics in the sea

(c) developmental: Evaluation of Iridium system for drifter applications

Main deployment areas: Black Sea

TECHNICAL DEVELOPMENTS

(a) Buoy design: SVP-B, SVP-B mini drifters equipped with Iridium terminals

(b) Instrumentation: Investigation of all the sides connecting with reliable application of the WOCE drifters with Iridium link

(c) Others: Investigation of barometric pressure measurements by SVP-B mini drifters (34-cm hull) in contrast with SVP-B drifters (41-cm hull)

PUBLICATIONS *(on programme plans, technical developments, QC reports, etc.)*
DBCP Workshop Technical Documents
Marlin-Yug Web-site: http://www.marlin-yug .com

SPECIAL COMMENTS (if any)

(a) Quality of buoy data: Through Météo-France QC system

(b) Communications: Iridium satellite system

(c) Buoy lifetimes: Mean lifetime of drifters in the Black Sea –4-5 months

(d) Others:

UNITED KINGDOM

UK National Report to the DBCP, 2006

Organisation	Type of programme	Platforms deployed in 2006	Location	Active at 31 Aug / on GTS at 31 Aug	Platforms planned for 2007	Location
Met Office	Moored buoy network	10 (includes 2 inshore buoys and 2 operated jointly with Météo France)	UK waters and Biscay	10/10	9 (K3 to be withdrawn when new Irish M6 buoy on station)	UK waters and Biscay
	Drifting buoy network	5 SVP-B drifters deployed (Dec 2005) 1 IcexAir buoy (deployed in 1999) transmitted during the summer	Southern Ocean Arctic	5/5 Inactive or deceased	5 SVP-B drifters	Southern Ocean
	Argo float programme	34 deployed in year to end Aug 2006	N Atlantic, S Atlantic, Indian and Southern Oceans	90/88	~30-40 new floats	N Atlantic, S Atlantic, Indian and Southern Oceans
NOCS	Oceanographic research	3 gliders	Mediterranean			
Plymouth Marine Laboratory	Tracer patch monitoring	1			1 GPS/Argos drifter	Mediterranean
Scottish Association for Marine Science and University of Cambridge	Sea ice research	11 Iridium ice buoys 2 SVP-Bs	Arctic Ocean Weddell Sea	2	8 Iridium ice buoys	Arctic

Technical Developments

Within the Met Office, a project has been progressed to upgrade the moored buoys to (i) replace the cup and vane anemometer with a Gill Windsonic (to improve reliability and extend the servicing interval), (ii) use Iridium as an alternative communications system alongside Meteosat DCP (to provide improved resilience and capacity) and (iii) provide the capability to report 3D wave spectra (using a Triaxys sensor/Iridium). Plans are to deploy the spectral wave capability (to meet E-SURFMAR requirements) on K5 by October 2006 and to operate the Aberporth buoy with a sonic (alongside a cup and vane) anemometer over the winter 2006/07 prior to rollout of sonics across the network in 2007/08.

The Scottish Association for Marine Science and University of Cambridge continue to make Iridium deployments in the Arctic as part of an EU-funded study to investigate changing patterns of sea ice dynamics and thickness.

UNITED STATES OF AMERICA

CURRENT PROGRAMMES

A. Agency or programme: National Oceanic and Atmospheric Administration (NOAA)/National Weather Service (NWS) /National Data Buoy Center (NDBC) Moored Buoys (Met/ocean)

Number and type of buoys: (a) deployed during year: 1

(b) operational at 31 August: 98

(c) reporting on GTS at 31 August: 92

Purpose of programme: (a) operational: □

(b) met/ocean research:

(c) developmental:

Main deployment areas: Atlantic and Pacific Oceans and coastal zone of U.S., including Bering Sea, Gulf of Mexico, and Great Lakes

PLANNED PROGRAMMES

A. Agency or programme: National Oceanic and Atmospheric Administration (NOAA)/National Weather Service (NWS) /National Data Buoy Center (NDBC) Moored Buoys (Met/ocean)

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

Purpose of programme: (a) operational: □

(b) met/ocean research:

(c) developmental:

Main deployment areas: Primarily northern hemisphere

CURRENT PROGRAMMES

B. Agency or programme: NOAA/NWS/NDBC Deep-Ocean Assessment and Reporting of Tsunamis (DART) buoys

Number and type of buoys: (a) deployed during year: 13

(b) operational at 31 August: 19

(c) reporting on GTS at 31 August: 18

Purpose of programme: (a) operational: □

(b) met/ocean research:

(d) developmental:

Main deployment areas: Pacific, Atlantic, Gulf of Mexico

PLANNED PROGRAMMES

B. Agency or programme: NOAA/NWS/NDBC Deep-Ocean Assessment and Reporting of Tsunamis (DART) buoys

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

Purpose of programme: (a) operational: □

(b) met/ocean research:

(c) developmental:

Main deployment areas: Pacific, Atlantic, Gulf of Mexico, Indian Ocean

SPECIAL COMMENTS (if any)

(a) Quality of buoy data: Real-time automated quality control applied to all data prior to release of NDBC's data.

(b) Communications: NDBC communications via satellite. Scheduled hourly data transmission via GOES and Iridium from moored buoys. Non-scheduled data transmitted from drifters and floats, and moored buoy position fixing by POES and Service Argos.

(c) Buoy lifetimes: NDBC planned service intervals every 2 to 3 years; discrepancy response to repair failures as needed.

(d) Others:

Teng, C.C., L. Bernard, B. Taft, and M. Burdette (2005), A Compact Wave and Ocean Data Buoy System, Proceedings of OCEANS 2005 Conference, Washington, D.C.

CURRENT PROGRAMMES

C. Agency or programme: NOAA/Pacific Marine Environmental Laboratory (PMEL)/NDBC Tropical Atmosphere Ocean (TAO) Project

Number and type of buoys: (a) deployed during year: 55 surface toroids, 4 subsurface

(b) operational at 31 August: 50 surface, 4 subsurf.

(c) reporting on GTS at 31 August: 54 surface

Purpose of programme: (a) operational: □

(b) met/ocean research:

(c) developmental:

Main deployment areas: Tropical Pacific

PLANNED PROGRAMMES

C. Agency or programme: NOAA/Pacific Marine Environmental Laboratory (PMEL)/NDBC Tropical Atmosphere Ocean (TAO)

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

Purpose of programme: (a) operational:

(b) met/ocean research:

(c) developmental:

Main deployment areas: Tropical Pacific

CURRENT PROGRAMMES

D. Agency or programme: NOAA/ Pacific Marine Environmental Laboratory (PMEL)/PIRATA

Number and type of buoys: (a) deployed during year: 8 surface toroids,

(b) operational at 31 August: 15

(c) reporting on GTS at 31 August: 15

Purpose of programme: (a) operational:

(b) met/ocean research: □

(c) developmental:

Main deployment areas: Tropical Atlantic

PLANNED PROGRAMMES

D. Agency or programme: NOAA/PMEL/PIRATA

Number and type of buoys planned for deployment in next 12 months: 18

Purpose of programme: (a) operational:

(b) met/ocean research: □

(c) developmental:

Main deployment areas: Tropical Atlantic

CURRENT PROGRAMMES

E. Agency or programme: NOAA/ Pacific Marine Environmental Laboratory (PMEL)PMEL/Indian Ocean

Number and type of buoys: (a) deployed during year: 0

(b) operational at 31 August: 1 surface, 1 subsurface

(c) reporting on GTS at 31 August: 1

Purpose of programme: (a) operational:

(b) met/ocean research: □

(c) developmental:

Main deployment areas: Indian Ocean

PLANNED PROGRAMMES

E. Agency or programme: NOAA/ Pacific Marine Environmental Laboratory (PMEL)PMEL/Indian Ocean

Number and type of buoys planned for deployment in next 12 months: 8 surface toroids, 2 subsurface

Purpose of programme: (a) operational:

(b) met/ocean research: □

(c) developmental:

Main deployment areas: Tropical Indian Ocean

SPECIAL COMMENTS (if any)

(a) Quality of buoy data: Monitored Daily

(b) Communications: Service Argos communications.

(c) Buoy lifetimes: 1 year

(d) Others:

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

Freitag, H. P., M. J. McPhaden, M. F. Cronin, C. L. Sabine. D. C. McClurg and P. D. McLain, 2006: PMEL Contributions to the OceanSITES Program. In: Proceedings of the OCEANS '06, MTS/IEEE meeting, September 19-21, 2006, Boston, MA.

Freitag, H.P, T.A. Sawatzky, K.B. Ronnholm, and M.J. McPhaden, 2005: Calibration procedures and instrumental accuracy estimates of next generation water temperature and pressure measurements. NOAA Tech. Memo OAR PMEL-128, NOAA/Pacific Marine Environmental Laboratory, Seattle, WA, 22 pp.

Teng, C.C., L. Bernard, and P. Lessing (2006), Technology Refresh of NOAA's Tropical

Atmosphere Ocean (TAO) Buoy System, Proceedings of OCEANS 2006 Conference, Boston, Massachusetts.

CURRENT PROGRAMMES

F. Agency or programme: NOAA/AOML Global Ocean Observing System Center, Global Drifter Program

Number and type of buoys: (a) deployed during year: 903

(b) operational at 31 August: 901

(c) reporting on GTS at 31 August: 901

Purpose of programme: (a) operational: □

(b) met/ocean research: □

(c) developmental:

Main deployment areas: Global, all Oceans

PLANNED PROGRAMMES

F. Agency or programme: NOAA/AOML Global Ocean Observing System Center, Global Drifter Program

Number and type of buoys planned for deployment in next 12 months: 960

Purpose of programme: (a) operational: □

(b) met/ocean research: □

(c) developmental:

Main deployment areas: Global, All Oceans

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

Lumpkin R. and M. Pazos, 2005: Measuring surface currents with Surface Velocity Program drifters: the instrument, its data, and some recent results. To appear in Lagrangian Analysis and Prediction of Coastal and Ocean Dynamics_, ed. A. Mariano, T. Rossby and D. Kirwan.

CURRENT PROGRAMMES

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

Number and type of buoys: (a) deployed during year: 40 SVP-B, 20 SVP-BW, 31 CODE

(b) operational at 31 August: 36 surface drifters, 28 floats

(c) reporting on GTS at 31 August: 36, 28 floats

Purpose of programme: (a) operational:

(b) met/ocean research:

(c) developmental:

Main deployment areas: Primarily northern hemisphere

PLANNED PROGRAMMES

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

Number and type of buoys planned for deployment in next 12 months: 60 SVP-B, 22 SVP-BW, 40 CODE, 20 floats

Purpose of programme: (a) operational:

(b) met/ocean research:

(c) developmental:

Main deployment areas: Primarily northern hemisphere

SPECIAL COMMENTS: Commander, Naval Oceanography Command authorized/funded 4 buoy deployment missions plus IABP support for FY07. Unlikely the aircraft program will exist past FY07 (30 Sept 2007). Ship program is slowly being developed.

(a) Quality of buoy data: Very good.

(b) Communications: Occasionally data are received at NAVOCEANO in the wrong format, but CLS staff is very quick to re-send and fix the problem. CLS US experienced a problem getting National Weather Service to post NAVOCEANO data to DBCP GTS bulletin header SSVX10 KARS for SVP-BW drifters deployed in the ISABP area of interest in July.

(c) Buoy lifetimes: CODE and SVP-B drifters are equipped with GPS transmitters, so have shorter life expectancies

(d) Others:

CURRENT PROGRAMMES

H. Agency or programme: NOAA/AOML Global Ocean Observing System Center, Global Drifter Program

Number and type of buoys: (a) deployed during year: 884 (as of Aug 31, 2006)

(b) operational at 31 August: 1127

(c) reporting on GTS at 31 August: 1059

Purpose of programme: (a) operational: 645

(b) met/ocean research: 239 CORC

(c) developmental:

Main deployment areas: Global, all Oceans

PLANNED PROGRAMMES

H. Agency or programme:

Number and type of buoys planned for deployment in next 12 months: 960

Purpose of programme: (a) operational: 760

(b) met/ocean research: 200

(c) developmental:

Main deployment areas: Global, All Oceans

TECHNICAL DEVELOPMENTS

(a) Buoy design:

(b) Instrumentation:

(c) Others:

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

Fratantoni, D. and P. Richardson, 2006: The Evolution and Demise of North Brazil Current Rings. *J. Phys. Oceanogr.*, **36** (7), 1241-1264.

Hughes, Chris W., 2005: Nonlinear vorticity balance of the Antarctic Circumpolar Current. *J. Geophys. Res.*, **110**, No. C11, C11008, 10.1029/2004JC002753.

LaCasce, J., 2006: Eulerian and Lagrangian Velocity Distributions in the North Atlantic. *J. Phys. Oceanogr.*, **35** (12), pp. 2327–2336.

Lumpkin, R. and M. Pazos, 2006: Measuring surface currents with Surface Velocity Program drifters: the instrument, its data, and some recent results. Chapter two of “Lagrangian Analysis and Prediction of Coastal and Ocean Dynamics” (LAPCOD) ed. A. Griffa, A. D. Kirwan, A. J. Mariano, T. Ozgokmen, and T. Rossby.

SPECIAL COMMENTS (if any)

(a) Quality of buoy data:

(b) Communications:

(c) Buoy lifetimes:

(d) Others:

REPORTS FROM THE DBCP ACTION GROUPS

At its tenth session (La Jolla, November 1994), the Panel adopted the following guidelines regarding its action groups:

1. An action group of the DBCP is an independent self-funded body that maintains, as a significant element of its responsibilities, an observational buoy programme providing meteorological and oceanographic data for real-time and/or research purposes in support of the World Weather Watch, the World Climate Research Programme, the Global Climate Observing System, the Global Ocean Observing System and other relevant WMO and IOC programmes.

2. Action groups of the DBCP shall support the aims and objectives of the DBCP as set out in the terms of reference of the DBCP in particular with respect to:

(a) Provision of good quality and timely data to users;
(b) Insertion of real-time (or near real-time) data into the GTS;
(c) Exchange of information on data buoy activities, development, and transfer of appropriate technology.

3. An action group may be regional or national in nature provided that its programme benefits a regional or international community.

4. To be adopted as an action group of the DBCP the terms of reference or operating principles of the body or programme shall be submitted to a session of the DBCP for formal approval. Once approved these shall be lodged with the WMO and IOC Secretariats.

5. On its part the DBCP shall support the activities of its adopted action groups and especially through the assistance of the officers of the DBCP, it's Technical Coordinator and the WMO and IOC Secretariats as far as resources allow.

6. Action groups of the DBCP shall submit annual reports of their activities to the DBCP chairperson.

The Panel has at present nine action groups; 8 of them submitted reports as follows:

EUCOS-SURFACE MARINE PROGRAMME (E-SURFMAR)

1. INTRODUCTION

On 1 April 2003, an optional programme, E-SURFMAR, was established by the European Meteorological Network (EUMETNET) within the framework of its Composite Observing System (EUCOS). Its main objectives are to co-ordinate, optimise and progressively integrate the European activities for surface observations over the sea – including drifting and moored buoys, and voluntary observing ships. Fifteen EUMETNET members agreed to participate in the first four years of the programme (2003-2006): Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Netherlands, Norway, Portugal, Spain, Sweden and United Kingdom.

According to a Memorandum of Understanding, signed in 2004 between the European Group on Ocean Stations (EGOS) and E-SURFMAR, it was agreed that, from 1st January 2005, E-SURFMAR would assume overall responsibility for the moored and drifting buoy networks managed by EGOS. The responsibilities of EGOS members have been transferred to an E-SURFMAR Data Buoy Technical Advisory Group (DB-TAG). E-SURFMAR was adopted as an action group of the DBCP, replacing EGOS at the DBCP twentieth session (Chennai, India 18-22 October 2004).

Financial contributions to the programme are shared among the participants according to the GNI of their respective country. For data buoys, the E-SURFMAR budget includes : the funding of a part time Data Buoy Manager; the purchase of drifting buoys; funding of drifting buoy communication costs from 1st January 2006; compensations for the amortization and the maintenance of 4 moored buoys; and the contributions of participants to the DBCP fund.

2. PROGRAMME MEETINGS

-The first E-SURFMAR Data Buoy Technical Advisory Group (DB-TAG) meeting took place immediately following the closure of the final meeting of the EGOS Management Committee (Geneva 18-19 January 2005).

-The second DB-TAG meeting was held in Hamburg 31May to 1 June 2005.

-The third DB-TAG meeting was held in Galway 13-14 June 2006.

3. OPERATIONAL PROGRAMME

3.1 Drifting buoys

Year	SVP-B	SVP-BW	FGGE	FGGE-W	Other	Total
1996-97	13	0	17	13	0	**43**
1997-98	28	7	14	4	0	**53**
1998-99	30	4	21	6	6	**67**
1999-00	41	5	15	6	2	**69**
2000-01	19	2	7	4	0	**32**
2001-02	36	5	8	0	0	**49**
2	4	5	8	2	0	**6**

002-03	5					**0**
2003-04	26	3	4	0	0	**33**
2004-05	51*	1	4	0	0	**56**
2005-06	56*	1	0	0	2	**59**
Total	**345**	33	98	35	10	**521**

Table 1. The number of drifting buoys deployed for according to buoy type
(Reference period : 1st Sept to 31st Aug.)

As shown in table 1, **59 drifting buoys** were deployed between September 2005 and August 2006 including (*) 14 upgrades of SVP drifters.

Many of the deployments in 2005/06, as in previous years, were carried out by research vessels, voluntary observing ships, and ships of opportunity plying the Atlantic Ocean from ports including Halifax (Canada), Reykjavik (Iceland), Le Havre (France), Fos (France), Brest (France), London (UK), Fairlie (UK), Charleston (USA), Norfolk (USA), Bergen (Norway). Five drifters were also deployed in the Western Mediterranean Sea, three were drifters from OGS, (Instituto Nazionale di Oceanographia e Geofisica Sperimentale, Italy) upgraded with barometers. Eleven drifters from GDP upgraded with barometers were deployed in May and July 2006 by a ship plying from USA to Europe.

Although the E-SURFMAR area of interest is mainly up to 70°N (i.e. to the ice limits), the EUCOS area actually extends to 90°N. Two IcexAir buoys were air deployed in Summer 2006 in the Arctic. These buoys, which have a 3 year lifetime, should remain operational during the whole IPY (International Polar Year, March 2007- March 2008) period.

Year	**1997-98**	**1998-99**	**1999-00**	**2000-01**	**2001-02**	**2002-03**	**2003-04**	**2004-05**	**2005-06**
Ship	39	45	46	24	39	50	33	56	57
Air	14	22	23	8	10	10	0	0	2
%Air	26%	33%	29%	25%	20%	17%	0%	0%	3%
Total	**53**	**67**	**69**	**32**	**49**	**60**	**33**	**56**	**59**

Table 2. The number of drifting buoys deployed for EGOS/E-SURFMAR
according to deployment method
(Reference period : 1st Sept to 31st Aug.)

The number of operational buoys providing Air Pressure (AP) measurements, generally between 40 and 50 since 2000, is now above 60. The deployment of SVP-B drifters has been growing every year, further increased by the use of barometer upgrades from 2005. In contrast the deployment of FGGE type buoys has been decreasing (see Figure 1) and this kind of buoy is no longer used within E-SURFMAR. The minimum number of operational drifting buoys at the end of each month in 2005-2006 was 53 (in February 2006) and maximum was 72 (in April 2006).

The mean lifetime of the SVP-B drifters was approximately 12 months (372 days) if we exclude the 8 early failures, 10 months (306 days) if we include them. The average age of the network was 239 days by the end of August 2005 and 323 days by the end of August 2006. Forty-five buoys failed to report air pressure measurements.

All drifting buoys use the Argos system to report their data. Most use the DBCP-M2 format which significantly increases the availability of the data to the GTS.

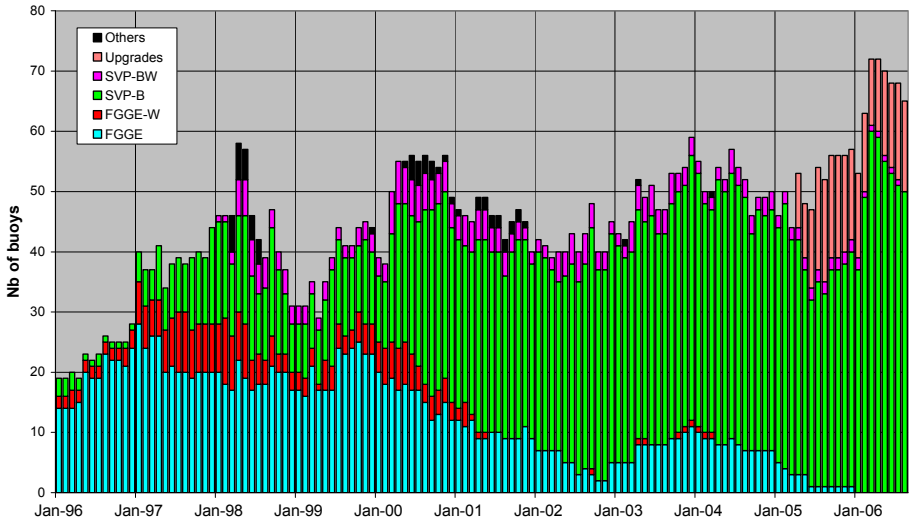


Figure 1. The number of operational EGOS/E-SURFMAR drifting buoys by the end of each month from 1996 to 2006

The availability, timeliness and quality of drifting buoy data continue to be carefully monitored.

The availability of data depends on the number of buoys operating in the EUCOS area. The number of reports received within 30 minutes remains stable (200 per day on average) whilst the total number of reports increased. About 1600 hourly observations per day had been reported on the GTS since April 2006.

The data are processed from 5 satellites by CLS Argos. About 80% are received by HH+120.

The AP differences from the French model outputs showed that the target of 1% of Gross Errors was easily being achieved. The RMS of AP differences had a significant seasonal variation, being higher in winter than in summer. This could be due to less accurate measurement in rough seas and to more low pressure systems crossing the North Atlantic.

Real time observations from drifting buoys are subject to routine quality monitoring. Besides monthly statistics provided by various meteorological centres for individual buoys, tools have been developed by Météo-France to identify buoys reporting dubious data as quickly as possible. Among these tools is a blacklist computed over the previous 14 days which is available on the web at: http://www.meteo.shom.fr/qctools/eblackap.htm .

3.2 Moored buoys

In 2004 the E-SURFMAR design study recommended that four moored buoys were needed to meet the EUCOS requirements, i.e. providing a suitable network to improve the quality of regional NWP over Europe, and for the validation and calibration of satellite wind and wave measurements. The four E-SURFMAR moored buoys are operated by UK, Ireland, France and Spain. (i.e. three K-pattern buoys and one SeaWatch buoy respectively).

In accordance with the MOU between EGOS and E-SURFMAR the monitoring of the previous EGOS moored buoy network has been continued. The availability, timeliness and quality of moored buoys data are carefully monitored. By the end of August 2006, 15 K-pattern buoys and 10 Oceanor buoys were operating.

Operating EGOS moored buoys (K-pattern)

WMO	Name	nobs	Wi	AT	AP	dP	ST	Wa	Ws	Dr	Sb	U	SS	O	Start_end	Lat	Lon
61001	Cote d'Azur	719	X	X	X	X	X	X	X	-	-	X	-	O	0108-3108	43.40	7.80
61002	**Lion**	**744**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**-**	**-**	**X**	**-**	**O**	**0108-3108**	**42.10**	**4.70**
62001	Gascogne	744	X	X	X	X	X	X	-	-	-	X	-	O	0108-3108	45.30	-5.00
62029	K1	743	X	X	X	X	X	X	-	-	-	X	-	O	0108-3108	48.70	-12.50
62052	Ushant	690	X	X	X	X	-	-	-	-	-	X	-	O	0108-3108	48.50	-5.80
62081	K2	744	X	X	X	X	X	X	-	-	-	X	-	O	0108-3108	51.00	-13.20
62090	**M1**	**728**	**X**	**X**	**S**	**S**	**X**	**X**	**-**	**-**	**-**	**X**	**-**	**O**	**0108-3108**	**53.10**	**-11.20**
62091	M2	744	X	X	X	X	X	X	-	-	-	X	-	O	0108-3108	53.50	-5.40
62092	M3	716	X	X	X	X	X	X	-	-	-	X	-	O	0108-3108	51.20	-10.50
62093	M4	743	X	X	X	X	X	X	-	-	-	X	-	O	0108-3108	54.70	-9.10
62094	M5	741	X	X	X	X	X	X	-	-	-	X	-	O	0108-3108	51.70	-6.70
62105	K4	744	-	X	X	X	X	X	-	-	-	X	-	O	0108-3108	55.80	-11.40
62108	K3	743	X	X	X	X	X	X	-	-	-	X	-	O	0108-3108	53.50	-19.50
62163	Brittany	17	X	X	X	X	X	X	-	-	-	X	-	O	0808-3108	47.50	-8.40
64045	**K5**	**252**	**X**	**X**	**X**	**X**	**X**	**X**	**-**	**-**	**-**	**X**	**-**	**O**	**2108-3108**	**59.10**	**-11.70**
64046	K7	743	X	X	X	X	X	X	-	-	-	X	-	O	0108-3108	60.70	-5.20

Comments:
- EUCOS moored buoys are presented in bold characters.
- K5 operating back on August 21st after several months of absence.
- Air pressure measurements failed on M1.
- Brittany has been reporting a few data since the 17th of July.

Operating EGOS moored buoys (Seawatch and Wavescans)

WMO	Name	nobs	Wi	AT	AP	dP	ST	Wa	Ws	Dr	Sb	U	SS	O	Start_end	Lat	Lon
13130	Gran Canaria		X	X	X	-	X	X	X	-	-	-	X	O		28.18	-15.82
13131	Tenerife Sur		X	X	X	-	X	X	X	-	-	-	X	O		28.00	-16.58
61196	C. Begur		-	-	-	-	-	-	-	-	-	-				41.92	3.65
61197	Mahon		X	X	X	-	-	X	X	-	-	-	-	O		39.72	4.42
61198	C. de Gata		-	X	X	-	-	X	X	-	-	-	-	O		36.57	-2.33
61199	M. Alboran		-	-	-	-	-	-	-	-	-	-	-			36.23	-5.03
61280	Tarragona		-	-	-	-	-	-	-	-	-	-	-			40.77	1.47
61281	Valencia		X	X	X	-	X	X	X	-	-	-	X	O		39.47	-0.27
62024	Bilbao-Visc.		X	X	X	-	-	X	X	-	-	-	-	O		43.63	-3.03
62025	C. de Penas		X	X	X	-	X	X	X	-	-	-	X	O		43.73	-6.17
62082	E. de Bares		X	X	X	-	X	X	X	-	-	-	-	O		44.07	-7.62
62083	Villano-Sis.		-	-	-	-	-	-	-	-	-	-	-			43.48	-9.22
62084	**C. Silleiro**		**X**	**X**	**X**	**-**	**X**	**X**	**X**	**-**	**-**	**-**	**X**	**O**		**42.12**	**-9.40**
62085	G. de Cadiz		X	X	X	-	X	X	X	-	-	-	X	O		36.48	-6.97

Comments:
- GTS BUFR data monitoring tools are not yet available. This explains why the number of reports and the observation period are missing.
- The snapshot for Seawatch and Wavescan buoys is dated 1st September 2006.
- The EUCOS buoy is presented in bold characters.

The INM (Spain) is reporting data from the Cabo Silleiro buoy (as well as others operated by Puertos del Estado) to the GTS in BUFR code. The messages received in Toulouse RTH are forwarded to Exeter and Offenbach. However, these data are apparently not yet being processed or used by forecast meteorological centres.

An action has been undertaken through the Technical Co-ordinator of the DBCP to propose a standard BUFR template for moored buoy data.

At present, of the 4 E-SURFMAR moored buoys, only Cabo Silleiro is able to provide directional wave spectra data. Lion is providing omni-directional wave spectra. Development work has been undertaken by the UK Met Office to permit the K series buoys to report directional wave spectra and a spectral wave system is expected to be installed on K5 in October 2006.

The availability of moored buoy data depends on the number of buoys operating. An average of more than

200 hourly observations per day have been reported on the GTS from the initial EUCOS buoys. About 70 messages per day were reported from the 3 K-pattern E-SURFMAR until January 2006 (when K5 went adrift).

More than 95% of data were received by HH+30 minutes (to be compared to the timeliness of the EUCOS target 85%) fro the K-pattern buoys.

The Air Pressure (AP) differences with the French model outputs shows the target of 0.5% of Gross Errors is generally achieved. The RMS of AP differences is about 0.6 hPa.

Real time observations from moored buoys are subject to routine quality monitoring in the same way as drifting buoys.

4. PLANS

4.1 Drifting buoys

The E-SURFMAR design study has recommended the deployment of an average of 175 SVP-B type drifters per year. For financial reasons (buoy and transmission costs), this will take several years to achieve. However, the drifting buoy component has been fully funded by E-SURFMAR in 2006, i.e. in addition to the drifting buoy purchases, all the Argos communication costs are funded by E-SURFMAR. Within the allocated budget more than 80 (including 30 upgrades) buoys will deployed in the E-SURFMAR area of interest in the coming year.

The transmission of drifting buoys data through Iridium will continue to be evaluated as an alternative to Argos.

E-SURFMAR will continue to contribute to the International Polar Year. Eight Ice beacons (Metocean) will be deployed by ship in 2007. The main challenge with the ice buoys is their ability to survive after being released from frozen ice. If it could be proven that NWP over Europe benefits from buoy data in the Arctic region (studies to be carried out), then E-SURFMAR could consider the regular deployment of such buoys.

4.2 Moored buoys

K5 (59.1N – 11.5 W), Cabo Silleiro (42.1N – 9.4W) and Lion (42.1N – 4.7E) are designated as E-SURFMAR moored buoys. The fourth buoy is currently M1 (53.1N – 11.2W). It is presently moored in 100 metres water depth, and so the fourth buoy will therefore need to be re-sited further west into deeper water, so that it will be able to provide wave data unaffected by the continental shelf. A new buoy M6 is expected to be in place at around 16W by October 2006.

The E-SURFMAR design study has recommended that all four buoys should provide directional wave spectra. By fall, K5 buoy should report directional wave spectra data through Iridium 4 times each day at the main synoptic hours. Once proven the system could be procured and installed on the M6 and Lion buoys.

5. INFORMATION ON E-SURFMAR

A public E-SURFMAR web site was activated at http://esurfmar.meteo.fr during the spring 2006. It gives general information about the programme including the monthly reports.

In addition there is a restricted working area of the web site for E-SURFMAR participants, it is based on a collaborative scheme which allows the participants to easily create and modify certain pages on the site.

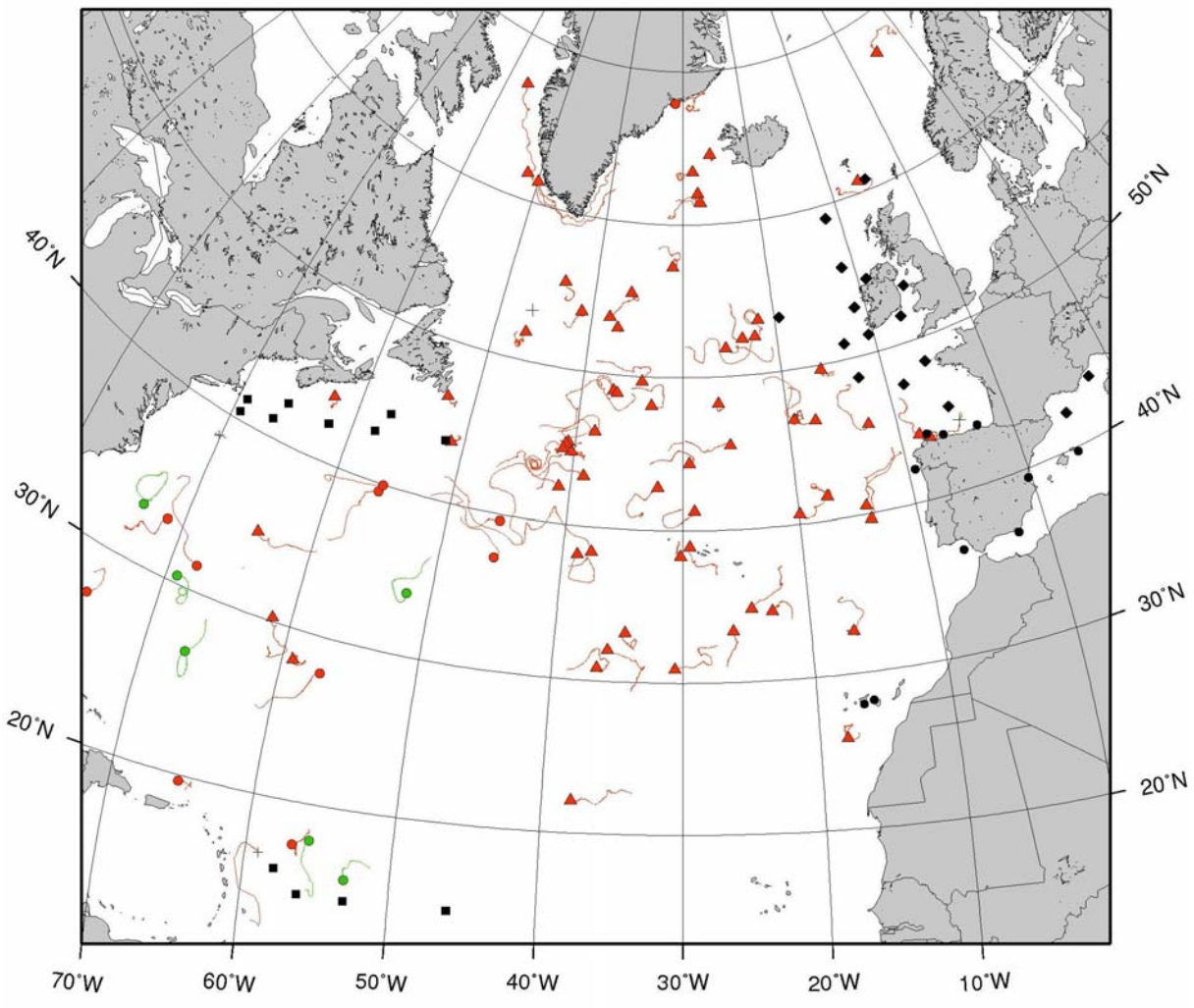
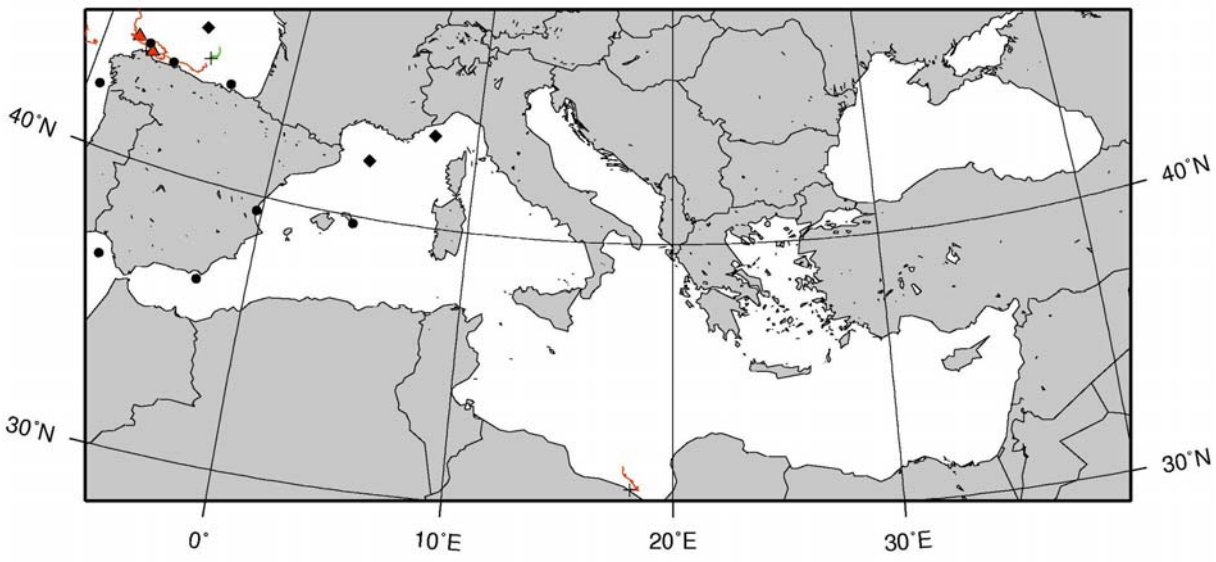


Figure 2. Operating Buoys in E-SURFMAR area
Drifting buoy trajectories and moored buoy positions
(August 2006)



GLOBAL DRIFTER PROGRAMME (GDP)

Directors: Rick Lumpkin (NOAA/AOML); Peter Niiler (Scripps Institution of Oceanography)
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 ARGOS-tracked surface drifting buoys to meet the need for an accurate and globally dense set of in-situ observations of mixed layer currents, sea surface temperature, atmospheric pressure, winds and salinity; and 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.

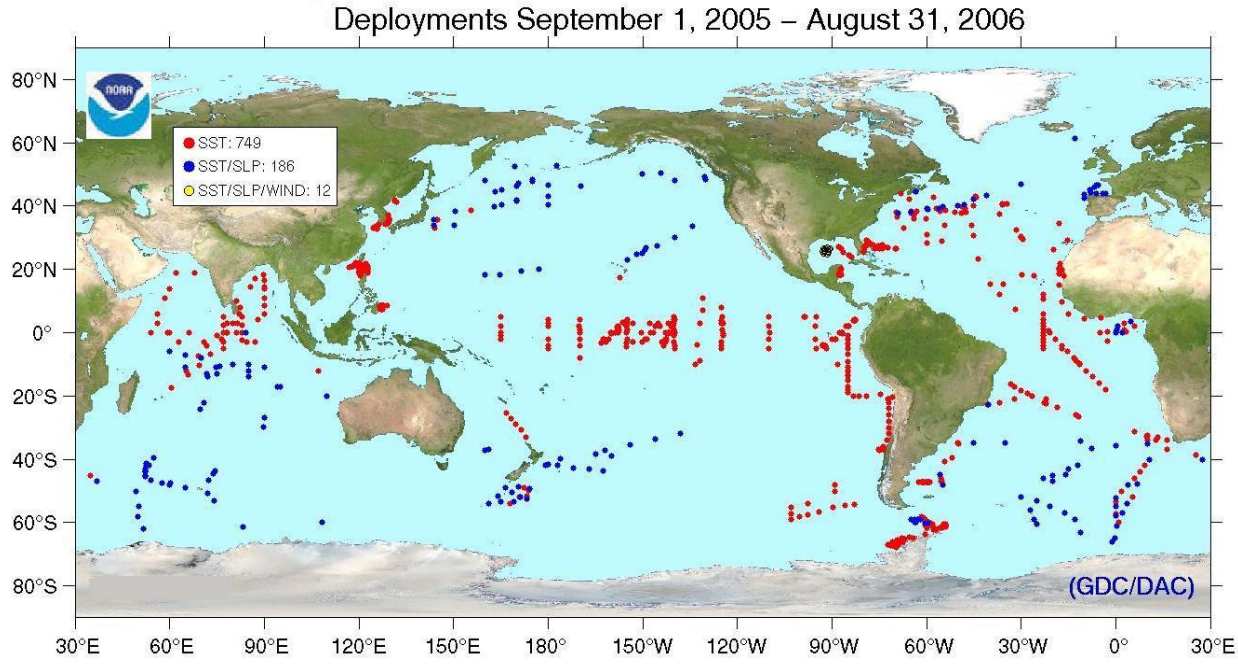
The GDP is managed with close cooperation between manufacturers in private industry, who build the drifters according to closely monitored specifications; NOAA's Atlantic Oceanographic and Meteorological Laboratory (AOML), which coordinates deployments, processes the data, archives the data, maintains META files describing each drifter deployed, develops and distributes data-based products, and updates the GDP website; and NOAA's Joint Institute for Marine Observations (JIMO), which supervises the industry, upgrades the technology, purchases drifters, and develops enhanced data sets. Drs. Peter Niiler (JIMO) and Rick Lumpkin (AOML) maintain liaisons between the GDP and individual research programs that deploy drifters.

During the intersessional year the GDP deployed 891 drifters.

The actual deployments were as follows:

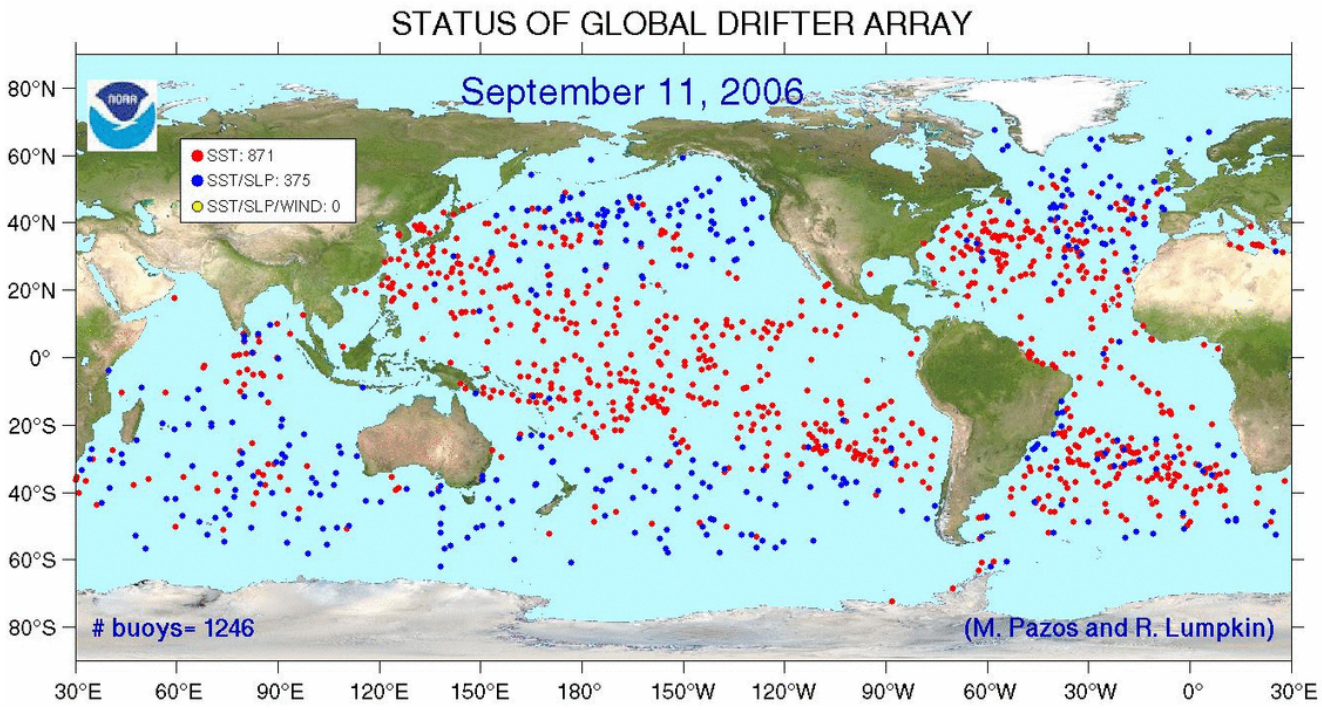
North Pacific	36
North Atlantic	31
Tropical Oceans	407
Southern Oceans	178
Consortium Research	239
Total	891

Error!



The GDP encourages other drifter programs to contribute their data to the GDP Data Assembly Center if those data are collected by Surface Velocity Program (SVP) -type drifters with drogues centered at 15 meters beneath the sea surface.

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.



INTERNATIONAL ARCTIC BUOY PROGRAMME (IABP)

Participants of the IABP continue to work together to maintain a network of drifting buoys on the ice of the Arctic Basin to provide meteorological and oceanographic data for real-time operational requirements and research purposes including support to the World Climate Research Programme (WCRP) and the World Weather Watch (WWW) Programme. Incremental opportunities are important to the IABP. It is the sum of these opportunities that are significant for a program that typically has 30-45 buoys in the field. Some of the current opportunities include EUMETNET, DAMOCLES, more ICEX, more buoys, and unique buoys (e.g. seasonal buoys, ice mass balance buoys, and ice tethered buoys).

IABP EXECUTIVE AND COORDINTOR

Chairperson:	Timothy Goos, Environment Canada, Canada tim.goos@ec.gc.ca
Vice Chairperson:	Christian Haas, Alfred Wegener Institut, Germany haas@awi-bremerhaven.de
Member:	Ivan Frolov, Arctic and Antarctic Research Institute, Russia aaricoop@aari.nw.ru
Member:	Pablo Clemente-Colon, US National ice Center Pablo.Clemente-Colon@natice.noaa.gov
Coordinator:	Ignatius Rigor, Polar Science Centre, U.S.A ignatius@apl.washington.edu

IABP 16th ANNUAL MEETING

Members of the International Arctic Buoy Programme met 24-26 April 2006 in Bremerhaven, Germany. Christian Haas, Alfred Wegener Institute hosted the meeting. There were 15 attendees representing 8 of the 20 Participants.

MEETING HIGHLIGHTS

New Participant - Participants were delighted to welcome EUMETNET represented by Pierre Blouch as a new contributing member of the IABP. EUMETNET contributed 2 ICEX buoys for this year's deployment and plan to deploy 8 MetOcean Ice Beacons by ship 2007. Attendees were alerted to a quality control tool available on the web. http://www.meteo.shom.fr/qctools/

Science briefings - IABP Participants were pleased to get briefings on science projects in the arctic basin such as the DAMOCLES project http://www.damocles-eu.org/ from Jean-Claude Gascard, Université Pierre et Marie Curie (UPMC), and a modeling study by Burghard Brummer, University of Hamburg, that will see a host of profiling and met buoys respectively deployed on the Arctic Basin. A clearer understanding of the IMB (Ice Mass Balance) buoys came courtesy of Jackie Richter-Menge.

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

Seasonal ice buoys - Martin Doble presented information on the GreenIce project http://dalriada.nsm.ac.uk/php and on a Marginal Ice Zone Drifter (GPS, wave, wind, AT, RH, SST, and Iridium SBD) http://www.ice-ocean.com . Three of these drifters will be deployed autumn 2007 as part of the Canadian lead Storms in the Arctic (STARS) project in the waters of Hudson Strait and / or Davis Strait. Participants are interested in such buoys prompted by the shrinking aerial coverage and thinning of the ice of the arctic basin and hence the vulnerability of buoys residing on the ice surface. Seasonal ice buoys also have the potential to extend coverage of the buoy array into the marginal seas.

IPY projects of interest to the IABP - Attendees noted the following IPY projects related to the IABP:

1. State of the Arctic Sea Ice Cover: Seasonal Ice Zone Observation Network (Lead: Hajo Eicken)
2. DAMOCLES (Lead: Jean-Claude Gascard)
   2.1. Cyclones: Burghard Bruemmer
3. Ice Mass Balance Network: Coordination with DAMOCLES: (Leads: Don Perovich & Jackie Richter-Menge)
4. Collaborative Research: Detailed investigation of the dynamic component of sea ice mass balance (Lead: Jenny Hutchings)
5. Towards an Arctic Observing Network: An array of Ice-Tethered Profilers to sample the upper ocean water properties during the International Polar Year (Lead: John Toole)

IABP DVD - Production of an IABP DVD that takes the IABP to, and into, the International Polar Year is proposed. Marine Environmental Data Centre, Fisheries and Oceans, Canada, would produce the DVD. MEDS produced the IABP CD covering the period 1979-1999

IABP Coordinator's Office supports science in real time - The IABP Coordinator's office is open to producing specific mappings in support of science projects. For example, a Nares Strait track map is posted daily on the IABP web site in support of the CATS (Canadian Arctic Through flow Study). http://newark.cms.udel.edu/~cats/

SOME PARTICIPANT HIGHLIGHTS

AARI (Arctic and Antarctic Research Institute) – September 2005, manned ice station SP-33 was closed. A re-located station – SP-34 – was established. This station was active through the winter of 2005 into 2006. http://www.aari.ru/clgmi/np.current/default_en.asp

JAMSTEC (Japan Marine Science and Technology Centre) – Scientists from JAMSTEC continue to deploy J-CAD buoys http://www.jamstec.go.jp/arctic/J-CAD_e/jcadindex_e.htm and deploy POPS (Polar Ocean Profiling System http://www.jamstec.go.jp/arctic/scosa/pops/pops.htm) buoys. The POPS buoys were developed in collaboration with MetOcean www.metocean.com and are ice-drifting buoys tethering an ARGO type subsystem CTD profiler. http://www.jamstec.go.jp/arctic/index_2e.htm

Meteorological Service of Canada - MSC provided an in-house assembled meteorological buoy for the Canadian/Danish Lorita Project (mapping of a section of seafloor north of Ellesmere Island / north of Greenland). The buoy was deployed at the Lorita on-ice camp. Poor flying weather precluded the annual MSC / Polar Continental Shelf Project deployment flight(s) out of Eureka. The 3 buoys slated for this deployment (one IMB buoy, one Alfred Wegener Institute buoy, and an Environment Canada assembled buoy) will spent a year in Eureka waiting for a March / April 2007 deployment.

Woods Hole Oceanographic Institution – ITP (Ice tethered profiler buoys)

http://www.whoi.edu/itp and IMB (ice Mass Balance) buoys are being deployed in the mid August to mid September as part of the ship borne Beaufort Gyre Exploration Project. ITP buoys are similar to the POPS buoys used by JAMSTEC. http://www.whoi.edu/beaufortgyre/dispatch2006/index2006.html

CHALLENGES

- Encouraging agencies who put buoys on ice the Arctic Basin to share their basic met data via GTS recognizing that some data is deemed proprietary by the scientists who have deployed the buoys.

- Ensuring a well positioned array of buoys providing the basics of position, air temperature and sea level pressure is met as the science community moves to more sophisticated buoys deployments.

- Increasing the demonstrated value of IABP data to operational forecast services and hence getting more support from operational agencies.

BUOY ARRAY

Spatial Resolution - The coordinator reviewed the requirements established by the WMO and NOAA for meteorological and oceanographic observations (e.g. von Storch and Zwiers, 2001; and http://ioc.unesco.org/goos/docs/act_pl/act_pla2.htm). It is his assessment that the IABP will strive for a spatial resolution of 250 km for the IABP buoy network. Ice coverage dictates the area where this resolution is possible.

Array for IPY - To ensure a network of buoys would be in place for the International Polar Year, Participants provided 12 rather than the usual 7 ICEX buoys for the White Trident Deployment exercise. Courtesy the US Naval Oceanographic Command, these buoys went on ice in the first days of August 2006.

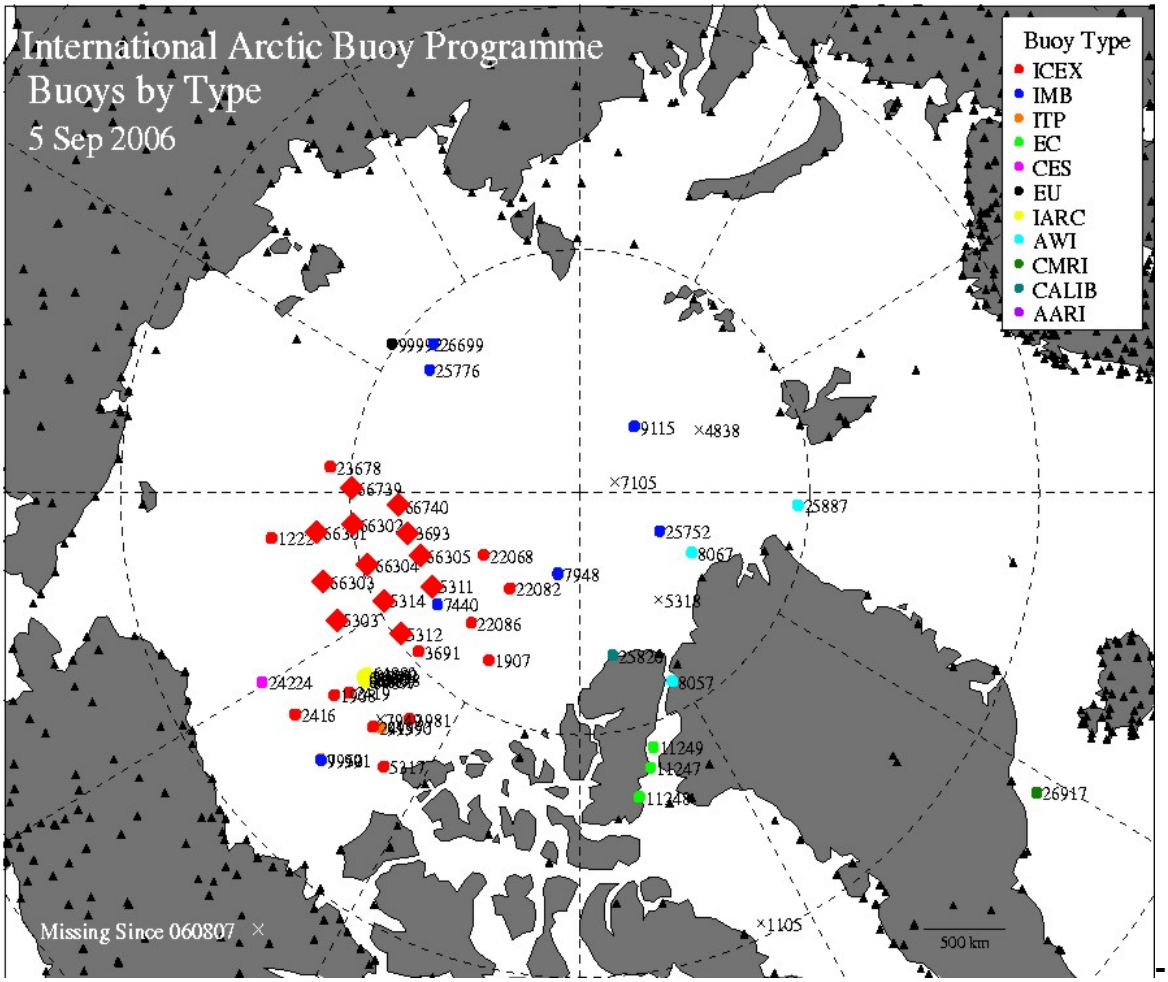
This table contrasts the array in place April 2006 when the array is typically at its lowest number to that September 2006 when the number of buoys on ice is usually at a maximum.

2006	**Buoys on map and status sheet**	**Buoys on GTS**	**Reporting surface air pressure and temperature**	**Reporting** *only* **surface air pressure**	**Reporting** *only* **surface air temperature**	**Reporting** *only* **position**
4 April	22[1]	20	18	1	Nil	3
5 September	51[2]	47	34	2	2	13[2]

[1] Includes a Russian manned station
[2] 6 of these buoys are drift stations in collocated clusters in the Beaufort

Buoy map - 5 September 2006
(from http://iabp.apl.washington.edu)

The map has been annotated to highlight the ICEX buoys deployed early August 2006 (♦). The map also shows buoys whose data went missing in the past month (x). There have also been a few deployments in the past month from icebreakers operating north of Alaska and in Nares Strait between Ellesmere Island and Greenland.



INTERNATIONAL BUOY PROGRAMME FOR THE INDIAN OCEAN (IBPIO)

1. INTRODUCTION

The International Buoy Programme for the Indian Ocean (IBPIO) was formally established at a meeting in La Reunion in 1996. The primary objective of the IBPIO is to establish and maintain a network of platforms in the Indian Ocean to provide meteorological and oceanographic data for both real time and research purposes. More specifically, the IBPIO supports the World Weather Watch Programme (WWW); the Global Climate Observing System (GCOS); the World Climate Research Programme (WCRP); the Global Ocean Observing System (GOOS); tropical cyclone forecast and monitoring; as well as the research activities of the participating institutions.

The programme is self-sustaining, supported by voluntary contributions from the participants in the form of equipment and services (such as communications, deployment, storage, archiving, co-ordination...).

There are presently seven organisations formally participating in the IBPIO :

- Australian Bureau of Meteorology (ABOM);
- Global Drifter Center of NOAA/AOML (GDC), USA ;
- Météo-France;
- National Institute of Oceanography (CSIR/NIO), India ;
- National Institute of Ocean Technology (DoD/NIOT), India ;
- Navoceano, USA ;
- South African Weather Service (SAWS).

2. PROGRAMME MEETINGS

The ninth Programme Committee meeting of the IBPIO will to be held in La Jolla, USA, on 14 October 2006, prior to DBCP-22. The eighth Programme Committee meeting of the IBPIO was held on 15 October 2005 in Buenos Aires, Argentina, in conjunction with DBCP-21.

3. OPERATIONAL PROGRAMME

3.1 Drifting buoys

Year	SVP	SVP-B	SVP-BW	FGGE	FGGE-W	Other	Total
1996-97	30	42	0	5	3	0	**80**
1997-98	1	21	2	6	7	6	**43**
1998-99	68	56	1	4	2	5	**136**
1999-00	48	48	4	3	0	2	**105**
2000-01	48	27	0	5	3	0	**83**
2001-02	30	64	4	6	1	0	**105**
2002-03	20	63	1	2	2	1	**89**
2	8	5	0	1	0	0	**6**

003-04		9					**8**
2004-05	40	35	0	0	1	0	**76**
2005-06	62	65	1	1	0	0	**129**
Total	355	480	13	33	19	14	**914**

Table 1. The number of drifting buoys deployed for the IBPIO according to buoy type. (Reference period : 1st Sept. to 31st Aug.)

As shown in table 1, **129 drifting buoys** were deployed between September 2005 and August 2006. All but one were Lagrangian drifters and 52% measured air pressure (AP).

Participants in the IBPIO contribute to the programme in various ways: the provision of buoys (ABOM, GDC, Météo-France, Navoceano and NIO); the funding of barometer upgrades to SVP drifters provided by GDC (ABOM and Météo-France); deployment arrangements (all); co-ordination (Météo-France) and data transmission (Météo-France and SAWS).

Many of the deployments in 2005/06, as in previous years, were carried out by research vessels and ships of opportunity plying the Indian Ocean from ports including Fremantle (Australia), Goa (India), Durban and Cape Town (South Africa) and La Reunion. Some ship voyages to remote islands were also used for deployments in the southern latitudes: Heard Island from Australia ; Amsterdam, Kerguelen and Crozet Islands from La Reunion ; and Marion Island from South Africa. 7% of the buoys were air deployed by Navoceano during the past 12 months (cf. table 2).

Year	**1997-98**	**1998-99**	**1999-00**	**2000-01**	**2001-02**	**2002-03**	**2003-04**	**2004-05**	**2005-06**
Ship	27	116	75	54	61	74	48	64	**119**
Air	16	20	30	29	44	15	20	12	**10**
Air %	37%	15%	29%	35%	42%	17%	29%	16%	**8%**
Total	**43**	**136**	**105**	**83**	**105**	**89**	**68**	**76**	**129**

Table 2. The number of drifting buoys deployed for the IBPIO according to deployment method. (Reference period : 1st Sept. to 31st Aug.)

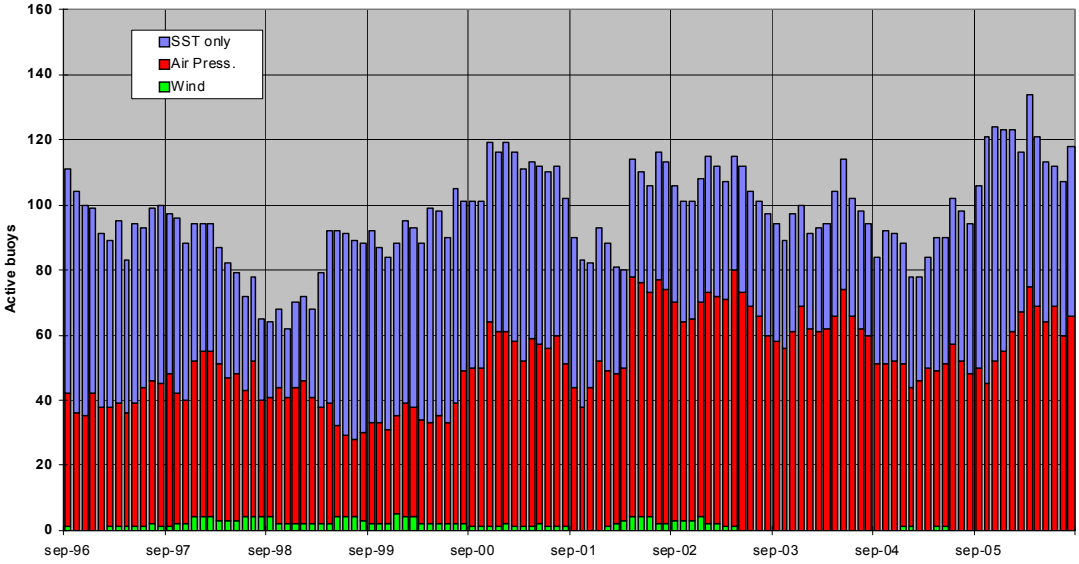


Figure 1. The number of operational IBPIO drifting buoys by parameters measured

The number of operational buoys providing AP measurements, which dropped to less than 50 by the end of August 2005 increased again over 60. It reached 75 by March 2006.

The number of buoys measuring SST only - in addition to their position – reached 76 by October 2005. It was 52 by August 2006. There were no drifting buoys reporting wind parameters in August 2006.

During the period from September 2005 to August 2006, 42 buoys owned by SAWS or GDC migrated from the South Atlantic Ocean and/or Southern seas to IBPIO area of interest. In contrast, the number of buoys that escaped to the south of Australia was 41 during the same period. Some of these escaping buoys were deployed near the SE boundary of IBPIO. The buoy fluxes over the past 12 months were quite neutral, as many buoys entered the Indian Ocean as escaped. The Indian Ocean benefits from a natural convergence that directs the buoys coming from the South Atlantic to the middle of the South Indian Ocean.

Owner	SST only	Air Pressure	Wind
Australian Bureau of Meteorology	0	12	0
Global Drifter Center	51	50*	0
SAWS	0	1	0
NIO	0	3	0
Other	1	0	0
Total	**52**	**66**	**0**

Table 3. Operational drifting buoys (i.e. reporting onto the GTS) at the end of August 2006
** including drifters upgraded*

All drifting buoys use the Argos system to report their data. Most are fitted with the DBCP-M2 format.

The availability of data depends on the number of buoys operating in the area. The number of reports received within 30 minutes remains stable (less than 10% per day in average) whilst the total number of reports increased. About 1400 hourly observations per day had been reported on the GTS since January 2006.

CLS Argos processes the data from 5 satellites. The timeliness at HH+120 minutes is about 50%.

Real time observations from drifting buoys are subject to routine quality monitoring. Besides monthly statistics provided by various meteorological centres for individual buoys, tools have been developed by Météo-France to identify buoys reporting dubious data as quickly as possible. Among these tools is a blacklist computed over the previous 14 days which is available on the web at: http://www.meteo.shom.fr/qctools/blackap.htm .

3.2 Moored buoys

The Department of Ocean Development (DoD, India), now known as Ministry of Earth Sciences, through the National Institute of Ocean Technology (NIOT), has established the National Data Buoy Programme (NDBP) to collect real-time meteorological and oceanographic data from moored data buoys in Indian waters.

The NDBP has established an array of 25 moored stations to support the Indian Meteorological Department (IMD), the Indian Climate Research Programme, Ports, the National Hydrographic Office and other scientific and research activities. The real-time data are currently transmitted by IMMARSAT. Since mid-2000, the surface meteorological data have been distributed on the GTS in FM 18 BUOY code by IMD (Bulletin header SSVX01 DEMS).

The moored buoy array requires regular maintenance by NDBP due to vandalism and severed moorings. At the end of August 2006, eight moored buoys were reporting on the GTS (WMO ids: 23095, 23097, 23098, 23101, 23167, 23170, 23173, 23174).

Two TRITON buoys are maintained by the Japan Marine Science and Technology Center (JAMSTEC). These buoys were first deployed in the eastern tropical Indian Ocean in November 2001 at 5°S 95°E (WMO Id. 53056) and 1.5°S 90°E (WMO Id. 53057). Both buoys were replaced in August 2005 and were still reporting on the GTS in August 2006. JAMSTEC has also maintained a subsurface ADCP mooring near 0° 90°E since 2000, which reports data in delay mode.

To support CLIVAR and GOOS, PMEL (USA) began to implement a deep-ocean moored buoy array in the Indian Ocean in co-operation with countries both within and outside this ocean. The first deployments were in the fall of 2004 from the Ocean Research Vessel (OVR) Sagar Kanya owned by the Indian DoD. Three ATLAS moorings were deployed along 80.5°E (1.5°N, 0°, 1.5°S) and one at 0° 90°E. The WMO ids are 23002, 23001, 23003 and 23004 respectively. In addition, a subsurface ADCP mooring was deployed near 0° 80.5°E, the data from which will be available in delayed mode. The buoys 23002, 23003, 23001, and 23004 stopped reporting on the GTS in January, April, August 2005, and May 2006, respectively. ATLAS moorings have a design lifetime of one year, but ship time to maintain the moorings has not been available since these moorings were deployed in 2004. The loss of data emphasizes the need for sustained and regular ship support for the mooring program to succeed.

4. PLANS

IBPIO participants are regularly encouraged to increase their contributions of buoys, or to fund barometers to equip SVP drifters provided by GDC. Météo-France and ABOM have funded barometer upgrades in the Indian Ocean since 1996 and 2000 respectively.

4.1 Tropical regions

Efforts are aimed mainly at filling data gaps in the tropical regions, primarily during the Tropical Cyclone seasons. In the southern tropical area, the air deployment of SVP-B drifters by Navoceano, typically during November each year, is expected to continue. These buoys are provided by NOAA/GDC and routinely include 10 barometer upgrades funded by Meteo-France. Further east, the ABOM plans to deploy 12 drifting buoys off Australia. NIO plans to continue to provide and deploy drifters in the Arabian Sea and in the Bay of Bengal.

In addition to the 10 drifters upgraded by Météo-France, the GDC has provided 10 SVP with barometer upgraded by NOAA/SIO to the WMO Sub Region Office for Eastern and Southern Africa in Kenya. The GDC plans to supply 40 SVP drifters (i.e. without barometer) for deployment in the Indian Ocean if opportunities exist.

The CLIVAR/GOOS Indian Ocean Panel has designed a deep-ocean moored buoy array of more than 40 buoys in the Indian Ocean. This array is similar to the TAO and PIRATA arrays in the Pacific and the Atlantic oceans respectively, and implementation has already begun as described above. The PMEL ATLAS moorings along 80.5°E and 90°E will be redeployed, plus one more at 1.5N 90°E in August/September 2006 from OVR Sagar Kanya. Two additional ATLAS moorings are to be deployed near 4°N 90°E and 8°N 90°E in November 2006 from Indonesia's Baruna Jaya I. One ATLAS mooring is to be deployed near 8°S 67°E from France's NO Suroit during the VASCO-CIRENE research experiment.

Japan will conduct a month-long process study (MISMO) near the 0° 80.5°E mooring in November 2006. During the intensive observation period additional surface and subsurface moorings will be deployed and additional ship board measurements made from R/V Mirai.

4.2 Southern seas

In the Southern part of the Indian Ocean, the deployment of SVP-B drifters provided by GDC and upgraded by Météo-France (10 to 12 units a year) should continue. These deployments will be supported by the RV Marion Dufresne during her rotations between La Reunion, Crozet, Kerguelen and Amsterdam Islands. ABOM also plans to provide 6 SVP-B drifters for this area over the next 12 months.

In addition to the drifters upgraded by Météo-France and ABOM, GDC plans to provide up to 14 SVP-B drifters (upgraded by SIO) for deployment in the Southern Indian Ocean.

The SAWS, through the PMO in Cape Town, continues to coordinate the deployment of drifters on behalf of GDC, ABOM and Météo-France from voyages to Marion Island (4 voyages every year, March, April, August and November). The ABOM plans to provide 2 SVP-B buoys for deployment from the scheduled voyages in 2007. The PMO in Durban also provides logistic support for deployments in the Indian Ocean from ships of opportunity.

As in previous years, the GDC remains the biggest contributor to the IBPIO. Many of the drifters are standard SVP that only measure SST in addition to the surface current deduced from their movement.

5. INFORMATION ON THE IBPIO

IBPIO information is available on the World Wide Web at *http://www.meteo.shom.fr/ibpio/*. The main pages give a description of the programme, its objectives and management, listings of

participants and links to related subjects such as DBCP data quality control information. Some pages are updated monthly with buoy trajectories and deployment log. Buoy status tables are updated less frequently.

A promotional leaflet on the IBPIO can be obtained from the Chairman or the Programme Co-coordinator.

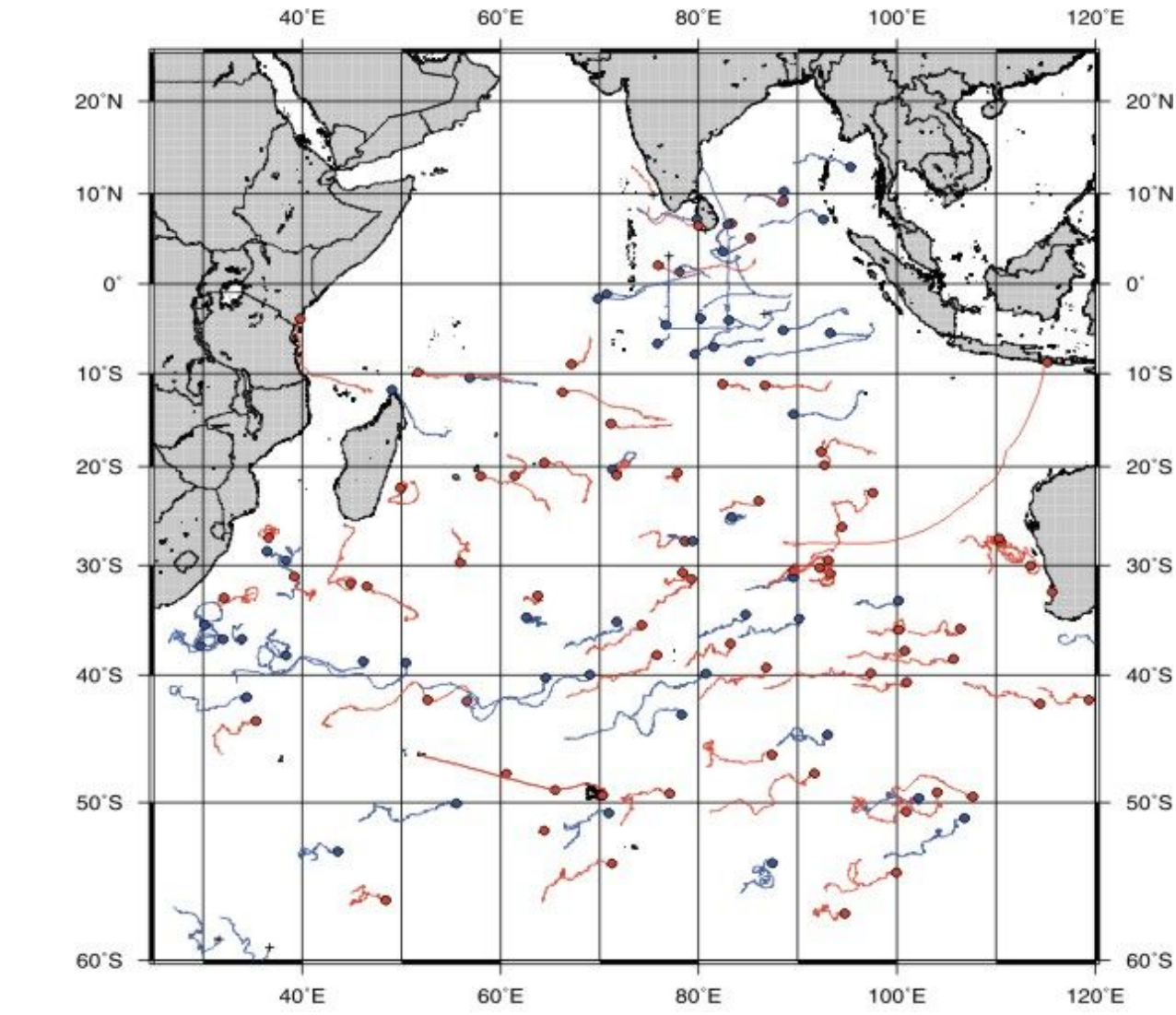


Figure 2. Buoys drifting in the Indian Ocean
August 2006

INTERNATIONAL SOUTH ATLANTIC BUOY PROGRAMME (ISABP)

1. INTRODUCTION

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

2. PARTICIPANTS TO ISABP

The following are organisations or institutions participating in the programme:

• Servicio Meteorológico Nacional	Rep- Argentina
• Servicio de Hidrografía Naval	Rep- Argentina
• The Met Office	United Kingdom
• Atlantic Oceanographic and Meteorological Laboratory	USA
• National Data Buoy Center	USA
• The Meteorological Service	Namibia
• INPE	Brazil
• Diretoría de Hidrografía e Navegaçao	Brazil
• South African Weather Service	South Africa
• Marine and Coastal Management	South Africa
• MEDS	Canada
• CLS/Service ARGOS	France/USA
• Instituto Nacional de Meteorología (INMET)	Brazil
• Naval Meteorology and Oceanography (Navoceano)	USA
• Caribbean Meteorological Organization	Caribbean
• Météo-France	France
• Marine Hydrophysical Institute of National Academy of Science of Ukraine	Ukraine

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

3. PROGRAMME MEETINGS

Following a decision taken in 2001, the Programme Committee meets every two years, preceded by a technical workshop. The next ordinary meeting will be held in Cape Town, in May 2008.

4. OPERATIONAL PROGRAMME

4.1 Data Coverage

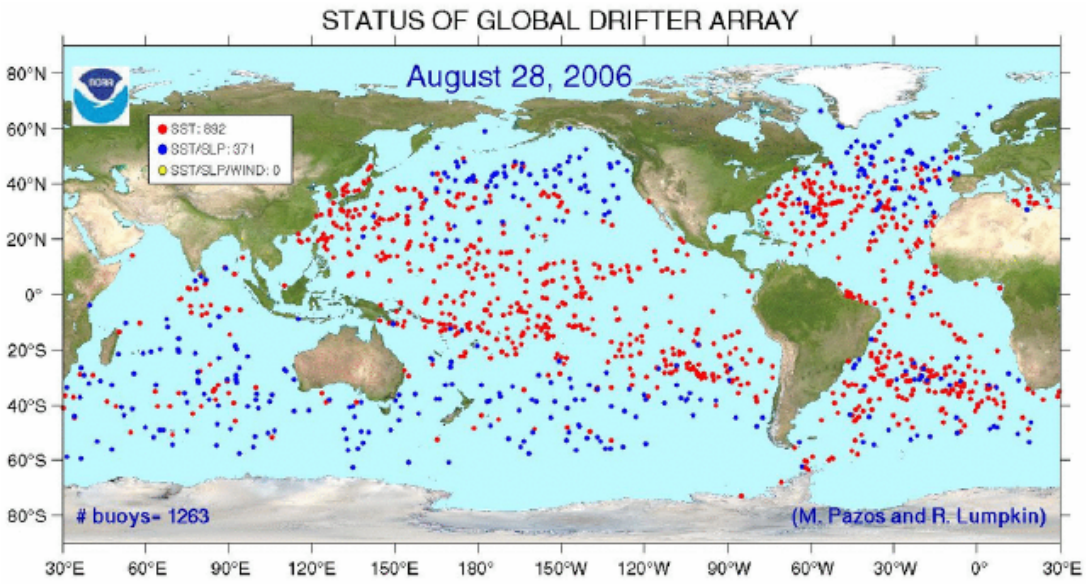


Figure 1. Global Drifter array

The figure shows the status of the drifter array as of August 28, 2006. Coverage of SVP drifters in the ISABP area is good, though gaps remain in the area of interest specially the
Gulf of Guinea, Angola Basin, particularly dynamic areas as the SW and SE Atlantic. The low amount of SVP-B is also noted.

4.2 Drifting Buoys

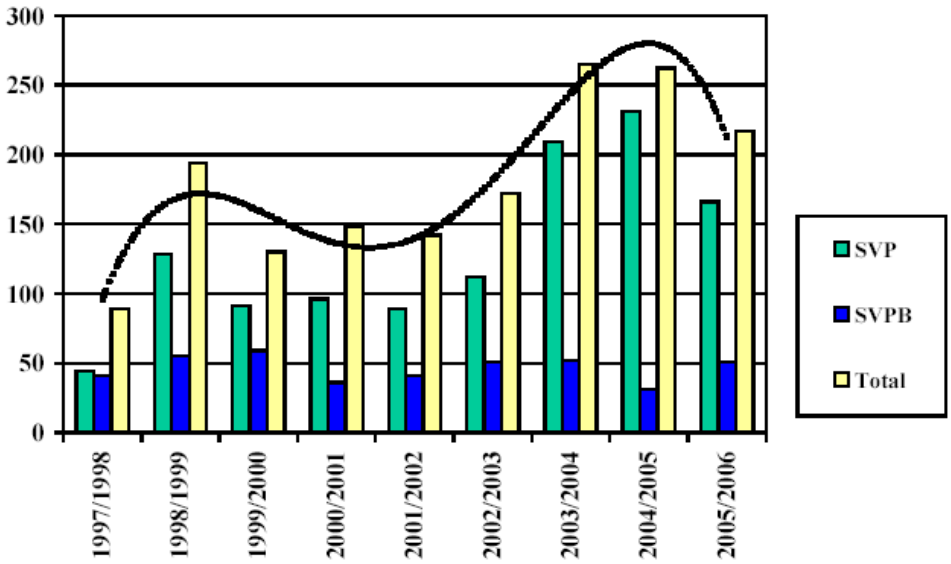


Figure 2. Buoys deployed since 1997 (periods from 1 Sept to 31 Aug)

In the intersession period 1 September 2005 to 31 August 2006, 217 drifters were deployed in the ISABP area of which 166 were SVP and 51 SVPB drifters. The deployments were carried out by GDC, Navoceano, Brazil, Argentina and South Africa mainly from research vessels and ships of opportunity and in the case of the Tropical Atlantic (30N – 20S) some were deployed from US

Navy aircrafts.

The number of drifting buoys reporting on the GTS in the ISABP area during the intersessional period oscillated between 219 and 274 per month as indicated in MEDS monthly statistics.

Year	Month	# Messages	# Buoys	Avr_Obs_per_buoy
2005	08	137568	219	628.16
2005	09	127113	230	552.67
2005	10	144101	220	655.00
2005	11	128026	228	561.52
2005	12	147213	239	615.95
2006	01	150086	240	625.36
2006	02	139413	261	534.15
2006	03	166556	274	607.87
2006	04	154874	248	624.49
2006	05	165542	236	701.45
2006	06	148082	256	578.45

Table 1. Monthly statistics of the number of drifting buoys reporting on the GTS and the number of messages archived at MEDS from these buoys

4.3 Fixed Stations

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

4.4 Data reception and dissemination

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

4.5 Other developments

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

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

5. FUTURE PLANS

Participants are constantly encouraged to increase their contributions of buoys and to fund especially the upgrade of SVP drifters to barometer drifters. The program should try and increase the barometer drifter deployments. The GDP will continue its support to the programme activities.

During XI ISABP, the group highlighted the need to increase observations and deployments in the SW and SE Atlantic, Drake Passage, Gulf of Guinea and Angola Basin. The group also raised the need to advertise the benefits of participating in the ISABP to other countries in addition to Brazil, Argentina, South Africa and the USA.

It was suggested that the GOOS Africa, Regional Ocean Observing and Forecasting System for Africa (ROOFS) coordinators and participants of the Reading DBCP Buoy Technical/Metadata base Workshop of March 2006 should be contacted as to attract the attention of African countries towards ISABP.

Further efforts to identify additional participants were encouraged, citing Spain and France as examples of potential interested parties.

Argentina will continue to maintain two moored buoys as well as providing deployment opportunities in the SW Atlantic and Antarctica.

The South African Weather Service is coordinating with the community on Tristan da Cunha the deployment of buoys at regular intervals.

In total it is expected that 228 drifters will be deployed.

The XII ISABP Meeting will be held in Cape Town, South Africa, in May 2008, preceded by a technical workshop.

6. INFORMATION ON THE ISABP

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

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

Summary Report for 2005/2006

Submitted to: October 2, 2006

- Data Buoy Co-operation Panel (DBCP)
- PICES, Physical Oceanography and Climate Committee

Summary of Activities for Sept. 2005 – Aug. 2006

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 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.

Craig Engler
Technical Coordinator - NPDBAP
Email Craig.Engler@noaa.gov

OceanSITES

(Ocean Sustained Interdisciplinary Timeseries Environment observation System)

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.

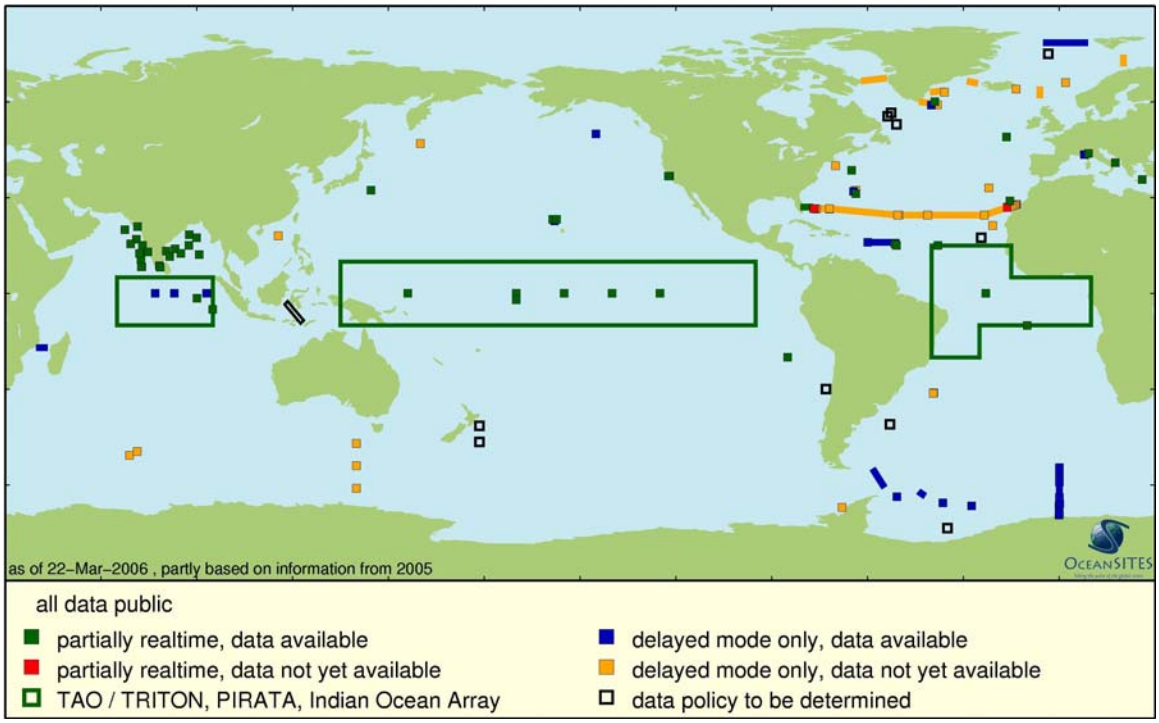


Fig. 1. *Near-term status of the OceanSITES timeseries network.*

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 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. However, 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/.

TROPICAL MOORED BUOY IMPLEMENTATION PANEL (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".

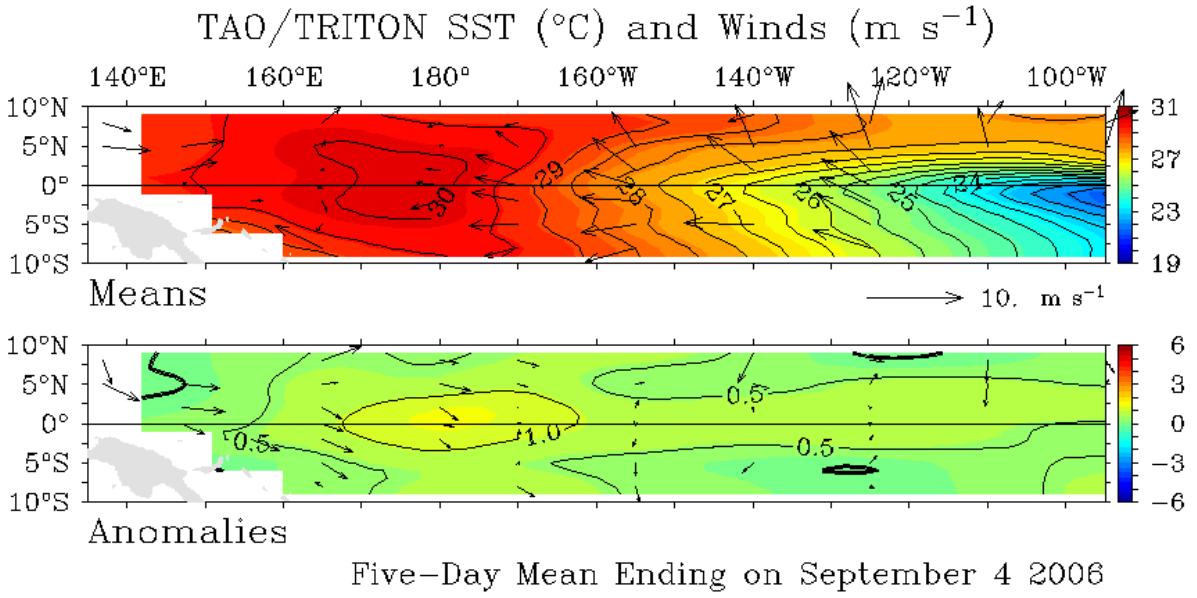


Figure 1. Sea surface temperature (contours) and surface wind velocity (arrows) from the TAO/TRITON mooring array. The upper panel shows the measured values and the lower panel shows the difference from climatological values.

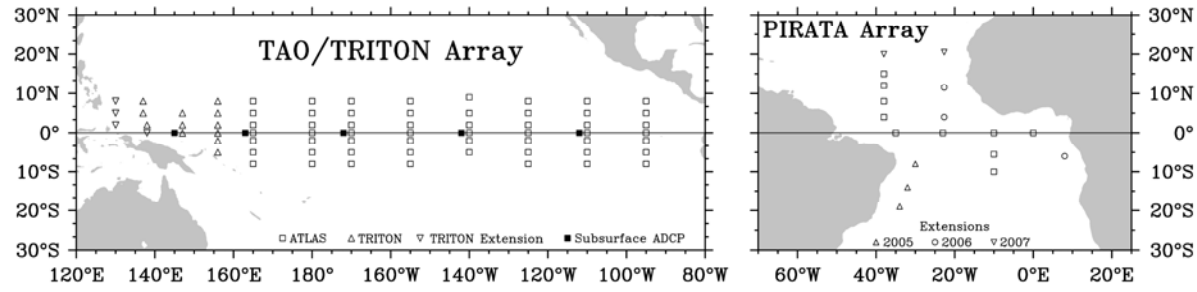


Figure 2. Mooring locations within the TAO/TRITON (left) and PIRATA (right) Arrays.

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. Brazil and France provide ship time for mooring maintenance. Cruises are staffed by US, French and Brazilian technicians.

The primary data telemetered in real time from moorings in both the TAO/TRITON and PIRATA Arrays are daily mean surface measurements (wind speed and direction, air temperature, relative humidity and sea surface temperature) and subsurface temperatures. NextGeneration ATLAS moorings provide optional enhanced measurements, which include precipitation, short and long wave radiation, barometric pressure, salinity, and ocean currents. High temporal resolution (10-min or less record interval) measurements are available in delayed mode. 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.

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.

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.

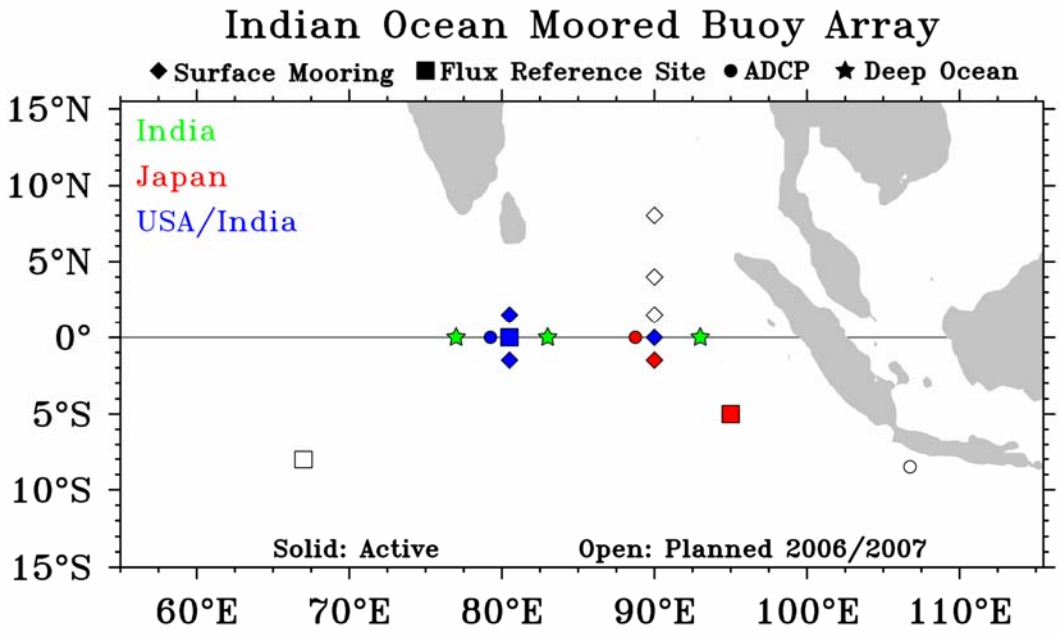


Figure 3. Locations of existing Indian Ocean mooring sites and a mooring to be deployed in late 2006 and 2007.

REPORTS FROM DATA MANAGEMENT CENTRES

The following pages contain the reports by the:

REPORT OF THE SOC FOR DRIFTING BUOYS

2005 - 2006

SOC for Drifting Buoys Report 2005 - 2006

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 program 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*). Examples are given for the last year.

- Figures 1, 2, 3, 4, show the time evolution of reports for wind and for pressure respectively for all BUOY reports (showing all buoys, moored buoys and Drifting Buoys) and SHIP reports, since Jan. 2005. The number of BUOY reports keeps increasing, after the new Argos tariff (multi-satellite option) was agreed.

- Figure 5 shows the time evolution of WAVEOB reports and sensors since Jan. 2005. The number of WAVEOB reports keeps regularly rising, with a strong seasonality.

Each month, mapping position plot charts and Marsden square distribution are produced for BATHY, TESAC, SHIP, BUOY and TRACKOB.

- Figures 6a,b to 10a,b show these products for June 2006. "a" stands for mapping position plot charts, and "b" for Marsden square distribution. Figure 6: BATHY, 7: TESAC, 8: SHIP, 9: BUOY, and 10: TRACKOB.

Each month, Marsden square distribution charts of mean monthly data availability (top) and percentage of BUOY reports compared to SHIP + BUOY reports (bottom) for wind, pressure, air temperature, sea surface temperature are produced.

- Figures 11 to 14 show such products for June 2006. Figure 11: Wind, 12: Pressure, 13: Air temperature, 14: Sea surface temperature.

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).

Few words about new people to come onboard: Thierry Ludjet, who devoted himself body and soul to the SOC for drifting buoys for almost 20 years, has moved to another exciting position, and Christophe Bataille is now handling the system. This report is also the last one made by the current representative. Joël Hoffman will now be in charge of marine meteorology and operational oceanography applications for Météo-France. Still being involved in GOOS and JCOMM, Philippe Dandin moves to climatology, and wishes to express its thanks to the DBCP community and his warm wishes for a renewed future, in which the DBCP group will be able to maintain the high standard of commitment of each member, sustain the current system and take advantage of our strengths to widen the scope to new horizons for marine meteorology and oceanography. Good luck too to our new TC, Hester Viola, who shall know she will get from Météo-France the same support as Etienne Charpentier – no need to add more here about Etienne's role for our activity! – did.

Dr Philippe Dandin
French SOC Representative

Time evolution of BUOY reports for wind and pressure

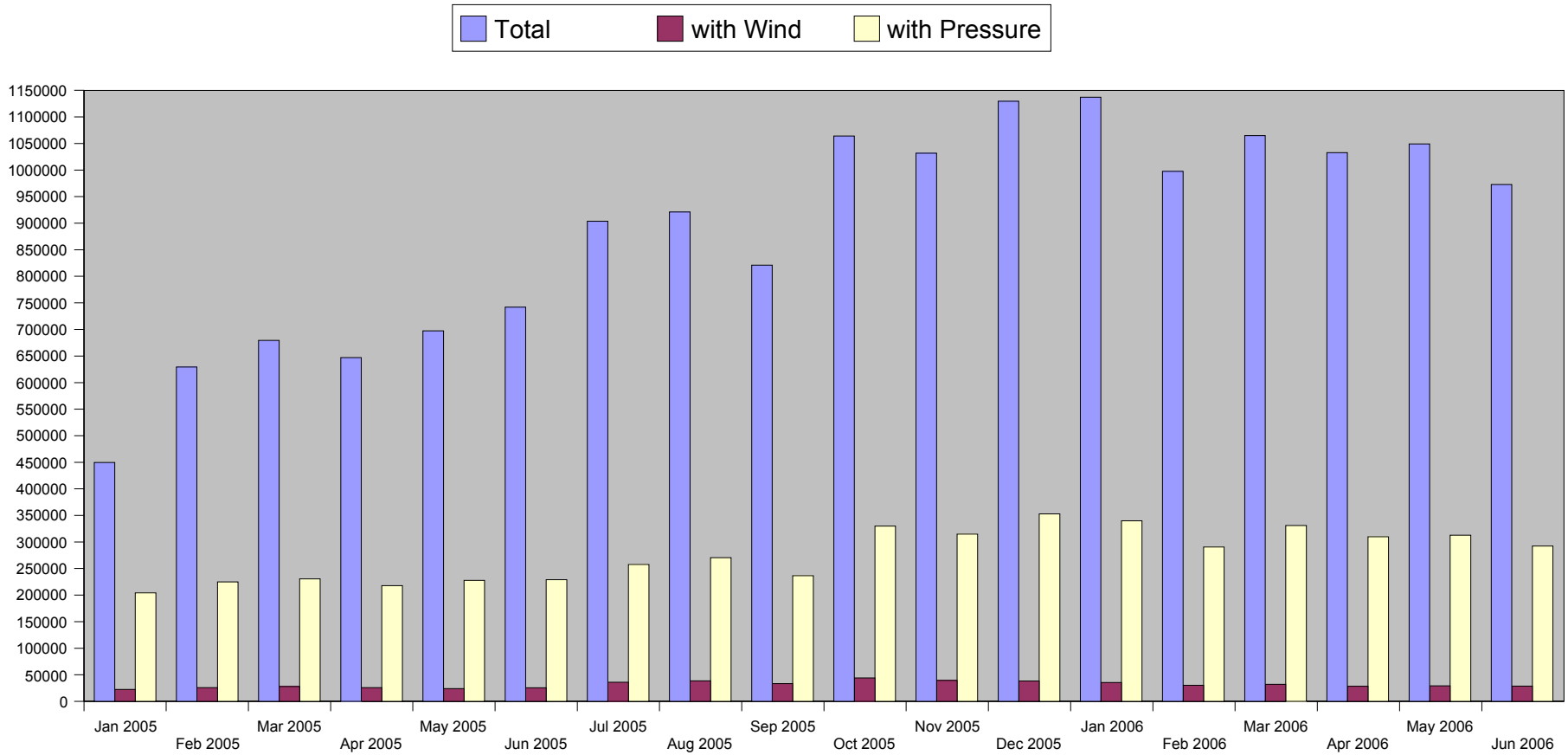


figure 1

DBCP annual report 205-2006

Time evolution of Moored BUOY reports for wind and pressure

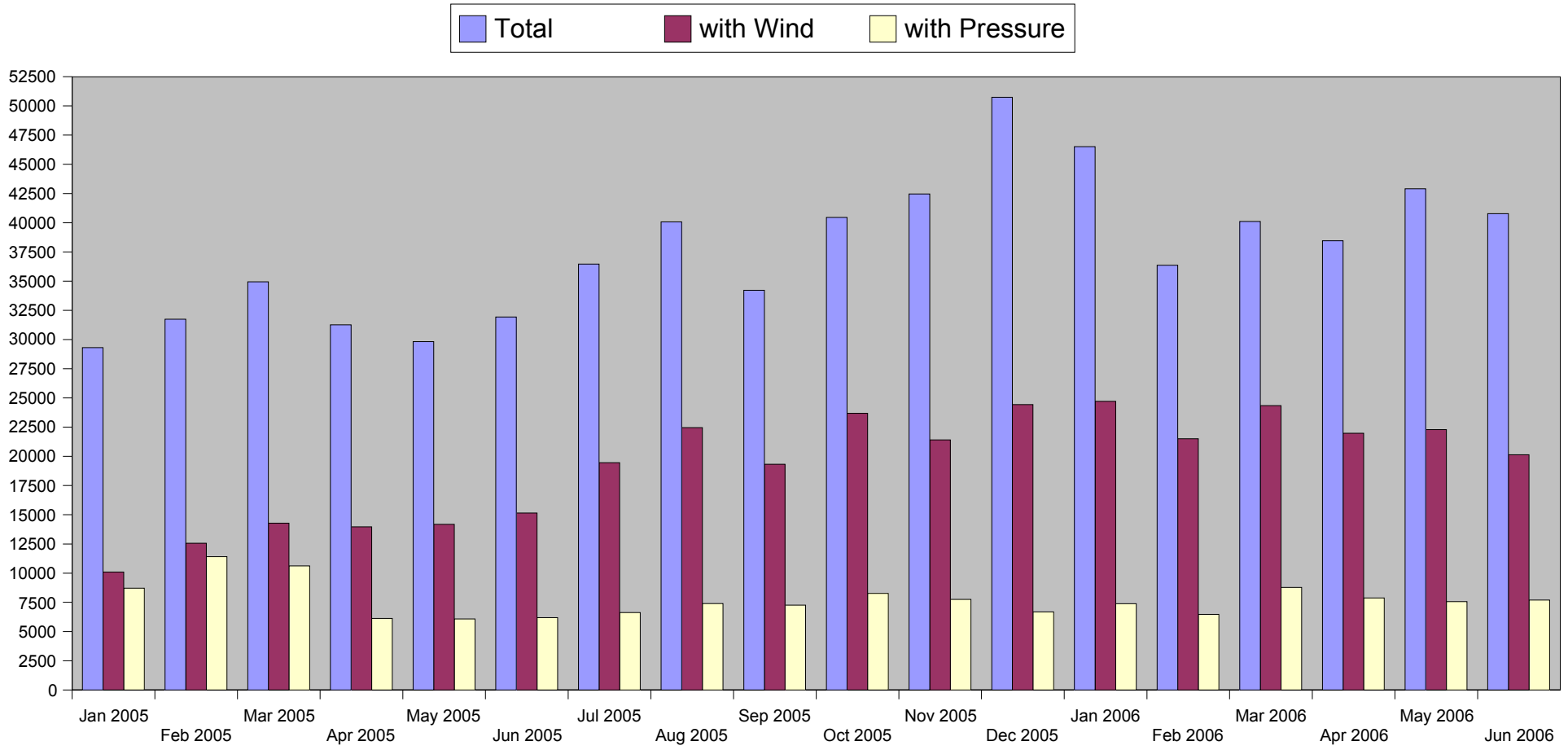


figure 2

Time evolution of Drifting BUOY reports for wind and pressure

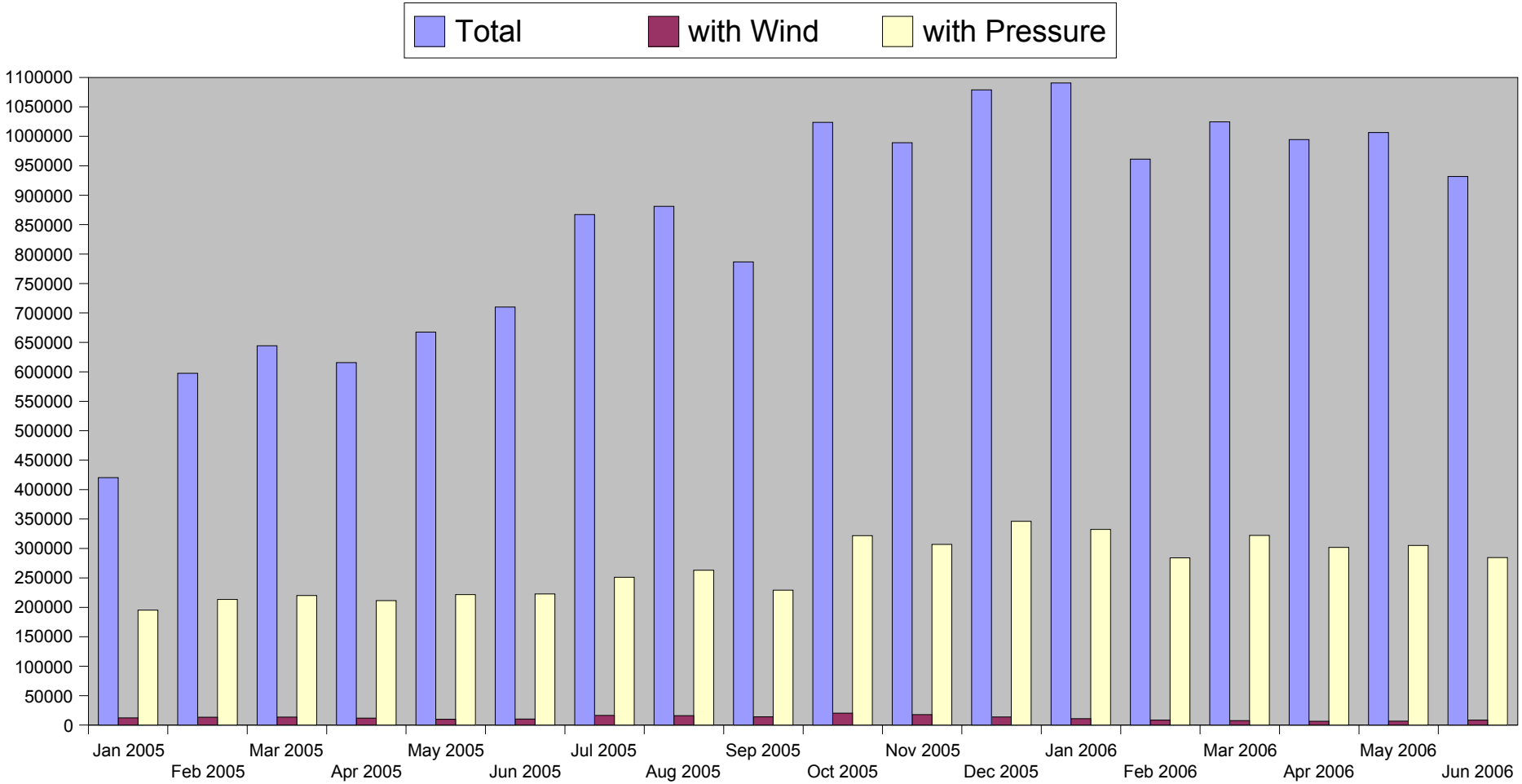


figure 3

Time evolution of SHIP reports for wind and pressure

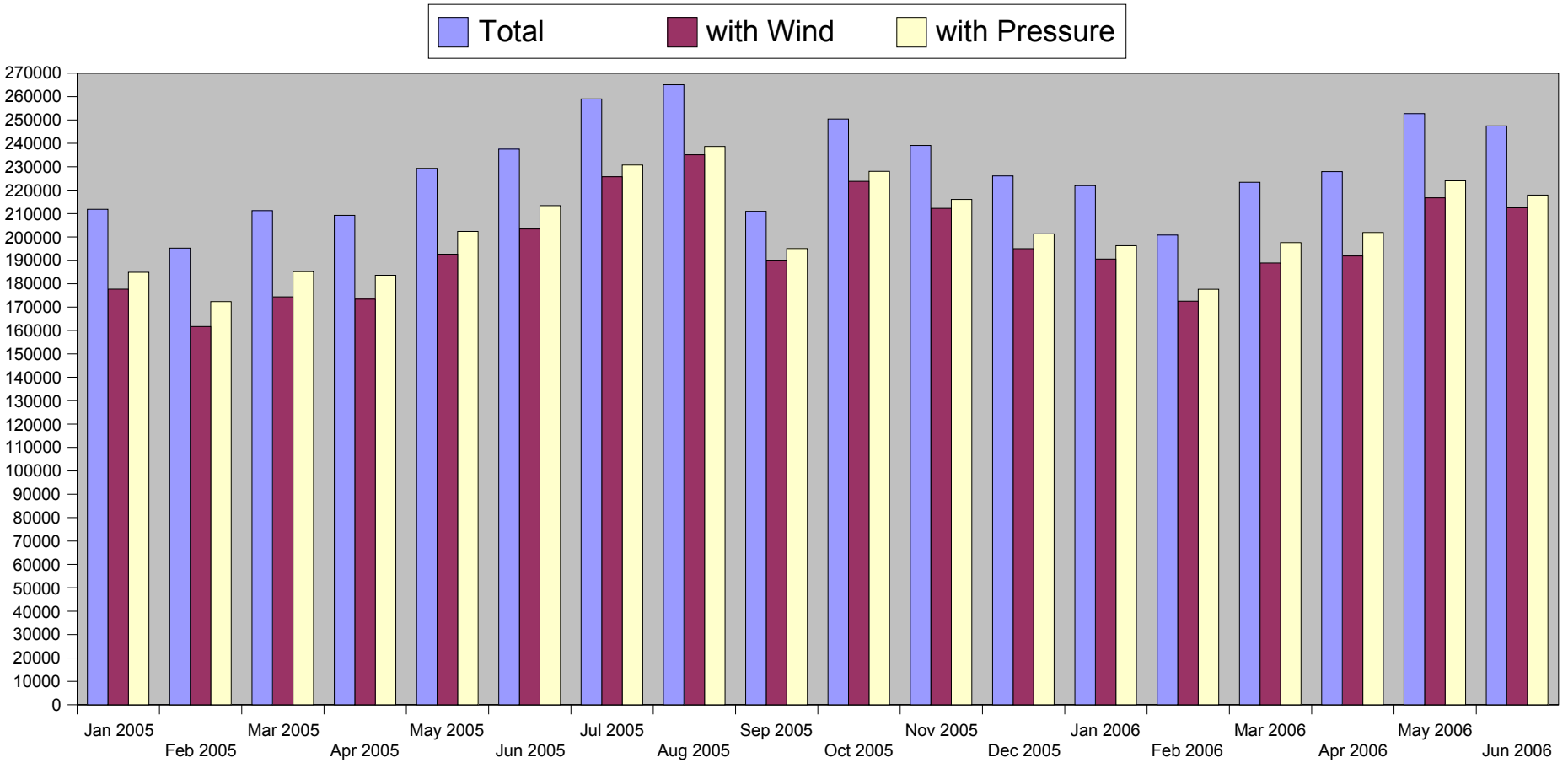


figure 4

DBCP annual report 2005-2006

Time evolution of WAVEOB reports and sensors

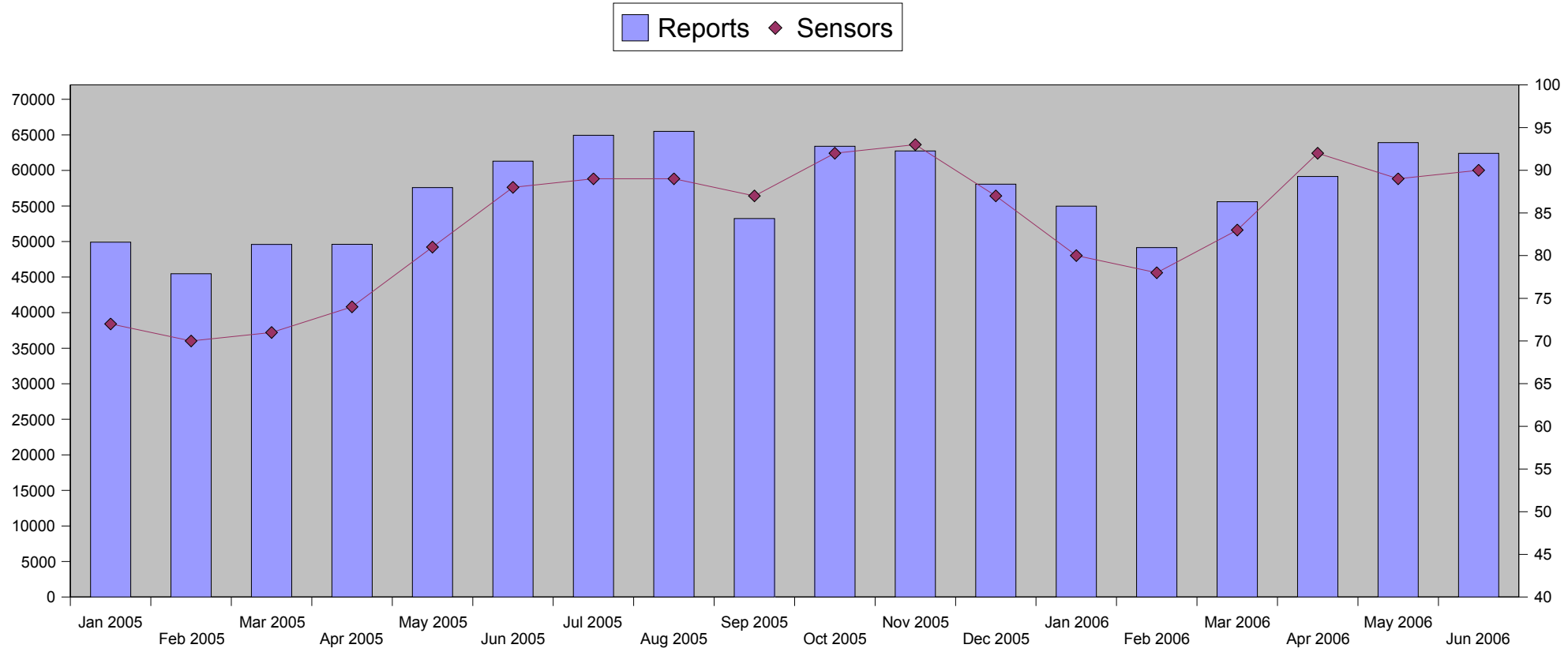


figure 5

Carte de pointage des observations reçues en juin 2006

Mapping position plot chart of data received during June 2006

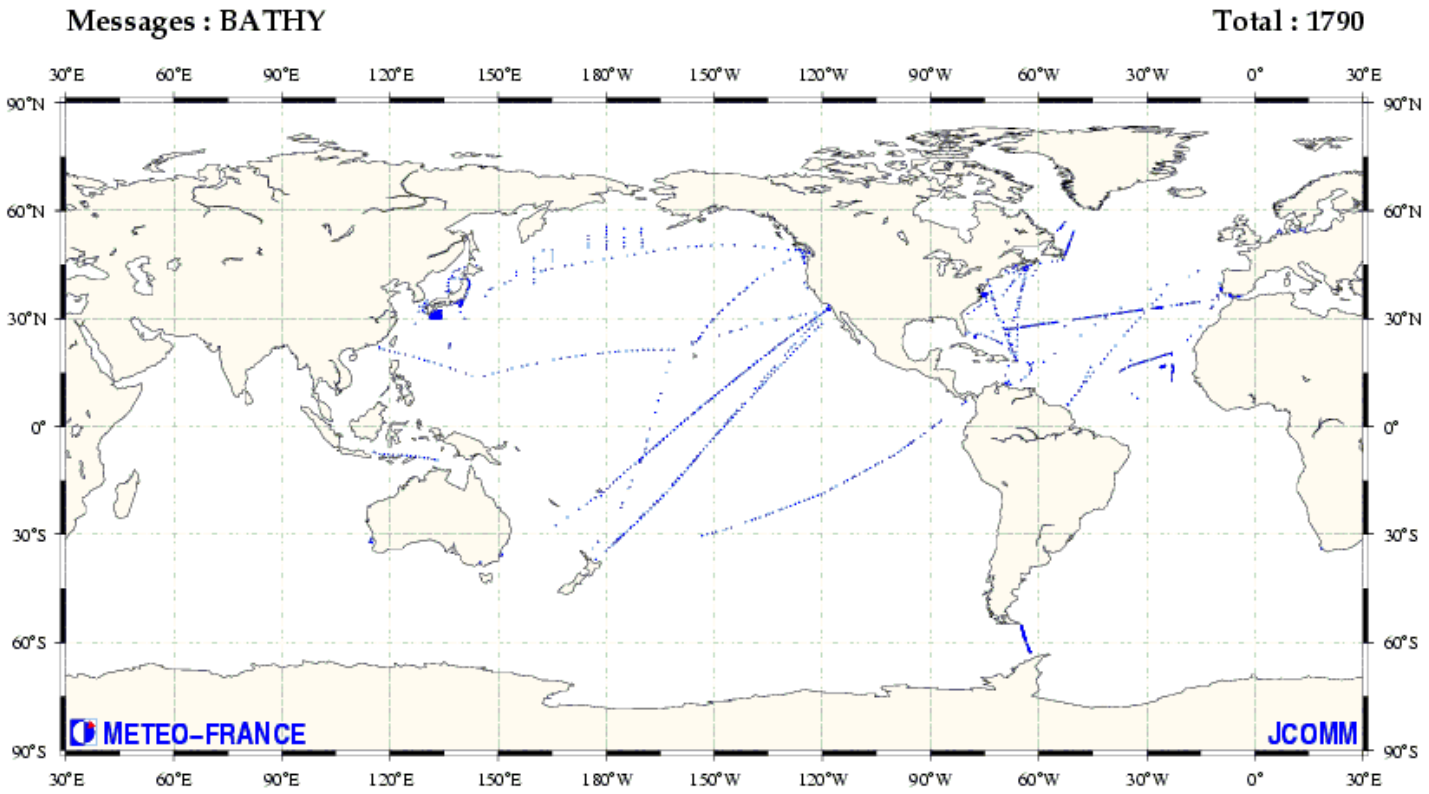


Figure 6a

Répartition par carré Marsden des observations reçues en juin 2006

Marsden square distribution chart of data received during June 2006

Messages : BATHY Total : 1790

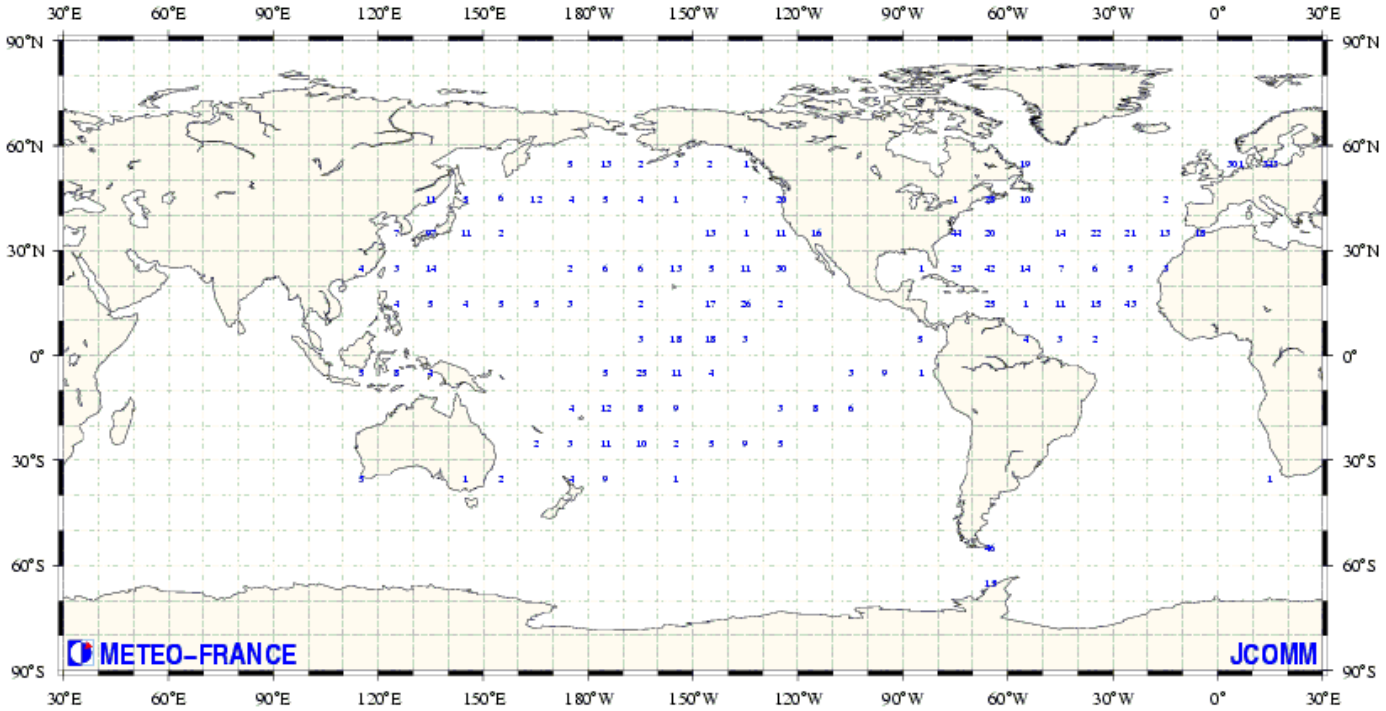


Figure 6b

Carte de pointage des observations reçues en juin 2006

Mapping position plot chart of data received during June 2006

Messages : TESAC Total : 16379

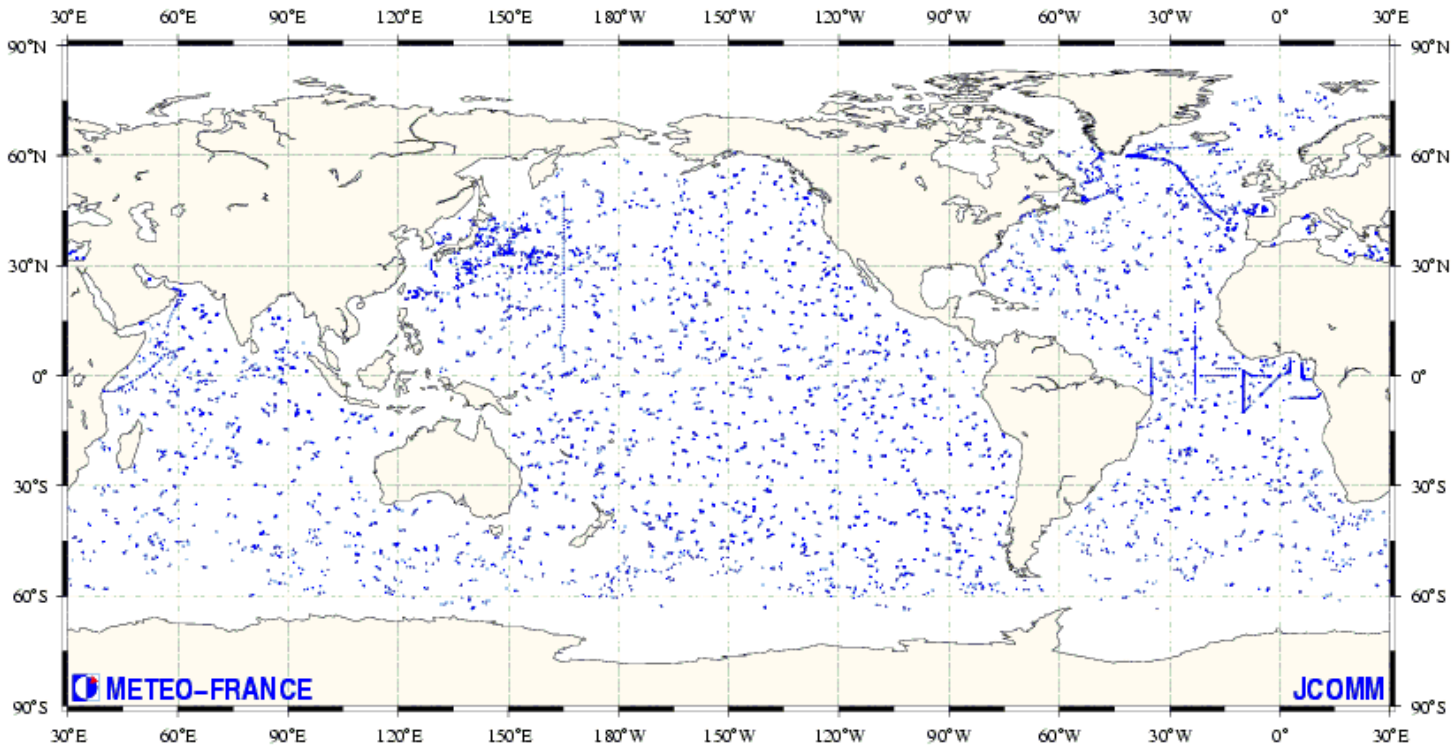


Figure 7a

Répartition par carré Marsden des observations reçues en juin 2006

Marsden square distribution chart of data received during June 2006

Messages : TESAC Total : 16379

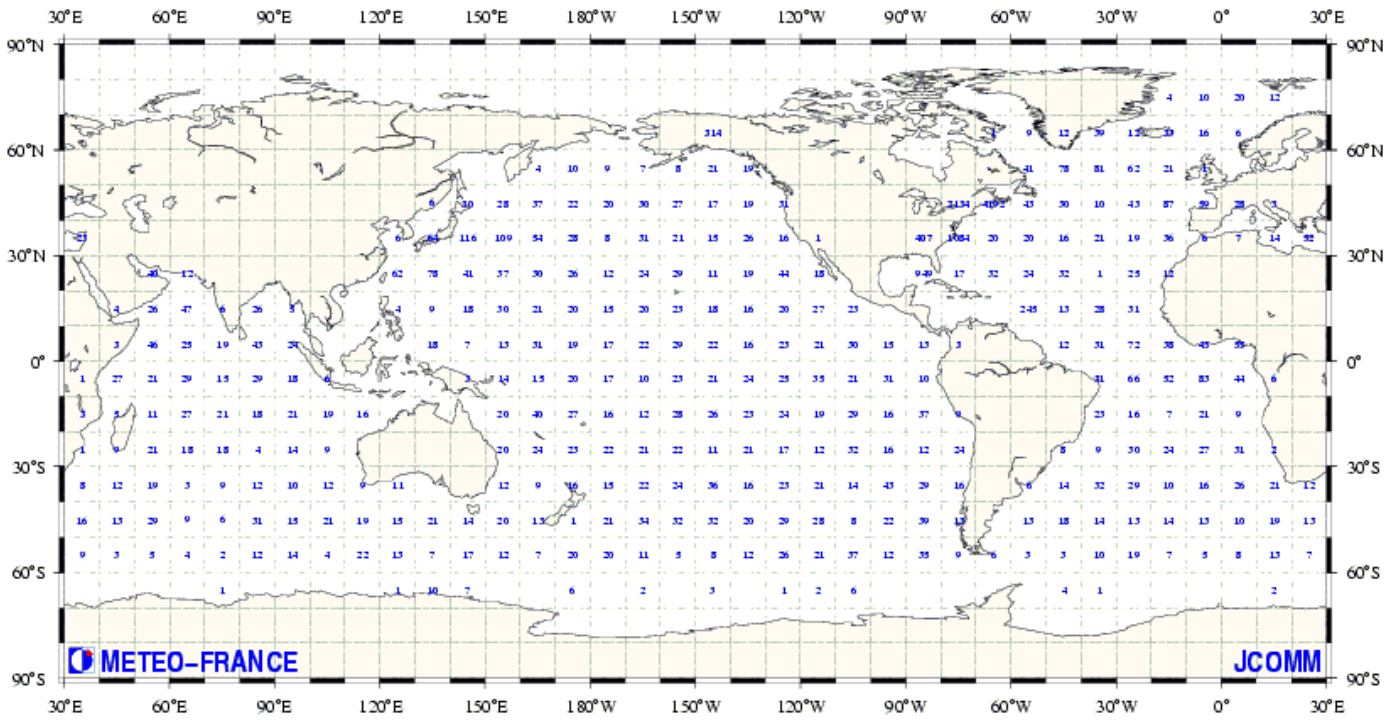


Figure 7b

Carte de pointage des observations reçues en juin 2006

Mapping position plot chart of data received during June 2006

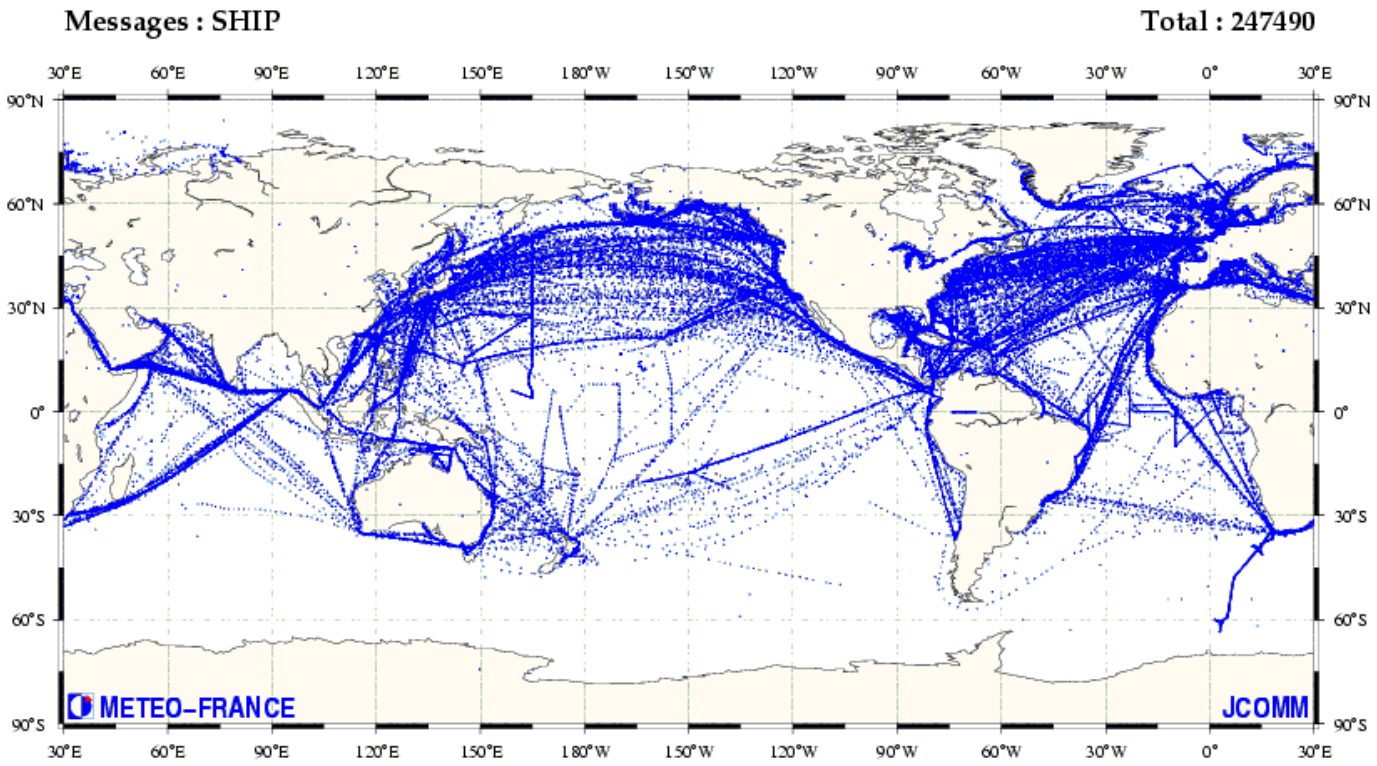


Figure 8a

Répartition par carré Marsden des observations reçues en juin 2006

Marsden square distribution chart of data received during June 2006

Messages : SHIP Total : 247490

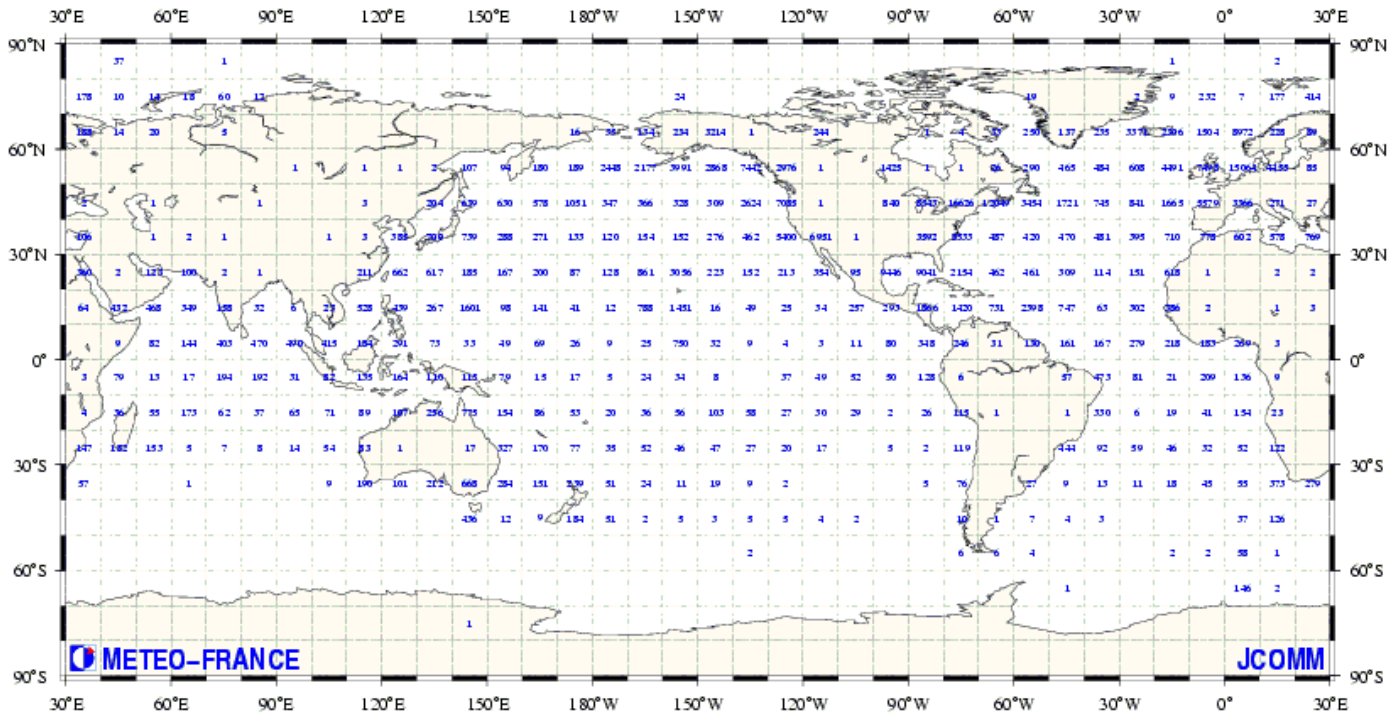


Figure 8b

Carte de pointage des observations reçues en juin 2006

Mapping position plot chart of data received during June 2006

Messages : BUOY Total : 972725

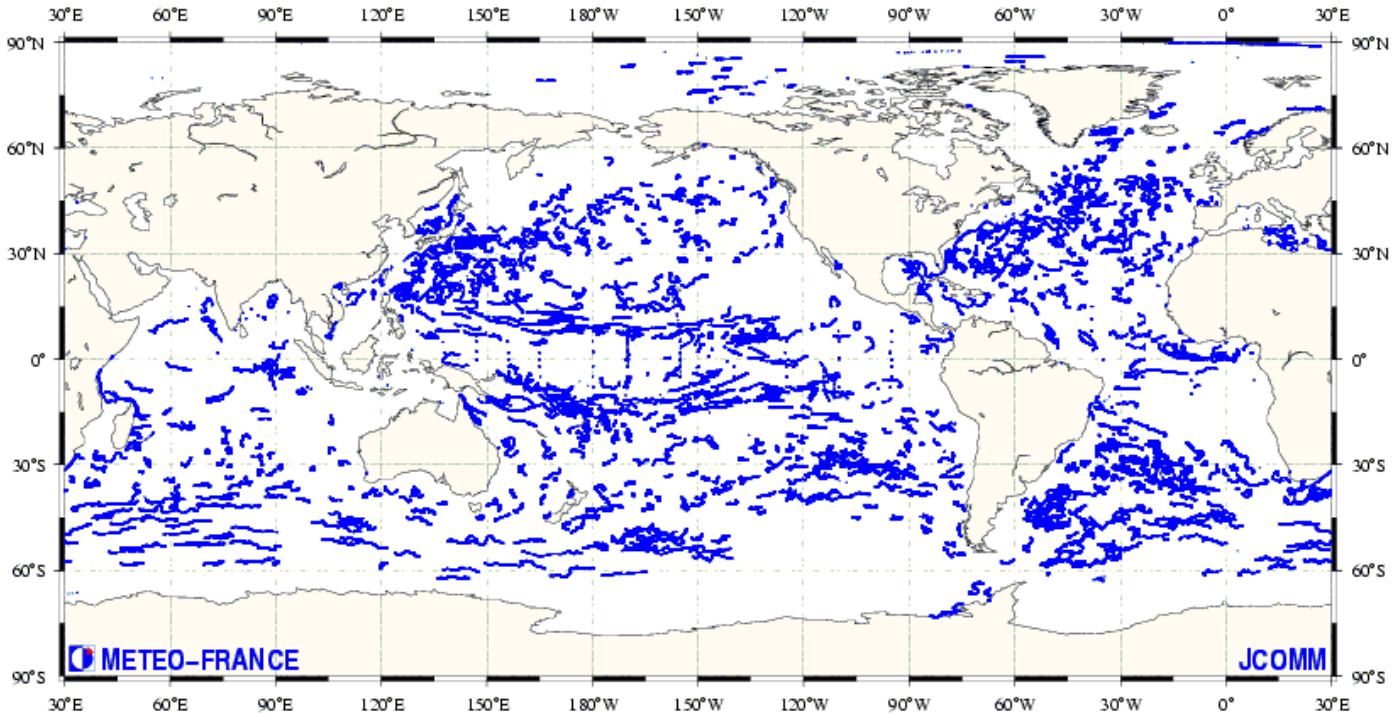


Figure 9a

Répartition par carré Marsden des observations reçues en juin 2006

Marsden square distribution chart of data received during June 2006

Messages : BUOY Total : 972725

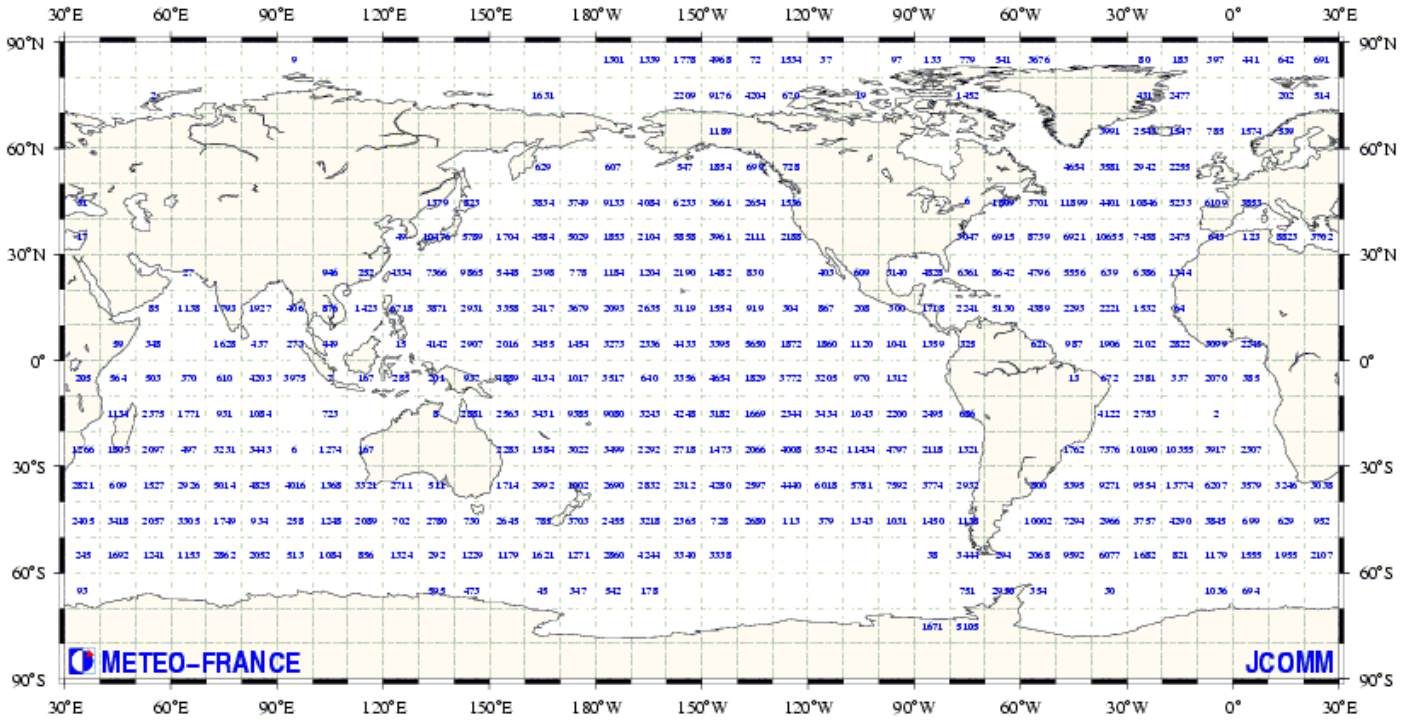


Figure 9b

Carte de pointage des observations reçues en juin 2006

Mapping position plot chart of data received during June 2006

Messages : TRACKOB Total : 648

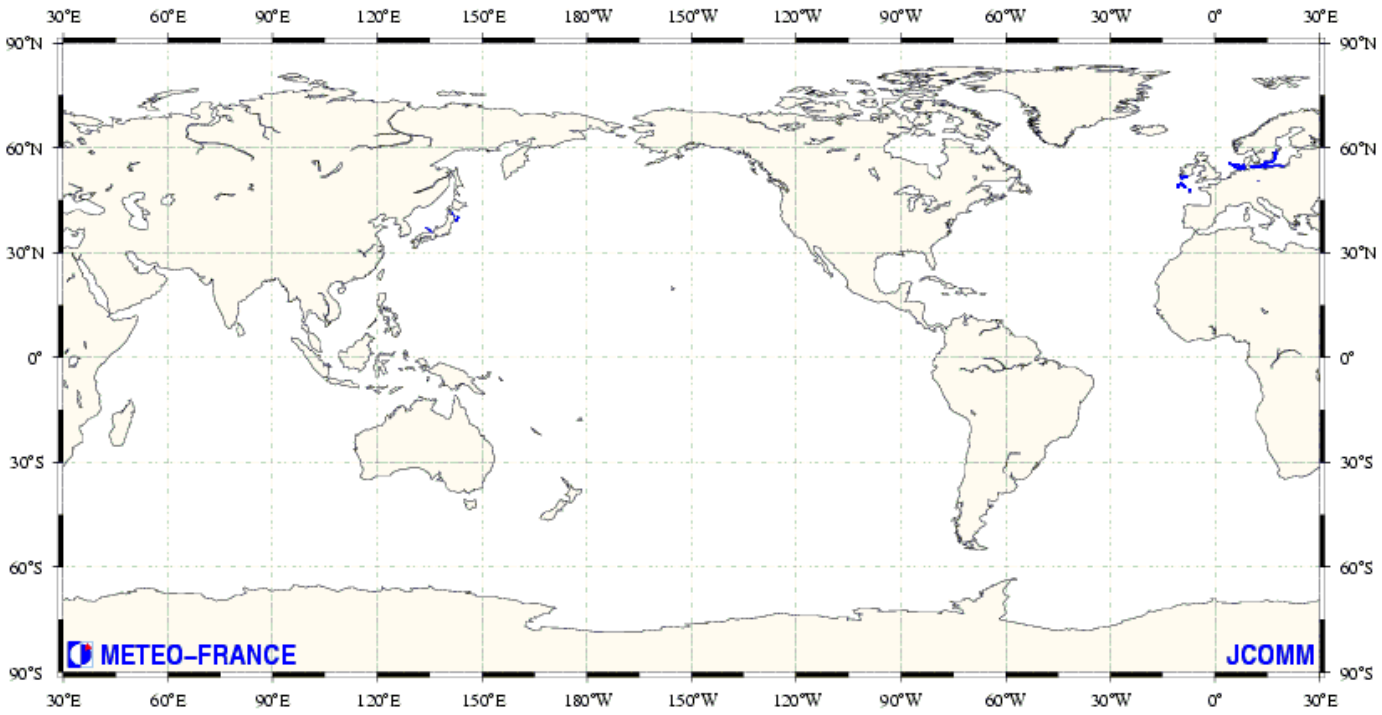


Figure 10a

Répartition par carré Marsden des observations reçues en juin 2006

Marsden square distribution chart of data received during June 2006

Messages : TRACKOB **Total : 648**

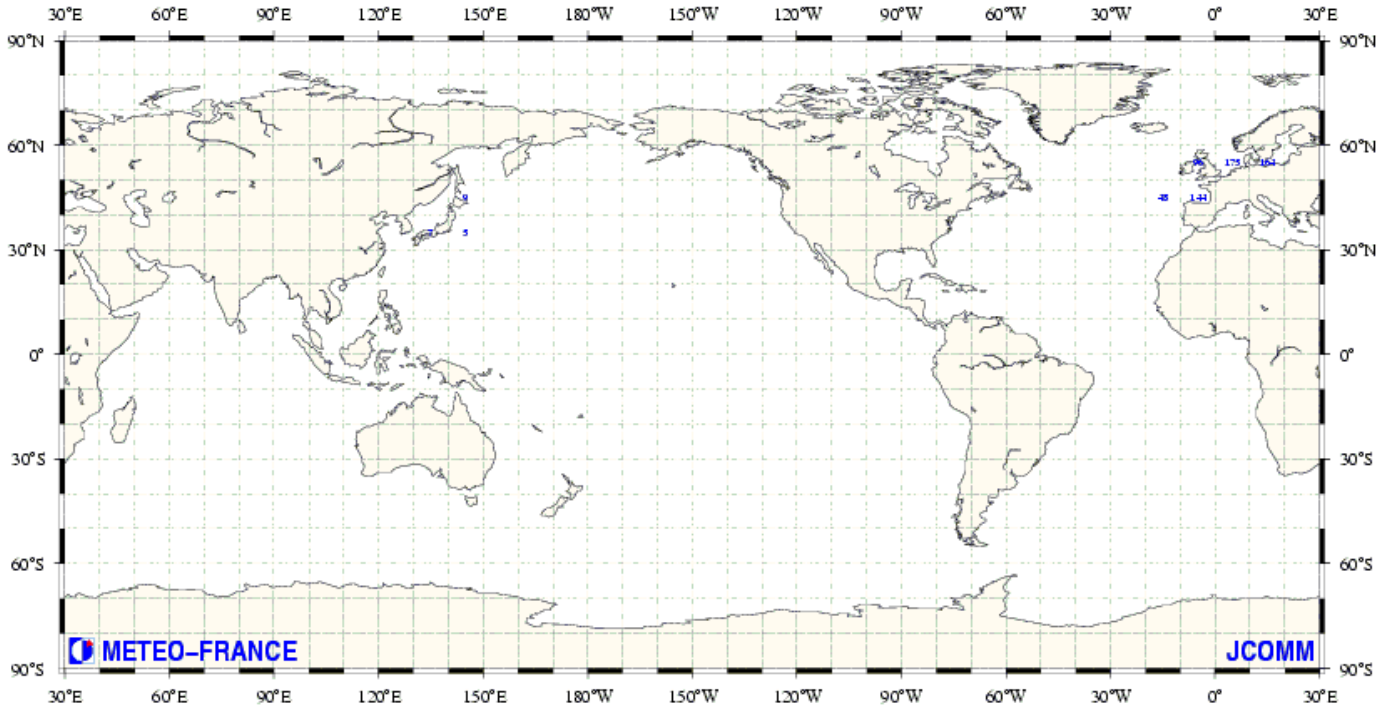


Figure 10b

METEO–FRANCE **WIND** **JUNE 2006**

Marsden square distribution chart of mean monthly data availability index (top)
(Index 100 = 8 obs. per day per 500kM * 500kM area of SHIP and BUOY reports)
and
Percentage of BUOY reports compared to SHIP+BUOY reports (bottom)

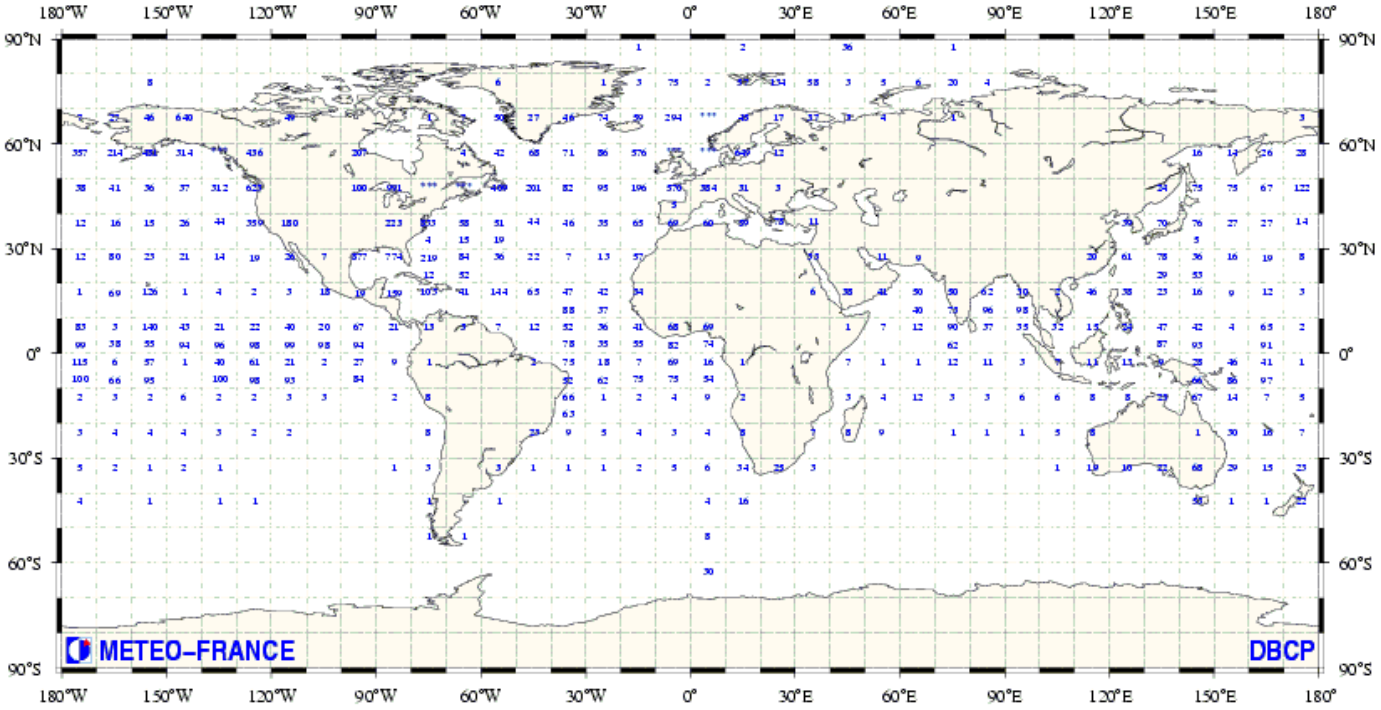


Figure 11

METEO–FRANCE **PRESSURE** **JUNE 2006**

Marsden square distribution chart of mean monthly data availability index (top)
(Index 100 = 8 obs. per day per 500kM * 500kM area of SHIP and BUOY reports)
and
Percentage of BUOY reports compared to SHIP+BUOY reports (bottom)

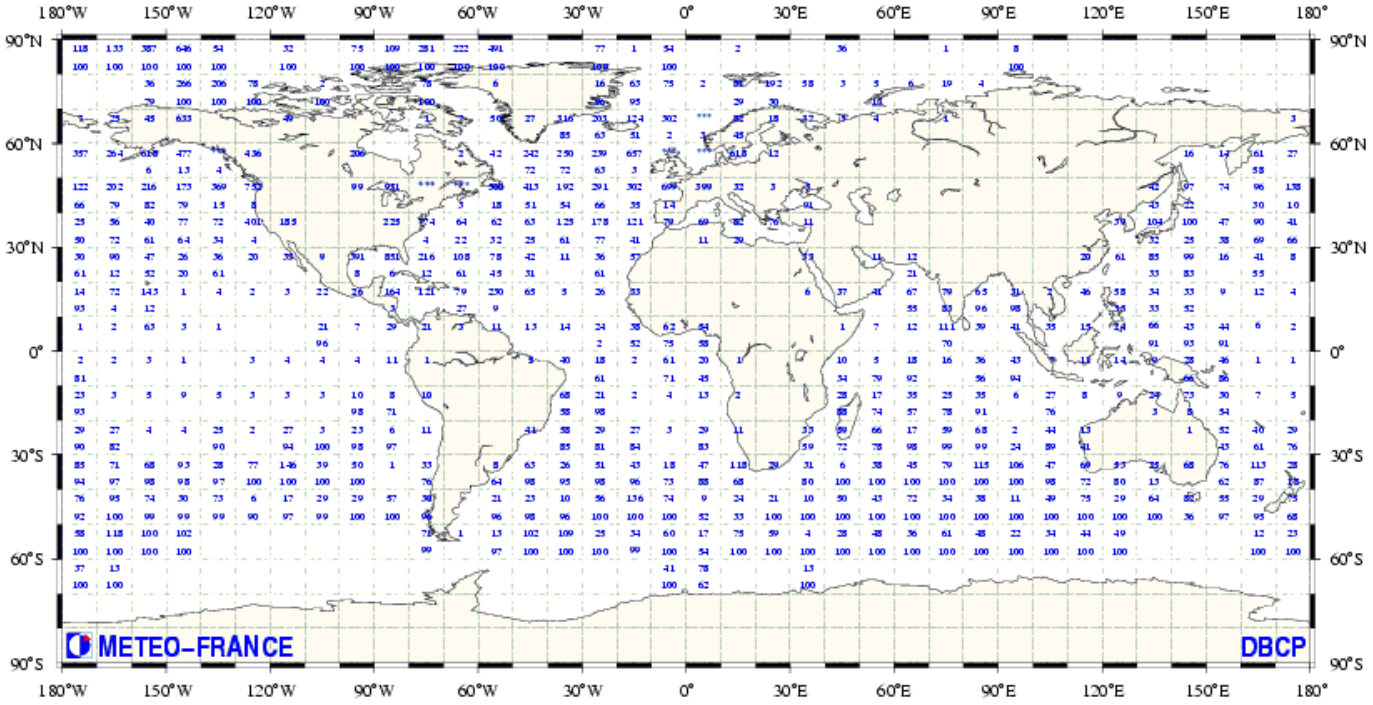


Figure 12

METEO–FRANCE **TEMPERATURE** **JUNE 2006**

Marsden square distribution chart of mean monthly data availability index (top)
(Index 100 = 8 obs. per day per 500kM * 500kM area of SHIP and BUOY reports)
and
Percentage of BUOY reports compared to SHIP+BUOY reports (bottom)

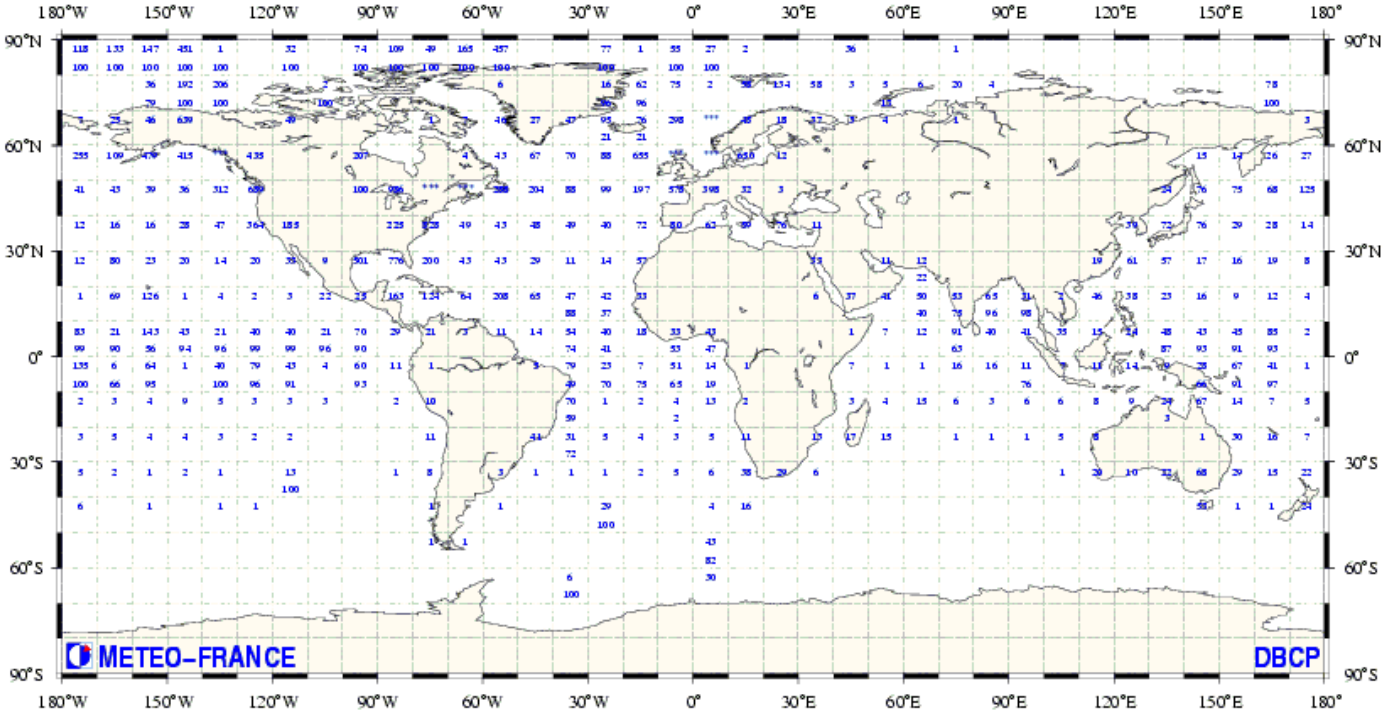


Figure 13

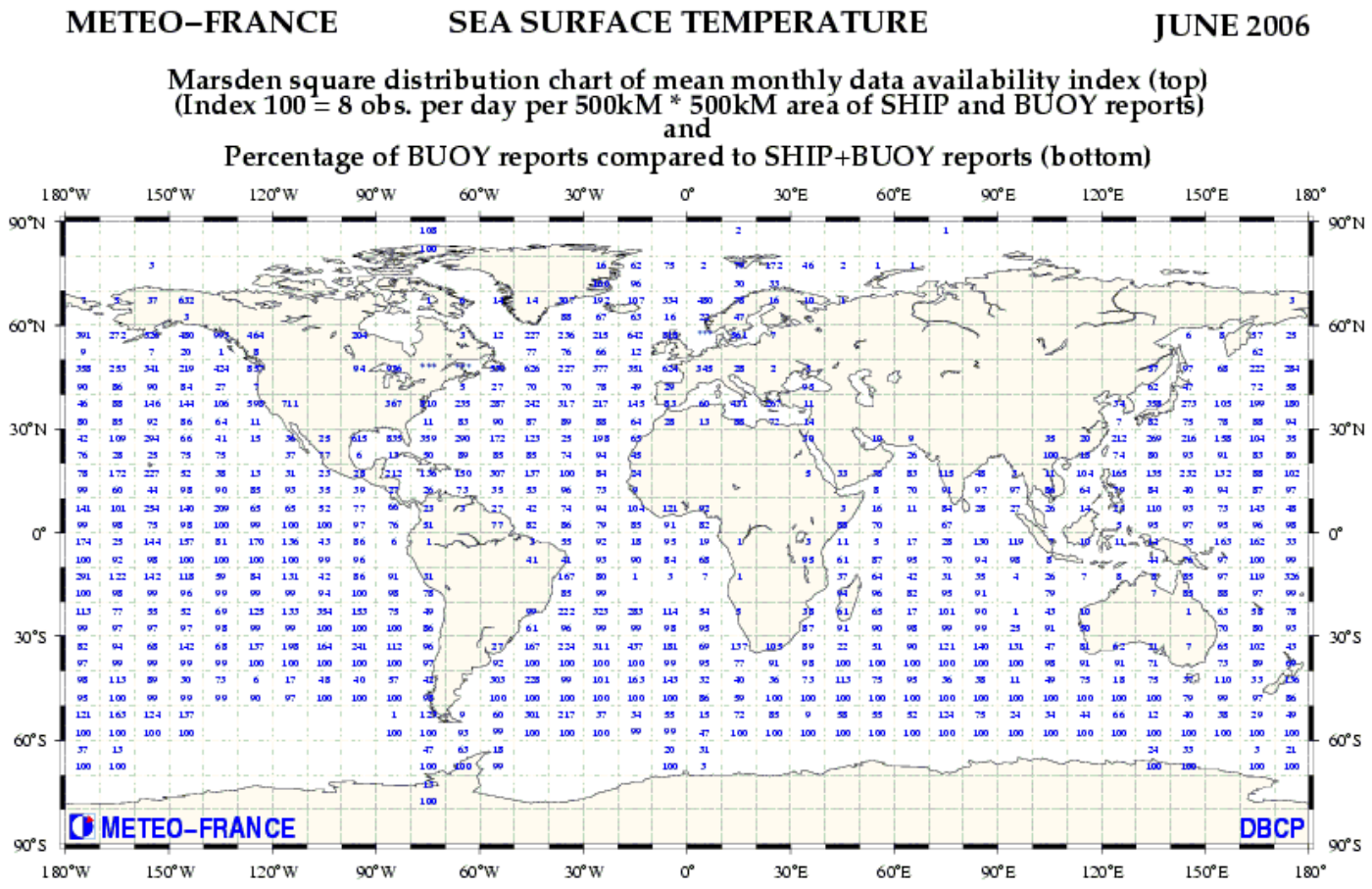

METEO–FRANCE SEA SURFACE TEMPERATURE JUNE 2006
Marsden square distribution chart of mean monthly data availability index (top)
(Index 100 = 8 obs. per day per 500kM * 500kM area of SHIP and BUOY reports)
and
Percentage of BUOY reports compared to SHIP+BUOY reports (bottom)
180°W 150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E 180°
90°N 60°N 30°N 0° 30°S 60°S 90°S
METEO–FRANCE
DBCP

Figure 14

REPORT OF THE RNODC FOR DRIFTING BUOYS

The Marine Environmental Data Service (MEDS)
(August 2005 to July 2006)

Introduction

The Marine Environmental Data Service (MEDS) in Canada became a Responsible National Oceanographic Data Centre (RNODC) for Drifting Buoy Data on behalf of the Intergovernmental Oceanographic Commission (IOC) and the World Meteorological Organization (WMO) in January 1986. The RNODC is a national data centre assisting the World Data Centres (WDCs) for Oceanography and was developed to enable the international exchange system to cope with the increasing variety and volume of oceanographic data being collected. 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. Although MEDS was officially recognized as an RNODC in 1986, its archive started in late 1978 with the First GARP Global Experiment (FGGE) program and is currently growing at a rate of over 800,000 messages per month.

At IODE-XVIII (Oostende Belgium, April 2005) a resolution was adopted to abolish the system of RNODC's. This was in response to a review of IODE activities and in particular, the lack of understanding and use of the RNODC system. The resolution instructed the Chair of IODE to discuss with RNODC host centres how their operations, if considered essential for the international community, could be maintained and properly acknowledged. The services provided by MEDS as the RNODC for drifting buoys were determined to be essential for the international community and as such will continue operating as an RNODC until the proper accreditation has been established.

As of April 2006, MEDS has expanded to include management of bathymetric data in DFO and as such has been renamed Integrated Science Data Management (ISDM). While ISDM is the current term used internally to DFO, a more appropriate international name has not yet been decided. For simplicity, the term MEDS will continue to be used until such time.

Overall annual statistics summary

All statistics, with the exception of the maps and unless otherwise stated, refer to data received in BUOY code which includes both drifter and moored buoys.

During the period August 2005 to July 2006, MEDS has archived an average of 860,000 BUOY reports per month (Figure 1) and received reports from an average of 1490 buoys per month (Figure 2), an increase of 345,000 reports (67%) and an increase of 320 buoys (27%) from last year respectively. On average, each drifter is reporting approximately 19 messages a day (Figure 3). Figure 4 shows the number of some of the meteorological/oceanographic observations posted on the GTS and Figure 5 shows the number of drifting buoys that reported Sea Surface Temperature (SST) and other meteorological observations. Drifting buoy tracks during the year can be seen in Figure 6. Of the BUOY messages received, 98% of the locations were quality flagged as good (Figure 7) and required on average 28.5 days from observation to reach the archive (Figure 8) (See Data Flow to MEDS). The size of the drifting buoy archive continues to grow (Figure 9) with about 42.5 million records containing 18 Gigabytes of data from 1978-2005.

Summary of work carried out during the year

DBCP QC Guidelines for Location Data

MEDS sent its first message on the BUOY-QC distribution list (buoy-qc@vedur.is) in October 2002 and continues to participate by sending monthly statistics on the number of erroneous positions on the distribution list. Maps displaying buoys tracks of the previous month for the Arctic, Antarctic and the rest of the world can be seen here: http://www.meds-sdmm.dfo-mpo.gc.ca/meds/Prog_Int/RNODC/Buoy-QC/Buoy-QC.htm. The maps serve as a visual aid to the statistics file and allows the user to "mouse over" tracks to determine which buoys are reporting erroneous locations. Figure 7 shows quality control percentages of all position data during this past year.

Implementing New BUFR Software

Drifting buoy data is now being reported on the GTS in both BUOY and BUFR (Binary Universal Form for Data Representation) format. A connection has been established to the Canadian Meteorological Center (CMC) to receive the BUFR messages via FTP. New software was written to read and decode each message into an internal format for update to our archives. In doing this, an error in the encoding of the WMO number was found for buoys reporting in WMO Region 7. This was brought to the attention of the former DBCP Technical Coordinator. Functionality related to new editions and data compression still need to be added as well as a thorough comparison of the two formats to ensure consistency. The software has also been used successfully in an initial test to decode Argo data reported in BUFR.

Goals for 2005/2006

Complete the remaining pieces of the BUFR software.

Look into increasing the frequency of archive updates (see Data Flow to MEDS).

Update new data submission (2003-2005) from AOML (See Partnerships).

MEDS expects an increase of data from the polar regions due to activities in support of the International Polar Year (IPY) initiative.

MEDS is currently undergoing an organizational restructuring and as such, all of our systems and software will be upgraded to newer technology. This upgrade with require a significant amount of time and resources with the effect that MEDS will be reluctant to undertake new developments with the current system.

Data flow to MEDS

In the real-time drifting buoy processing system, GTS data are ftp'd to MEDS every half hour from the Canadian Ice Service, a branch of the Met Service of Canada (MSC) of Environment Canada (EC). Every hour, these messages are sorted through to extract BUOY messages, as well as other oceanographic reports such as BATHY and TESAC. Once a day, the BUOY messages are decoded into an in-house format after which automated tests are run to check for acceptable ranges of values in several measurements (SST, atmospheric pressure, air temperature, wind direction/speed, sub-surface temperature/salinity and wave height/period) and meta-data (date/time, latitude and longitude). The data are stored in a file for a month at which time software to detect duplicates is run making the data available for quality control. Trained scientific personnel review plots of buoy time series of the measurements, drift tracks and speed graphs. Flags are set according to the international QC flag definitions derived from IGOSS, now JCOMM. Once completed, the data are added into the archive and the website is updated.

With a monthly QC system, it takes anywhere between one and six weeks for BUOY data to be added into the archive. Last year on average, the delay between reception and update was 28.5 days. Frequency of the data arriving into the archive as compared to observation date and time can be seen in Figure 8. With the increasing number of messages received each month, the QC process takes longer and therefore increases the time it takes to update the archive. This, along with a growing need for real-time drifter data in a timelier manner, has prompted MEDS to look at instituting a new processing system to perform the operation on a weekly or even daily basis.

Data distribution

MEDS continues to distribute the data upon request, on a regular basis and via the web. Last year, MEDS received 25 requests for drifting buoy data. Requests came mostly from universities, government organizations and private consulting companies. Of the 25 requests, 5 were for the International Arctic Buoy Programme (IABP) CD that was created by MEDS in 2000. The CD contains data, products and documents that were produced under the IABP between 1979 and 1999.

Regular data distributions include sending raw drifting buoy GTS messages daily to the US National Oceanographic Data Center (NODC) by FTP, as well, a yearly file of all the QC'd drifting buoy data on CD. Hourly raw data of buoy id, date/time, and meteorological data are posted on our ftp site for use by the Canadian Coast Guard in Search and Rescue. In the past, a monthly file was sent to IFREMER (French Research Institute for Exploitation of the Sea) but no longer required and was discontinued.

MEDS website is updated after the monthly QC and contains many trajectories, inventories and statistics of the buoy archive by month and year on a global scale, as well as for specific regions such as the Arctic, Antarctic, North Pacific, Southern Atlantic, EGOS (European Group on Ocean Stations) and Indian Ocean. Except for Arctic data for the current month, data are not available on the website and must be requested through the on-line Data Request Form. The current month's data for the Arctic is made available through a special application designed for the IABP region, which shows real-time tracks of Arctic floats on a scalable map with the option to view specific buoy data. The URL for drifting buoy data and information at MEDS is http://www.meds-sdmm.dfo-mpo.gc.ca/meds/Databases/DRIBU/drifting_buoys_e.htm.

Partnerships

AOML
MEDS is, along with Atlantic Oceanographic and Meteorological Laboratory (AOML), the Data Assembly Centre (DAC) for Surface Velocity Profile (SVP) data collected by drifting buoys. AOML handles the initial processing of the data received through Service Argos. They carry out quality control on the data and generate the interpolated files. Every 6 months, they forward the data to MEDS who function as the archive and distribution centre. For all years up to 2003, and with only minor inconsistencies with AOML, the AOML data are in MEDS archives, and available through the MEDS web site.

CLIVAR
MEDS is continuing to collect drifting buoy data in support of CLIVAR as it had in the past under WOCE.

Archive Information

Figures 10-13 show information derived from the entire archive. The maps show all the buoy tracks in three projections, global, Arctic and Antarctic and the graph displays the growth of the top five parameters (from both drifter and moored buoys) throughout the years 1978-2005.

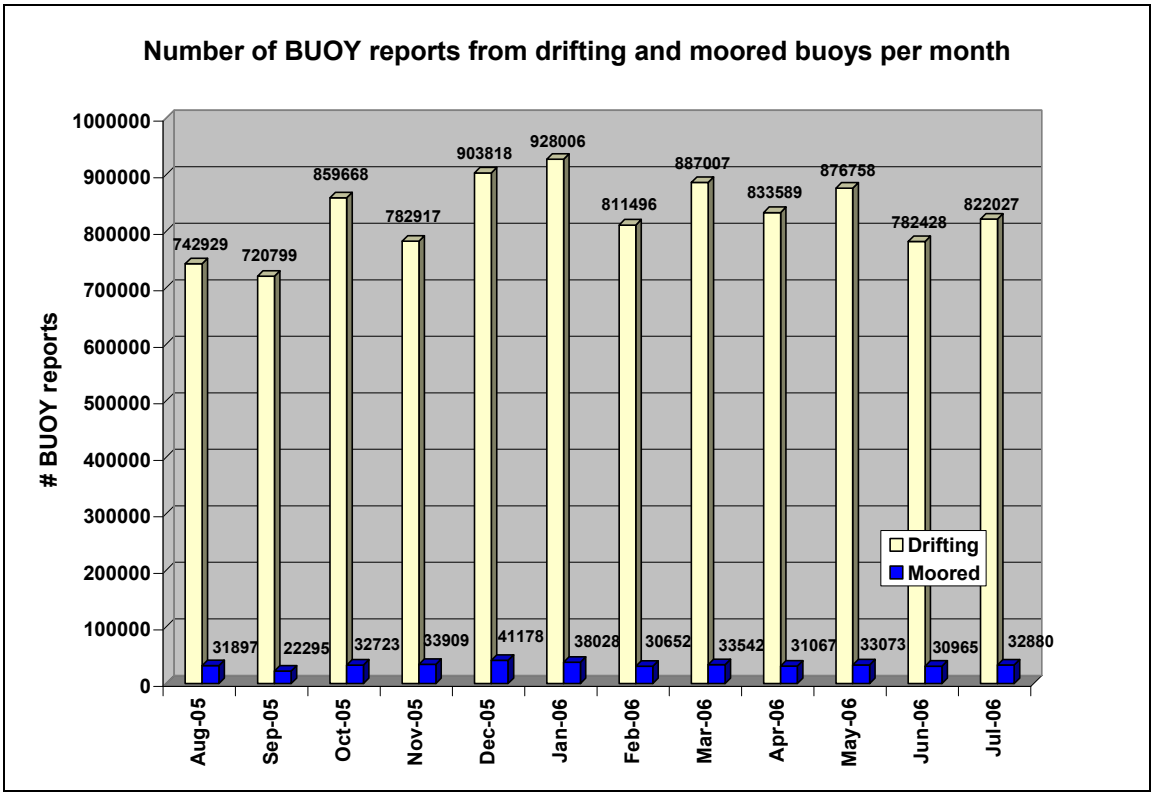


Figure 1

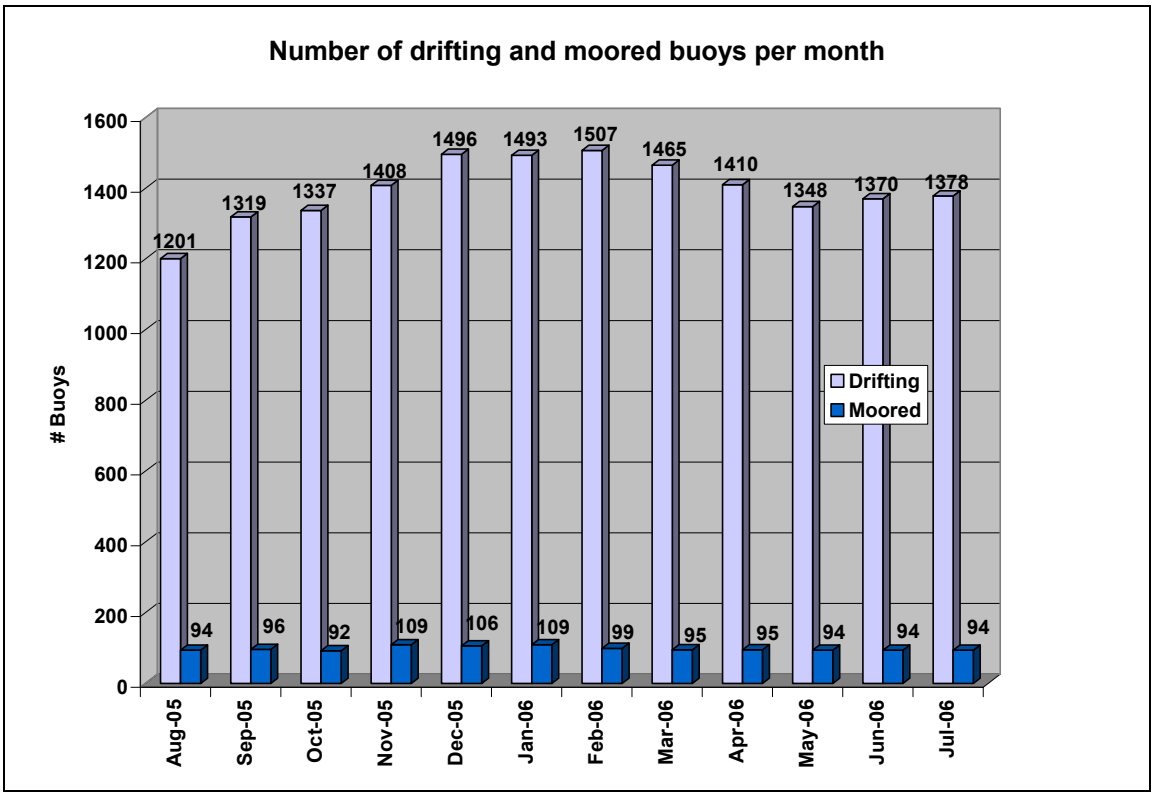


Figure 2

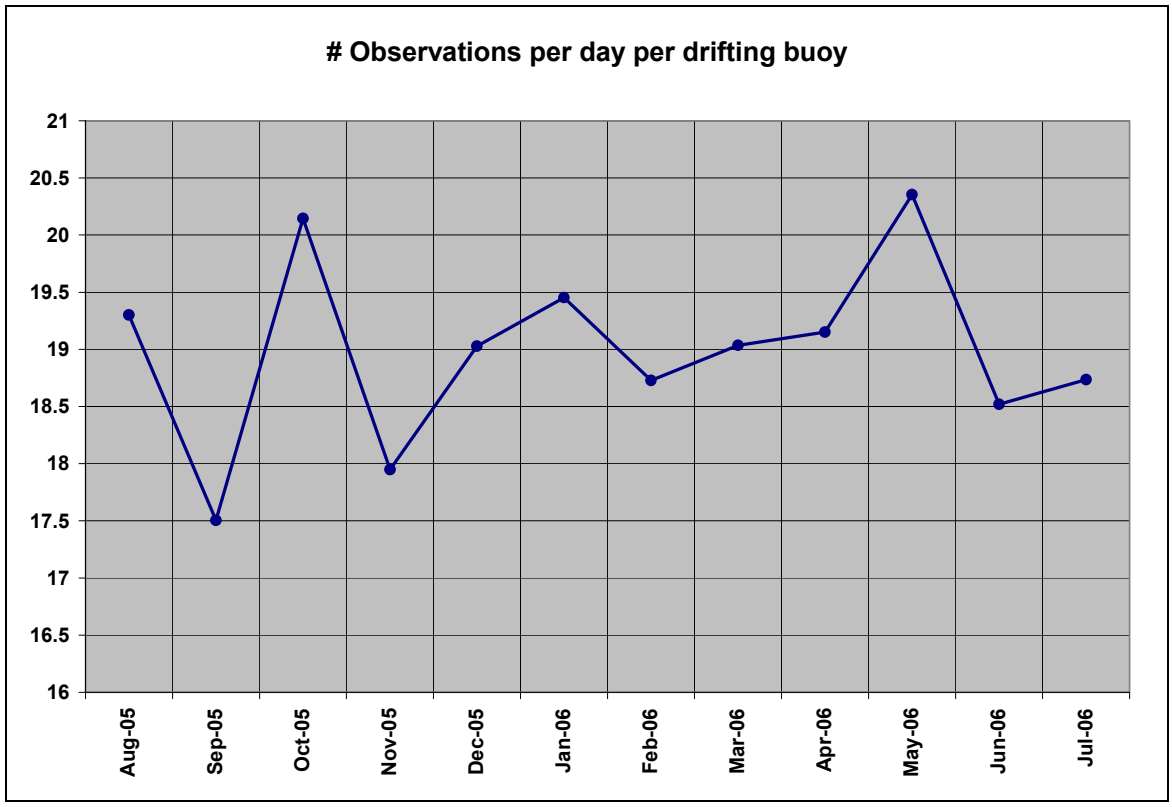
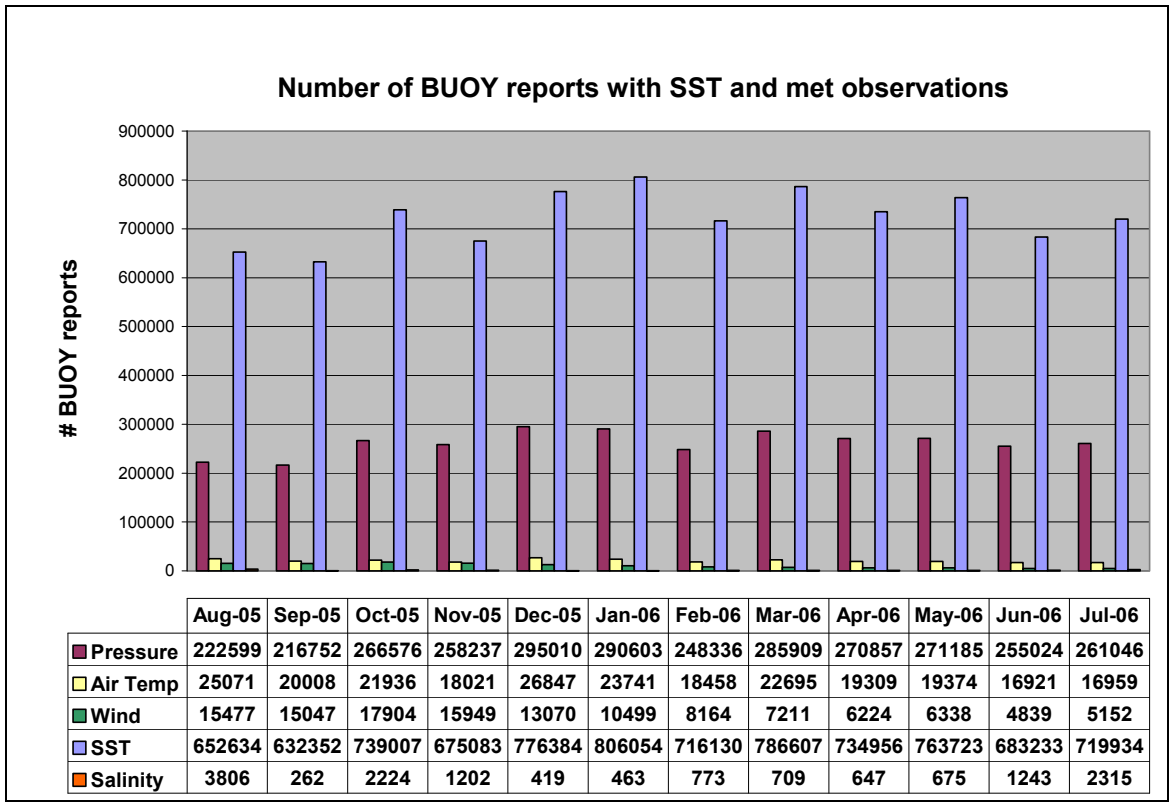


Figure 3



	Aug-05	Sep-05	Oct-05	Nov-05	Dec-05	Jan-06	Feb-06	Mar-06	Apr-06	May-06	Jun-06	Jul-06
Pressure	222599	216752	266576	258237	295010	290603	248336	285909	270857	271185	255024	261046
Air Temp	25071	20008	21936	18021	26847	23741	18458	22695	19309	19374	16921	16959
Wind	15477	15047	17904	15949	13070	10499	8164	7211	6224	6338	4839	5152
SST	652634	632352	739007	675083	776384	806054	716130	786607	734956	763723	683233	719934
Salinity	3806	262	2224	1202	419	463	773	709	647	675	1243	2315

Figure 4

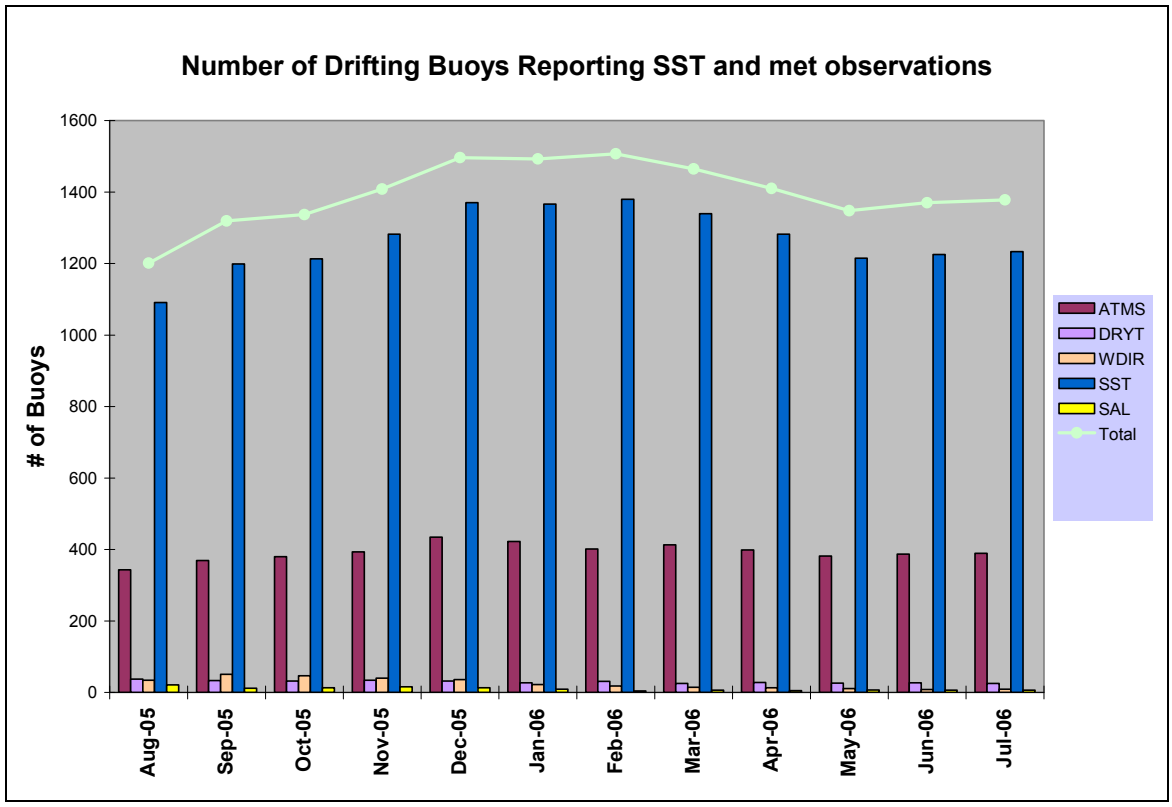


Figure 5

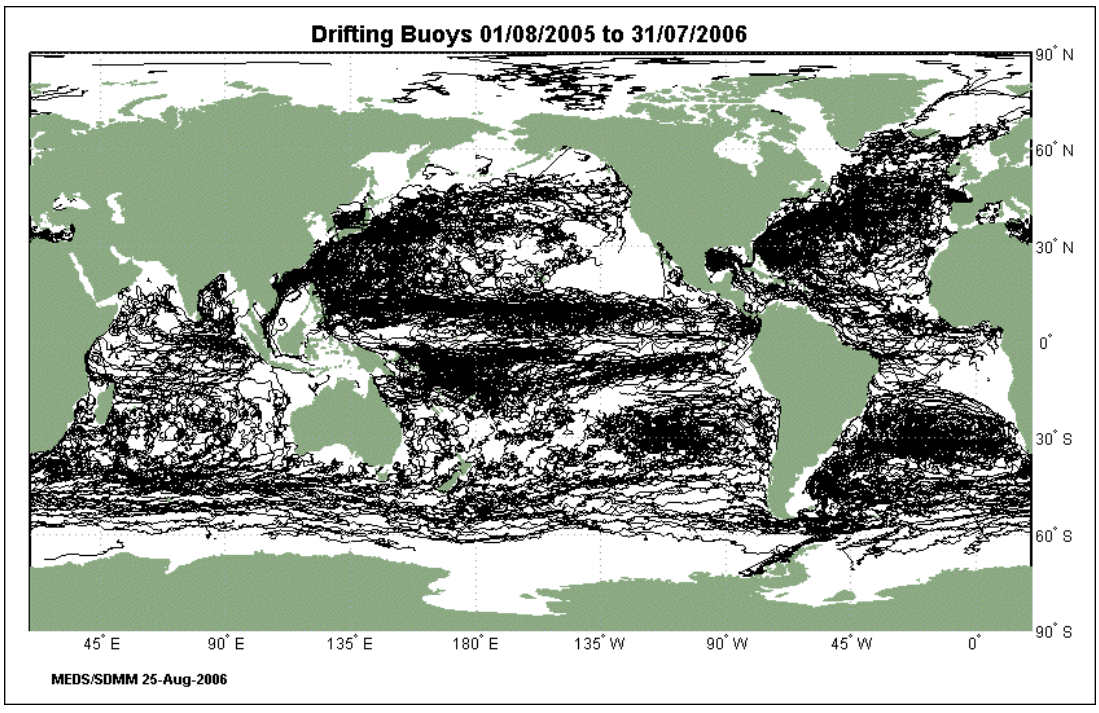


Figure 6

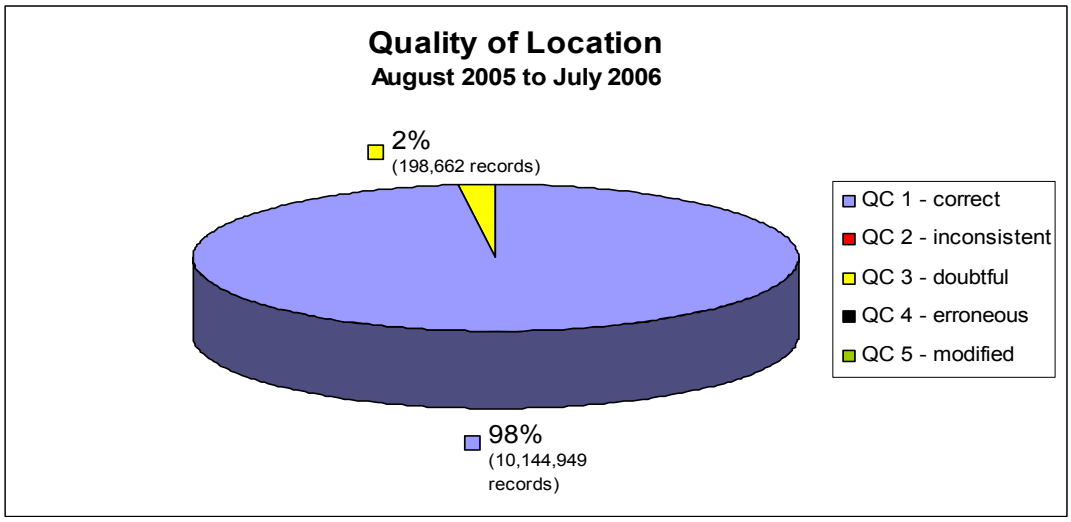


Figure 7

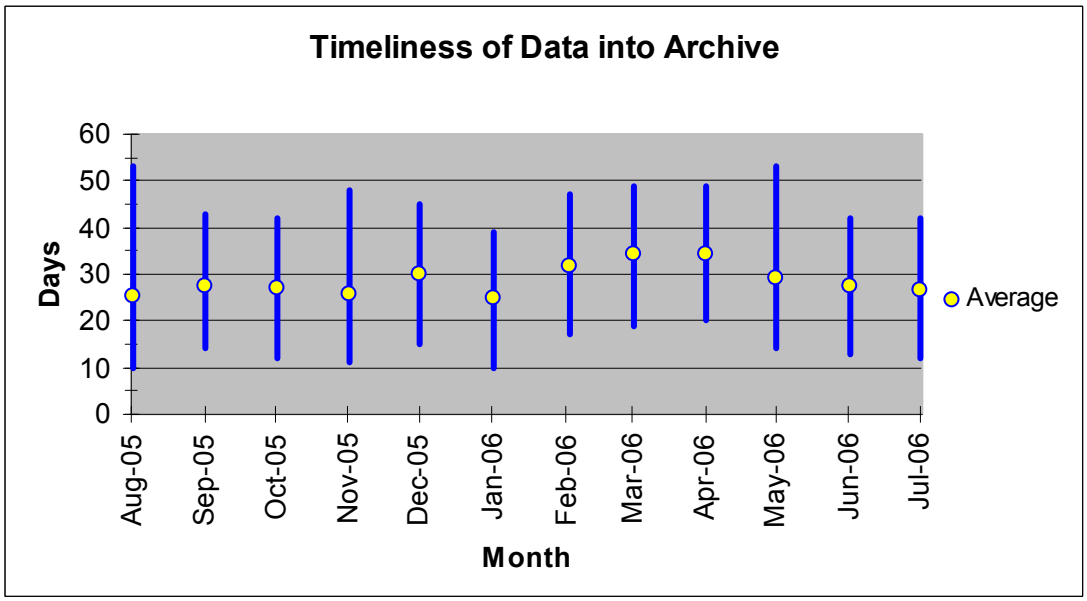


Figure 8

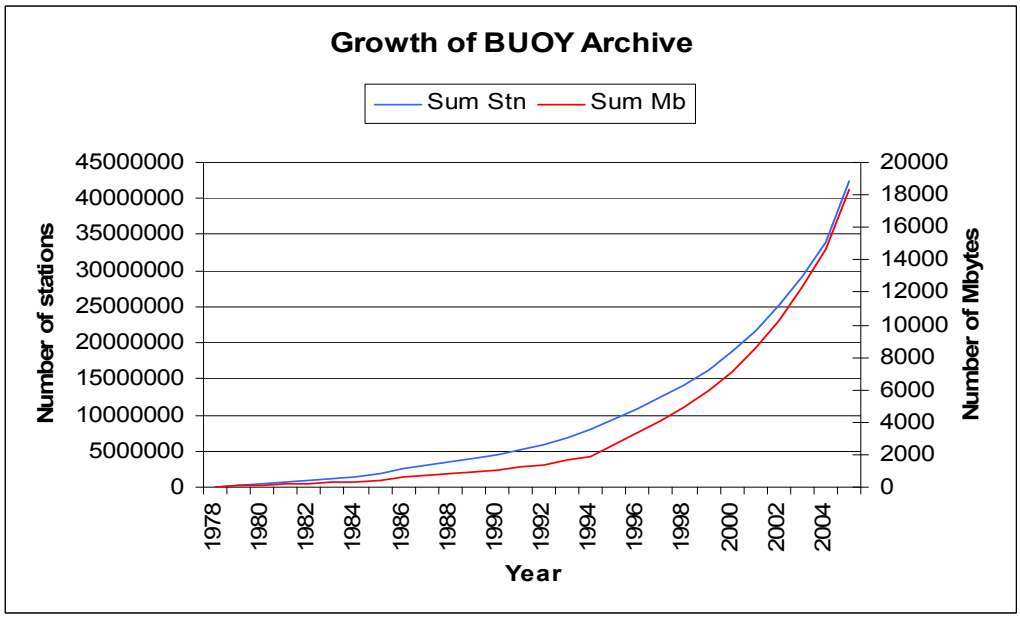


Figure 9

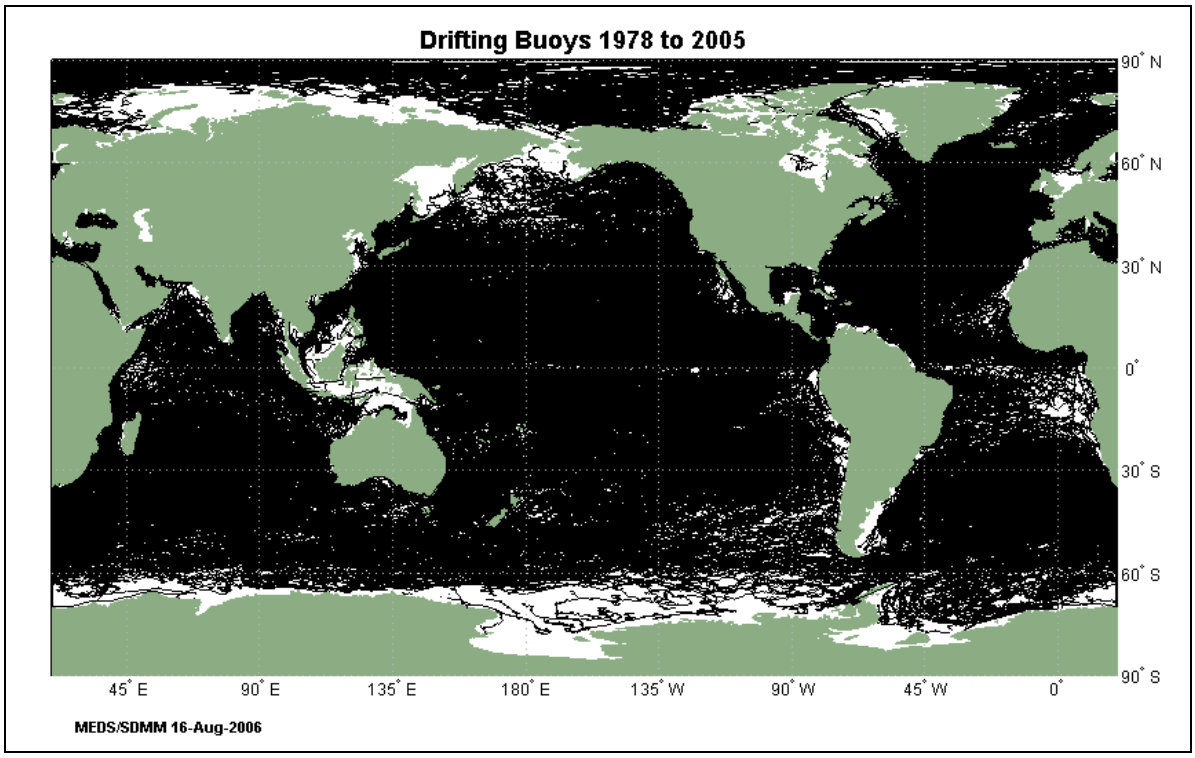


Figure 10

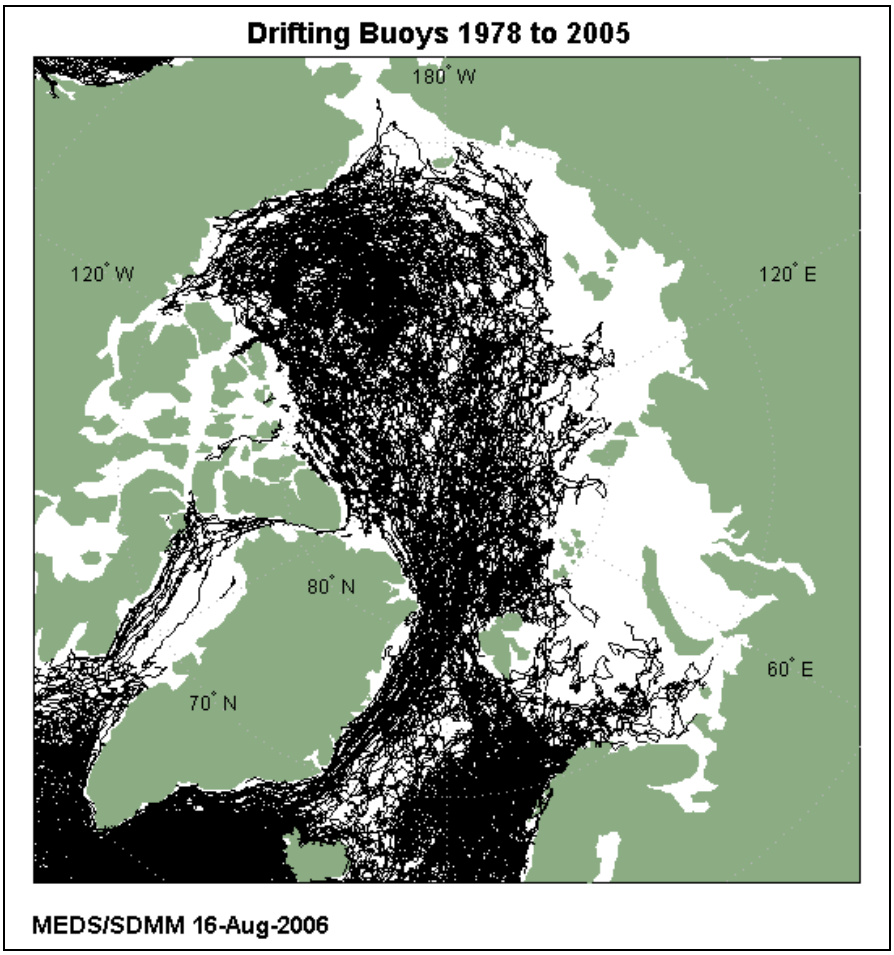


Figure 11

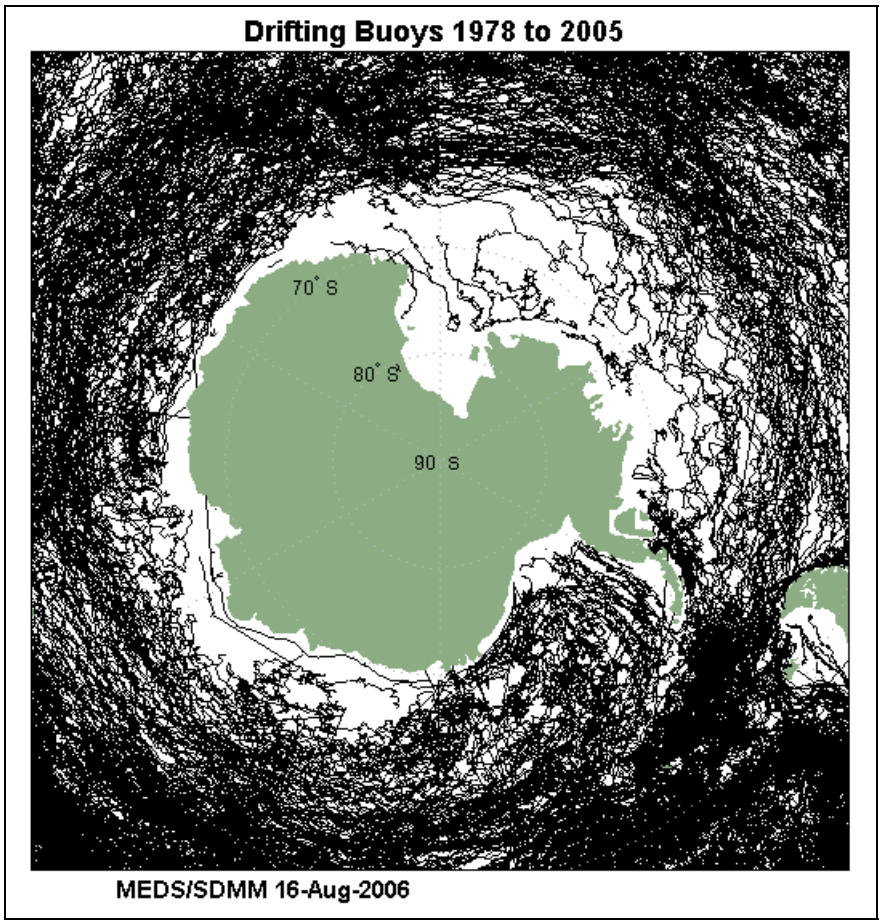


Figure 12

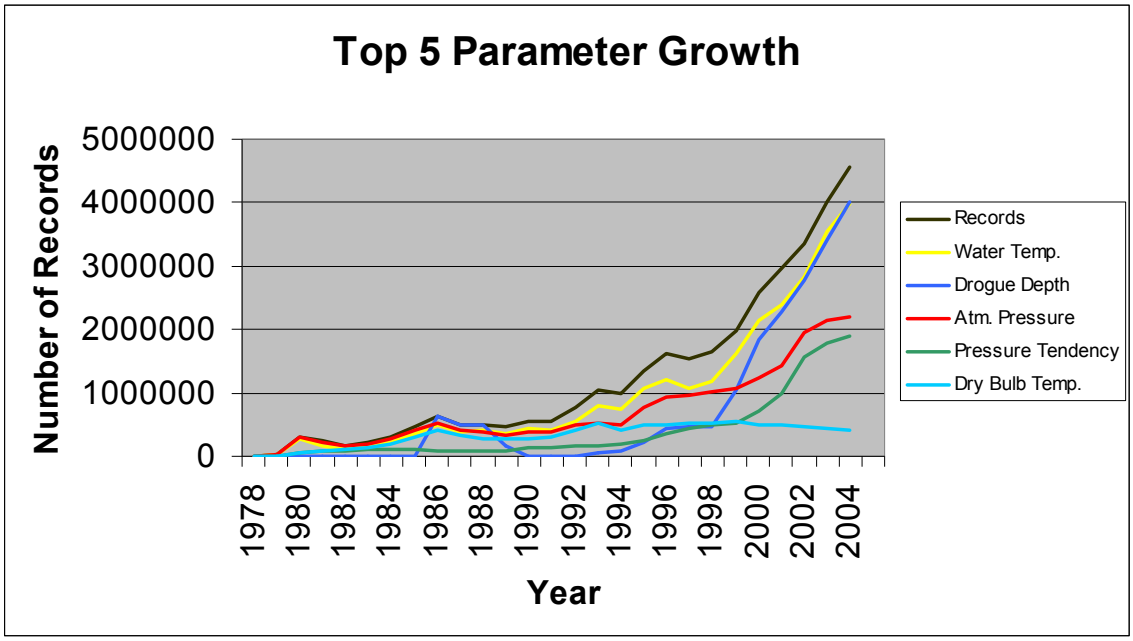
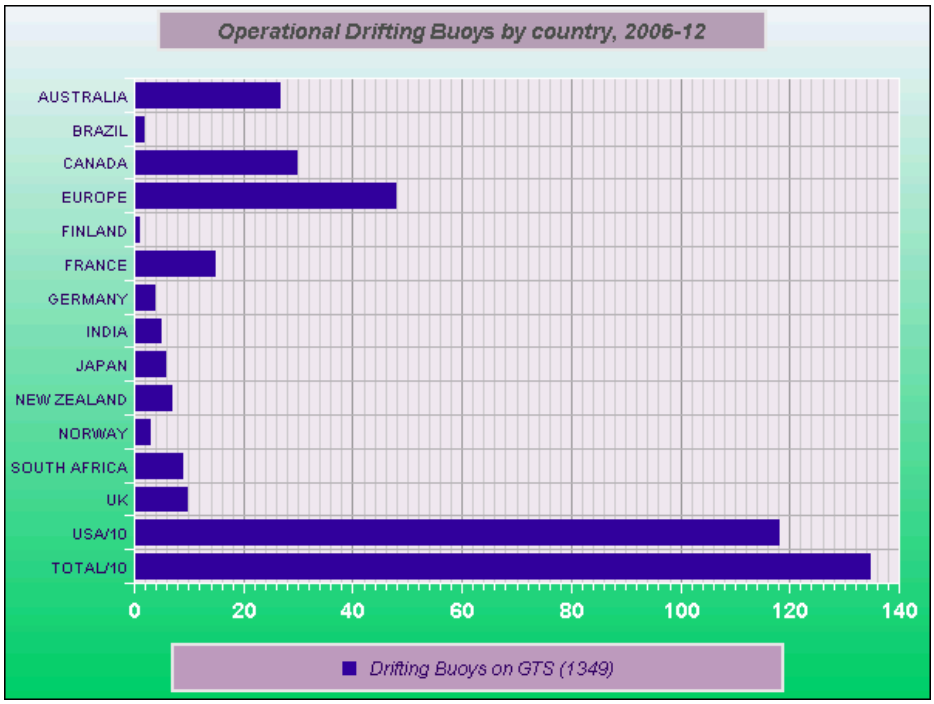


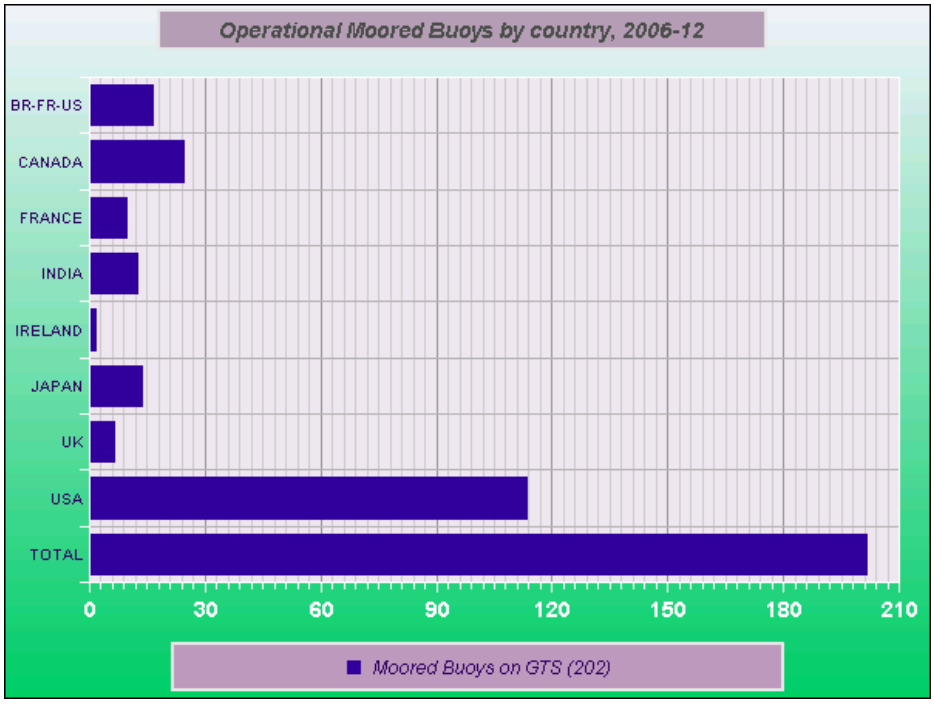
Figure 13

DISTRIBUTION OF GTS AND NON-GTS PLATFORMS BY COUNTRY

Drifting Buoys and those on GTS by country, December 2006

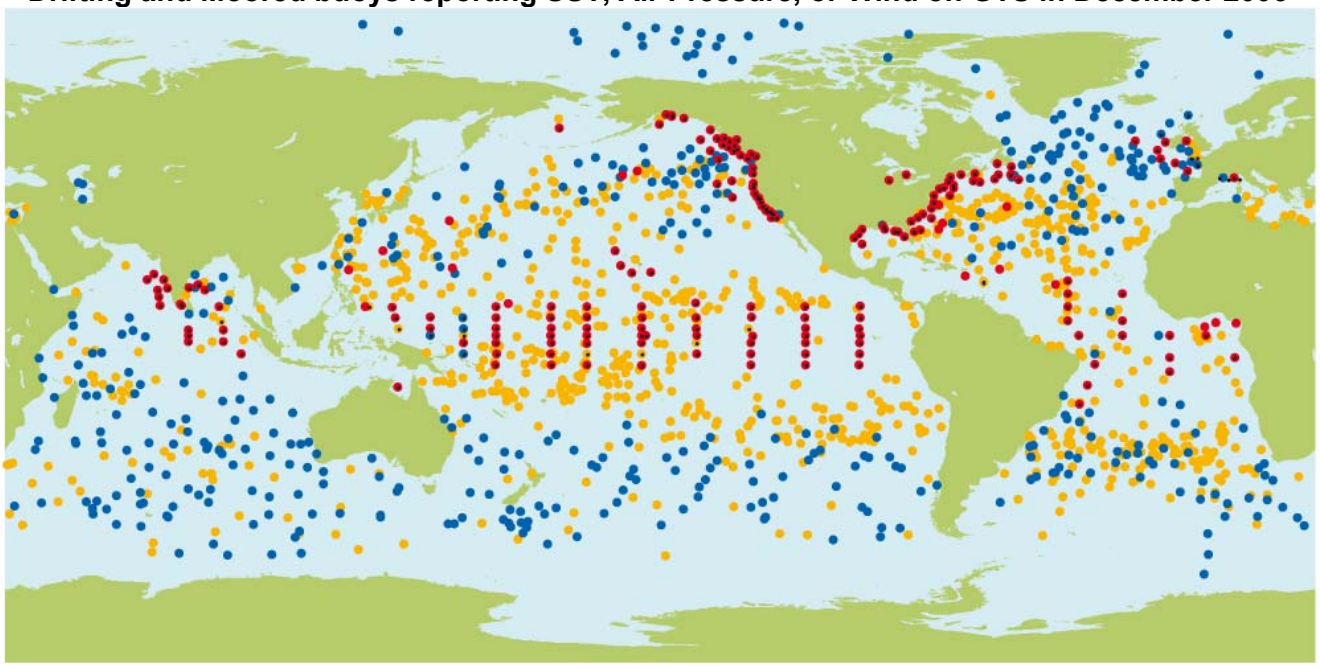


Moored Buoys in the high seas (plus US and Canadian buoys and moorings reporting via Argos) and those on GTS by country, December 2006



MAPS OF DRIFTING BUOY DATA ON GTS BY COUNTRY AND SENSOR

Drifting and Moored buoys reporting SST, Air Pressure, or Wind on GTS in December 2006



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

Air pressure
SST
Wind
Moorings

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

Buoys reporting on GTS in December 2006 by country

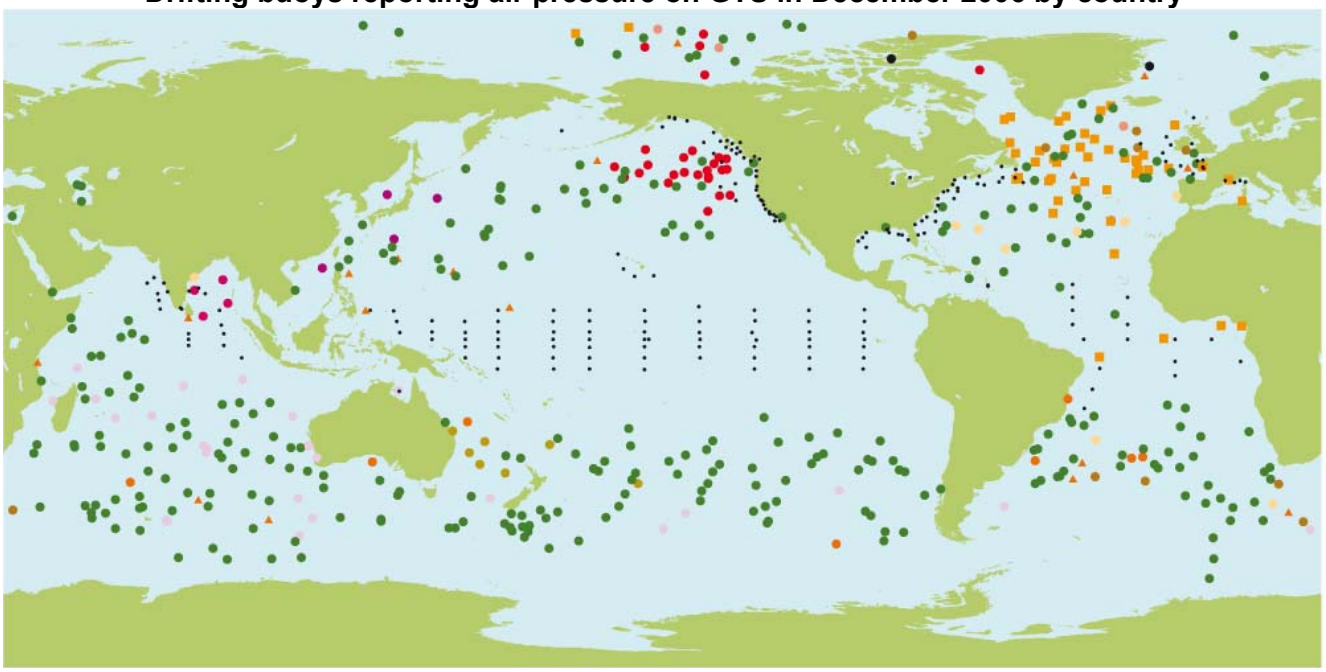
DBCP status by country, December 2006 (data buoys reporting on GTS)

Drifting buoys: 1341 Moored buoys: 203

- AUSTRALIA (27)
- CANADA (29, 25)
- FRANCE (14, 10)
- IRELAND (2)
- NORWAY (3)
- UNITED STATES (1176, 115)
- BRAZIL (2)
- EUROPEAN UNION (48)
- GERMANY (4)
- JAPAN (6, 14)
- SOUTH AFRICA (9)
- MOORINGS
- BRAZIL/FRANCE/USA (17)
- FINLAND (1)
- INDIA (5, 13)
- NEW ZEALAND (7)
- UNITED KINGDOM (10, 7)
- UNKNOWN

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

Drifting buoys reporting air pressure on GTS in December 2006 by country



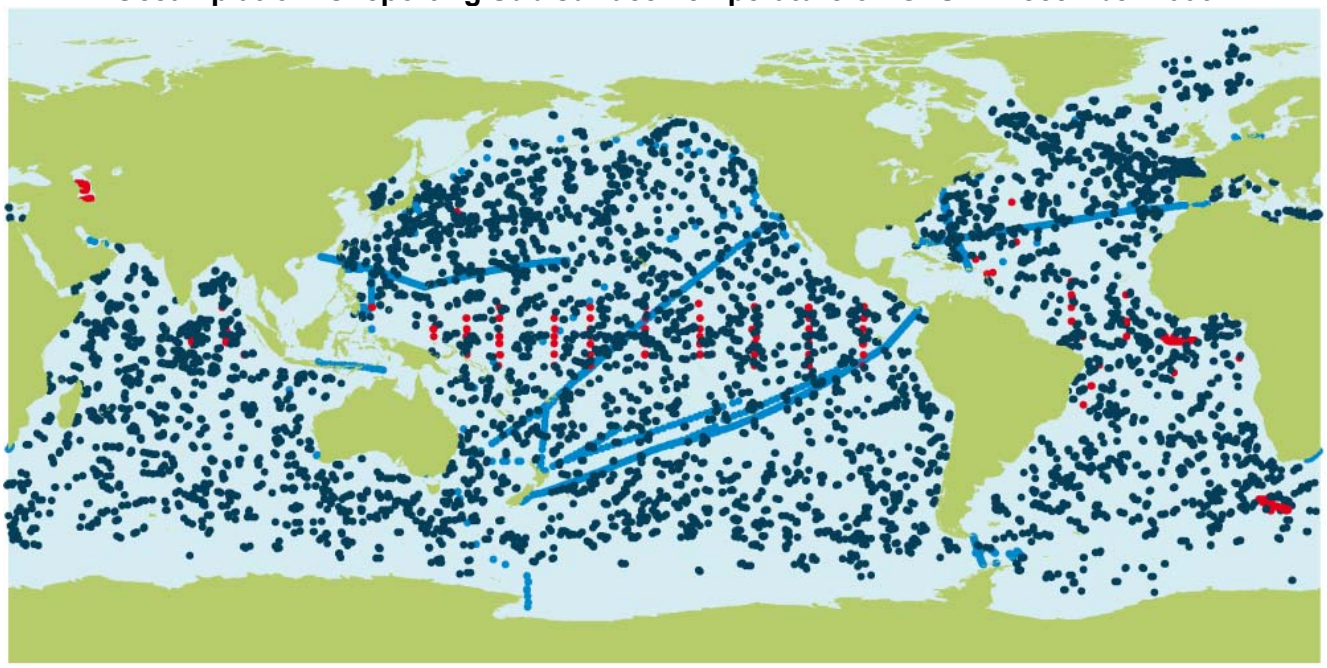
Barometer Drifting Buoy status by country, December 2006 (data buoys reporting on GTS)

Drifting buoys: 428

AUSTRALIA (25)	BRAZIL (2)	CANADA (27)
EUROPEAN UNION (0)	FRANCE (56)	GERMANY (2)
INDIA (5)	JAPAN (4)	NEW ZEALAND (7)
NORWAY (0)	SOUTH AFRICA (8)	UNITED KINGDOM (1)
UNITED STATES (291)	UNKNOWN	

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

Ocean platforms reporting Sub-surface Temperature on GTS in December 2006



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

Total stations: 2581 Total profiles: 27396

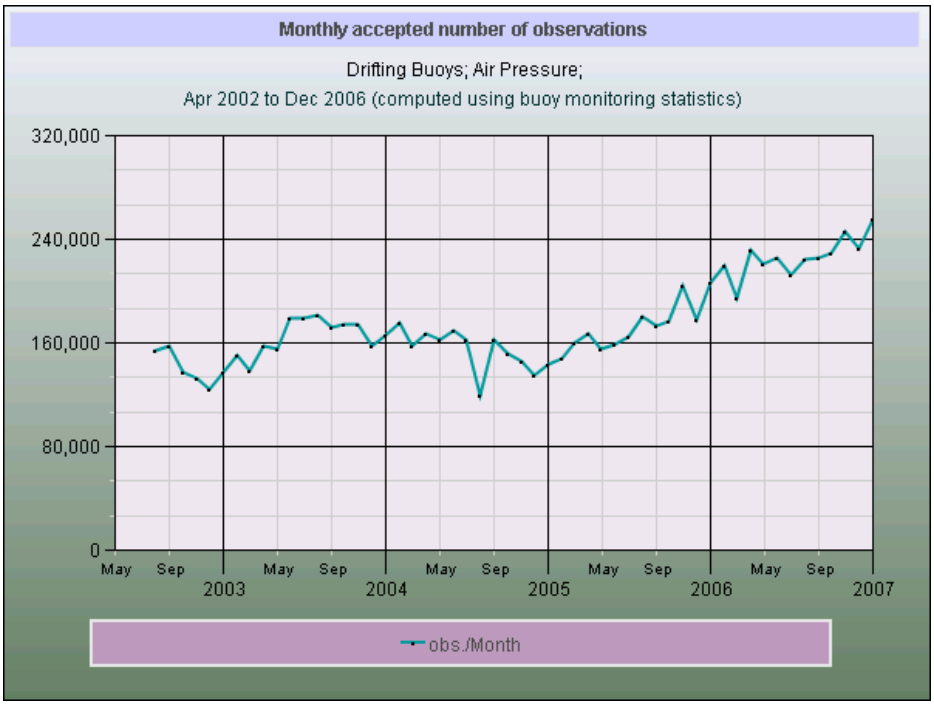
- BATHY (mainly XBTs) (28, 1482)
- TESAC (mainly Argo floats) (2458, 17773)
- BUOY (drifting & moored buoys) (95, 8141)

GTS data received at JCOMMOPS via Météo-France.

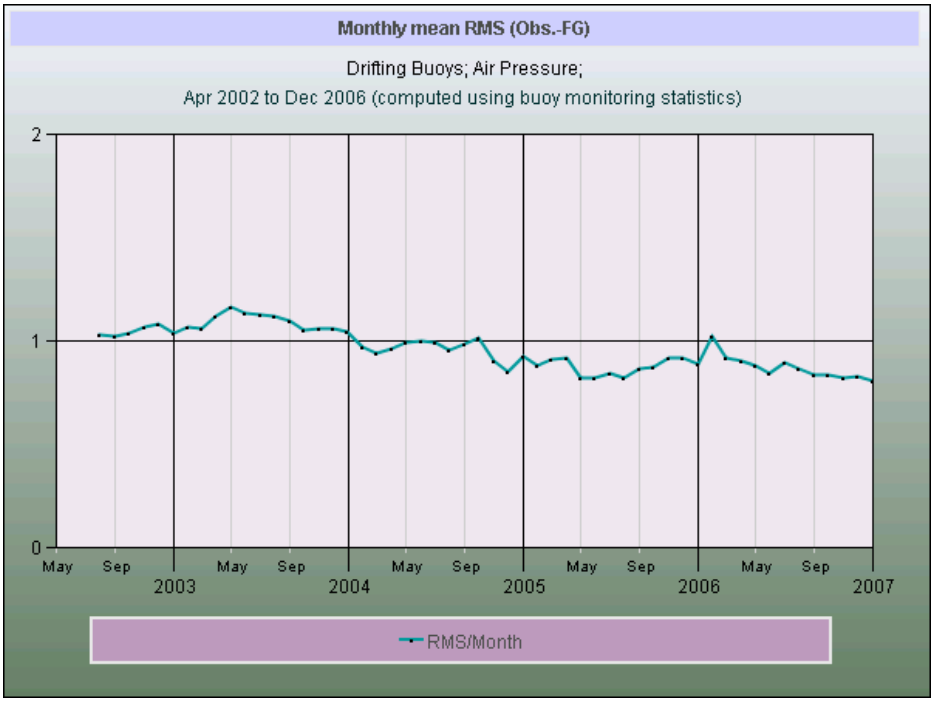
Note: figures in bracket are number of platforms and number of profiles respectively

EVOLUTIONS AND DISTRIBUTIONS OF RMS (OBs-FG) (FROM ECMWF STATISTICS)

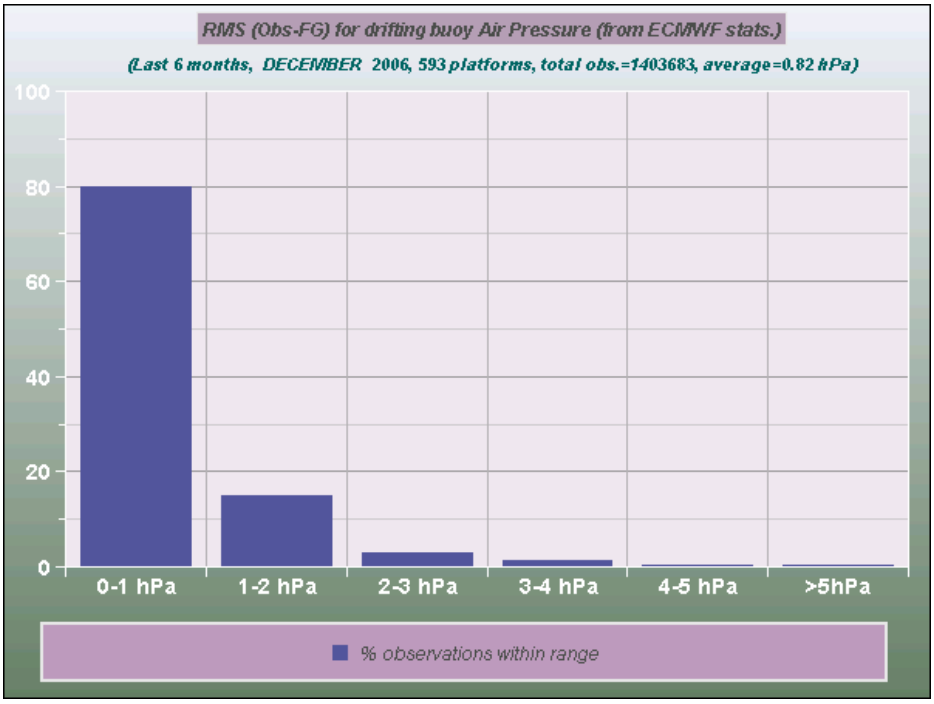
Evolution of number of air pressure observations distributed on GTS per month for the period July 2002 to December 2006 (from ECMWF monitoring statistics)



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



Histogram of distribution of RMS (Obs. - First Guess) for the period 07/2006 to 12/2006.



BUFR Template for buoy data
including directional and non-directional wave data
(as adopted for validation by May 2006 by ET/DRC, Muscat, Oman, 5-8 Dec. 2005)

This Template remains compatible with the BUFR template for buoy data adopted by the CBS Expert Team on data representation and codes at its Arusha meeting, 17-21 February 2003 and which is now being used operationally by Service Argos for GTS distribution of buoy data in BUFR (i.e. descriptors number 1 to 84 in the table below). Compatibility is ensured by just adding new required descriptors at the end of the existing template (descriptors number 85 to 109).

Descriptors used are from BUFR Master table 0, version 11. No local table is being used.

#	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) 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)	

#	Descriptor	Name	Expanded descriptors	Comment, encoding
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 (depth, 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

#	Descriptor	Name	Expanded descriptors	Comment, encoding
				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 deck
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 wind measurement)	007033	Real height of anemometer above average water surface
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

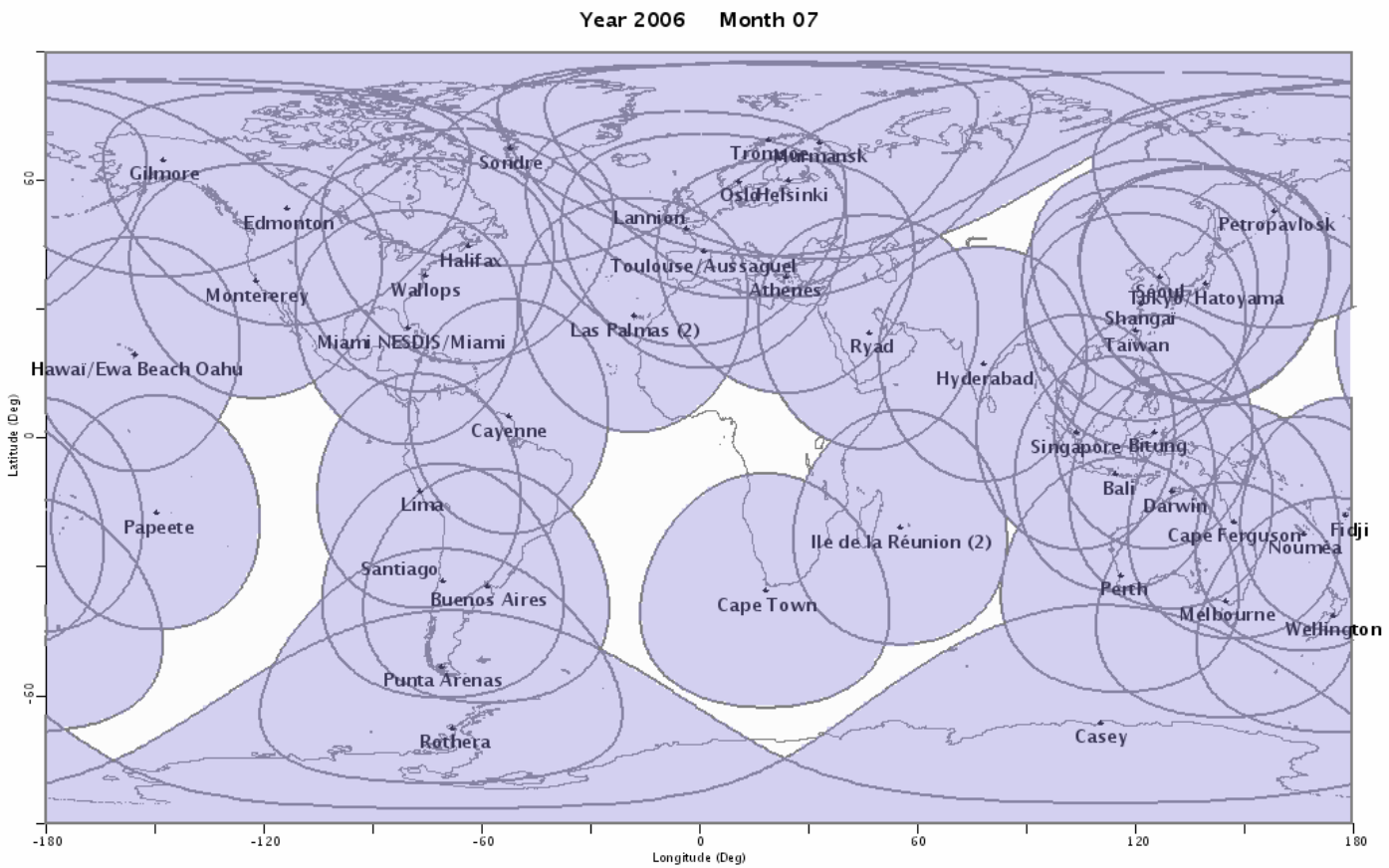
#	Descriptor	Name	Expanded descriptors	Comment, encoding
77	007032	Height of sensor above marine deck platform (set to missing to cancel the previous value)	007032	Value = “missing”
78	008021	Time significance	008021	Value = 3 (accumulated)
79	004024	Time period in hours	004024	Period during which global 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
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

LIST OF REGIONAL RECEIVING STATIONS

	Antenna	Code	Country	Operator	Possible satellites
1	Buenos Aires	BA	Argentina	INTA	**N12, N14, N15, N16, N17,**
2	Cape Ferguson	CP	Australia	NOAA/NESDIS	**, , , N16, N17, N18**
3	Casey	CA	Australia (Antarctica)	BOM	**N12, , N15, N16, N17,**
4	Cayenne	CY	France (Guyana)	IRD	**N12, , N15, N16, N17,**
5	Darwin	DA	Australia	BOM	**N12, , N15, N16, N17,**
6	Gilmore	GC	USA	NOAA/NESDIS	**N12, N14, N15, N16, N17, N18**
7	Halifax	HF	Canada	Can. Coast Guard	**N12, N14, N15, N16, ,**
8	Hatoyama	HA	Japan	NASDA/EOC	**N12, N14, , , N17,**
9	Hawaï	HW	USA	NOAA/NWS	**N12, , N15, N16, N17,**
10	Hyderabad	HY	India	ISRO	**N12, N14, N15, N16, N17,**
11	La Réunion	RN	France (Reunion Island)	Météo France	**, , , , N17, N18**
12	La Réunion	RE	France (Reunion Island)	IRD	**, , N15, , N17, N18**
13	Lannion	WE	France	Météo France	**, , , N16, N17,**
14	Las Palmas	LP	Canary Island	Las Palmas University	**N12, N14, N15, N16, N17,**
15	Melbourne	ME	Australia	BOM	**N12, N14, N15, N16, N17,**
16	Miami	MI	USA	NOAA/AOML	**N12, , N15, N16, N17,**
17	Miami	MA	USA	NOAA/AOML	**, , N15, N16, N17,**
18	Noumea	NO	France (New Caledonia)	IRD	**N12, , N15, , N17,**
19	Oslo	OS	Norway	NMI	**, N14, N15, N16, N17, N18**
20	Oahu	EB	USA (Hawaii)	NOAA	**N12, , N15, N16, N17, N18**
21	Perth	PE	Australia	BOM	**N12, N14, N15, N16, N17,**
22	Punta Arenas	PA	Chile	Meteo Chile	**, , N15, N16, N17,**
23	Riyadh	RY	AU	KACST	**N12, N14, N15, N16, N17,**
24	Rothera	RO	UK (Antarctic)	MetOffice BAS	**N12, N14, N15, N16, N17, N18**
25	Santiago	CH	Chile	Meteo Chile	**N12, , N15 , N16, N17,**
26	Singapore	SG	Singapore	SMM	**N12, , N15 , N16, N17,**
27	Tahiti	TA	France (Tahiti)	Météo France	**N12, , N15, N16, N17, N18**
28	Tromsoe	ST	Norway	KSAT	**, , N15, N16, N17,**
29	Wallops	WI	USA	NOAA/NESDIS	**N12, N14, N15, N16, N17, N18**
30	Wellington	NZ	New Zealand	Met Office	**, N14, N15, N16, N17,**
31	Athenes	AT	Greece	NCMR	**N12, N14, N15, N16, N17, N18**
32	Aussaguel	AU	France	CLS	**N12, N14, N15, N16, N17, N18**
33	Bali	BL	Indonesia	PT CLS	**N12, N14, N15, N16, N17, N18**
34	Bitung	BI	Indonesia	PT CLS	**N12, N14, N15, N16, N17, N18**
35	Cape Town	SA	South Africa	CLS/SAWB	**N12, N14, N15, N16, N17, N18**
36	Helsinki	HL	Finland	CLS	**N12, N14, N15, N16, N17, N18**
37	Las Palmas	CN	Canary Island	CLS	**N12, N14, N15, N16, N17, N18**
38	Lima	PR	Peru	CLS Perù	**N12, N14, N15, N16, N17, N18**
39	Lima	LM	Peru	CLS Perù	**N12, N14, N15, N16, N17, N18**
40	Murmansk	RU	Russia	Complex System	**N12, N14, N15, N16, N17, N18**
41	Petropavlosk	PT	Russia	Rybradiov	**N12, N14, N15, N16, N17, N18**
42	Tokyo	JM	Japan	Jamstec	**N12, N14, N15, N16, N17, N18**
43	Edmonton	ED	Canada	Envir. Canada	**N12, , N15, N16, N17,**
44	Fiji	FI	Fidji	FMS	**, N14, N15, N16, N17,**
45	Monterey	MO	USA	NESDIS/NWS	**, , , N16, N17,**
46	Seoul	SE	Korea	KMA	**N12, , N15, N16, N17, N18**
47	Shanghai	SH	China	ECSFRI	**N12, , N15, N16, N17,**
48	Sondre	GR	Greenland	DMI	**, , N15, N16, N17,**
49	Taiwan	TW	Taiwan	NTOU	**N12, , N15, N16, N17,**

	Antennas under agreement
	CLS and subsidiaries antennas
	Customer antennas under CLS maintenance contract
	Antennas without written agreement ("Best effort")

ARGOS RECEIVING STATION NETWORK



DBCP NATIONAL FOCAL POINTS

(last updated 17 November 2006)

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FINANCIAL STATEMENTS

1) IOC STATEMENT

193-GLO 2001

INTERGOVERNMENTAL OCEANOGRAPHIC COMMISSION

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

(Statement of Account from 1 January 2006 to 31 December 2006)

(Expressed in US Dollars)

Balance Brought Forward as at 1 January 2006:		184,478.83	
Funds Received from:		-	184,478.83
Deduct:			
Disbursements			
Salary of Mr Charpentier:	1/1/2006	11,979.06	
Salary of Ms Hester Victa:	8/2006-12/2006	41,793.65	53,772.71
Recruitment costs of Ms Hester Victa			1,970.20
Missions :	Mr Charpentier		
	USA - 12/12/2005 to 16/12/2005	2,877.11	
	Ms Hester Victa		
	Toulouse - July 2006	1,266.54	4,143.65
Sub-contract :			
	'Collecte Localisation Satellites' - paid in November 2006		890.56
Cash balance as at 31 December 2006			124,292.69
Unliquidated Obligations at Year-end 2006			11,847.07
Funds Available as at 31 December 2006			112,445.62

2) WMO STATEMENT

DATA BUOY CO-OPERATION PANEL

Statement of income and expenditure
For the period 1 January to 31 December 2006
Amounts in United States dollars

1. Balance brought forward , 1 Jan 2006		25,621	
1.1 Adjustment to Surplus - 2004-2005 Support Costs		(3,460)	
1.2 Adjusted beginning balance			22,161
2. Income:			
2.1 Contributions received (please see below for details)			126,188
3. Total available funds during reporting period			148,349
4. Expenditure			
4.1 Direct project costs			
4.1.1 Individual contractors		12,090	
4.1.2 Travel - Other Representatives ad hoc travel		21,988	
4.1.3 Ad hoc travel of staff to attend non WMO mtgs		2,019	
4.1.4 Other Contributions		6,518	
4.1.5 Total direct costs		42,615	
4.2 Indirect project costs			
4.2.1 Support costs at 3%		1,278	
4.2.2 Bank charges		121	
4.2.3 Exchange differences		(8,928)	
4.2.4 Rounding differences		(87)	
4.2.5 Total indirect costs		(7,616)	
4.3 Total project expenditure			34,999
5. Balance of fund at 31 December 2006			**113,360**

Contributions	2006	2007	Total
Australia	16,200	-	16,200
Canada	20,000	-	20,000
CLS Argos	-	15,000	15,000
France	47,393		47,393
Germany	6,000	5,000	11,000
India	3,000	-	3,000
New Zealand	2,400	2,400	4,800
South Africa	4,500	-	4,500
United Kingdom	4,295	-	4,295
	103,788	22,400	126,188

Certified correct:

Luckson Ngwira
Chief, Finance Division
28-Mar-07

3) DBCP TRUST FUND INCOME AND EXPENDITURE IN USD

Frank Grooters based on the WMO and IOC Finance Information as at 31 Dec. 2006 has produced this statement.

Final Statement with new budget line items DBCP-22 (20 October 2006) for 2006
DBCP Trust Fund: Income and Expenditure (based on WMO and IOC Finance Information as at

DBCP	1 Jan2004 - 31 Dec 2005 WMO	IOC			Final Jan-Dec 2006 WMO	IOC
Receipts						
Brought Forward	125,361	38,145			22,161	184,479
Contributions (listed below)	246,481	502,075			103,788	0
Adjustment					9,015	
Total Receipts	**371,842**	**540,220**			**134,964**	**184,479**
Expenditure/Oblig'ns						
Consultancy (JTA Chair)	20,903				12,090	
Tech Coordination		281,734				55,152
JCOMMOPS logistic supp		37,331				890
IOC	286,600					
Marine Programme	12,000					
Unliquidated Obligations						11,847
Travel/Missions						
Tech Coordinator		36,676				4,144
DBCP Chairman	4,342				21,988	
NON-DBCP	12,650				2,019	
Bank Charges/SuppCost	3,659				1,399	
Projects & Activities						
Outreach and Publications						
JCOMMOPS Data Devt	6,527				6,518	
Contingency						
JCOMMOPS IS migration						
Supp. DBCP Mtgs/WSs	3,000					
New Technical Evaluation						
Capacity Building						
Collaborative Arrangement						
Total Expenditure	**349,681**	**355,741**			**44,014**	**72,033**
Balance of Fund	**22,161**	**184,479**			**90,950**	**112,446**
Contributions						
Argos Inc		1,000				
Australia *	31,375				16,200	
Canada *	25,000	1,000			20,000	
CLS	10,000					
E-SURFMAR					47,393	
France(incl E-SURFMAR)	110,379	1,000				
Germany *	10,000				6,000	
Greece	2,200					
Iceland	2,250					
India *	3,000				3,000	
Ireland	1,517					
Japan *	12,000					
Netherlands	1,970					
New Zealand *	4,395				2,400	
Norway	395					
South Africa *	7,500				4,500	
United Kingdom		975			4,295	
United States of America *	24,500	207,500				0
WMO		290,600				0
Total	**246,481**	**502,075**	**0**	**0**	**103,788**	**0**

* incl. 2005 contribution E=Estimate

Notes:

(1) The difference of $22400 between the WMO balance at 31 December 2006 indicated in the table above ($90950) and the one indicated in the WMO statement ($113350) is explained by the $22400 contribution actually received by WMO in 2007.

(2) No income from CLS on 2006 as payment was made in 2007.

(3) Positive adjustments (income) in WMO accounts for exchange/rounding differences.

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